Beneficiary: Temple University (Dr. Yuzhou Chen)

Visualizing Support

Using Knowledge Graphs and Data visualization to aid people experiencing homelessness

DreamKG

Team 45

Dream-KG | The Team

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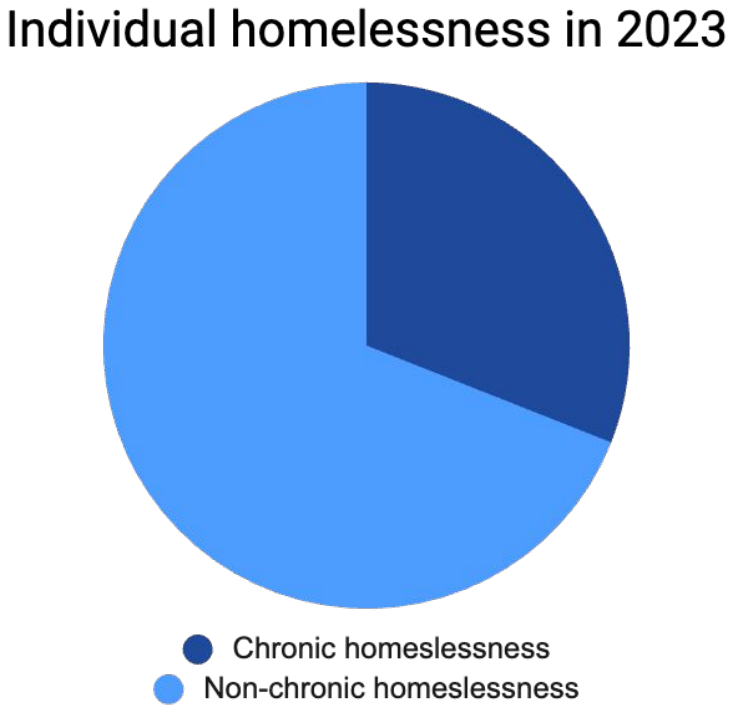
Homeless service resources are subject to frequent changes due to several factors. These unpredictable changes in homeless resources create challenges in the provision of the Continuum of Care for **People Experiencing Homelessness (PEH).**



Dream-KG | The Challenge

EXHIBIT 6.1: **PIT Estimates of Individuals Experiencing Chronic Patterns of Homelessness**
By Sheltered Status, 2007-2023

The 2023 Annual Homelessness Assessment Report (AHAR to Congress) Part 1: Point-In-Time Estimates of Homelessness, December 2023

$38B opportunity in the workforce [1] [2]

80% experience mental health issues [4] [5]

$50B cost of living [1] [3]

Services required [6]

(1) Mental health

(2) Shelter

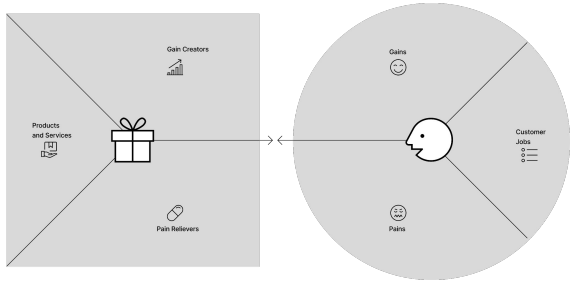
(3) Incarceration

[1] 650k uncared for persons
[2] $60,000 median wage
[3] $77,000 cost of living
[4] Period with serious mental health condition
[5] At least one mental health condition
[6] Service units

Dream-KG | The Stakeholders

The success of the Homelessness Navigator project depends on the collaboration of various stakeholders. Additionally, community members can raise awareness and offer local insights. Together, these stakeholders will help create a comprehensive resource empowering individuals experiencing homelessness to access essential services.

- PEH whose insights shaping the data into a knowledge graph.
- Case workers whose services are made more effective by the knowledge graph.
- Government agencies like The U.S. Department of Housing and Urban Development (HUD) can lend legitimate resources, while local governments implement and optimize.
  - Law enforcement agents
  - Non-profit organizations
  - Federal agencies



Dream-KG | The Solution

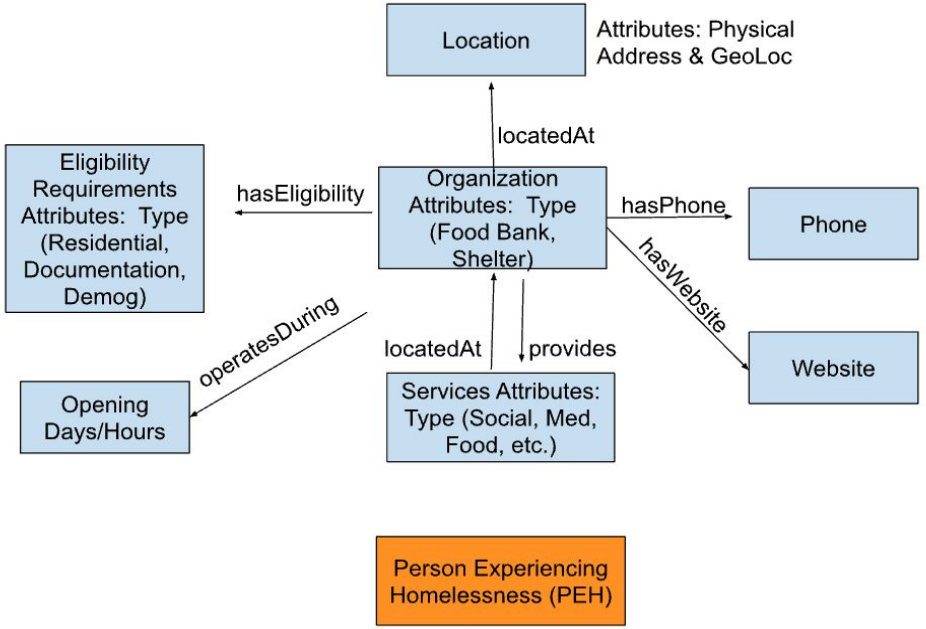
The Homelessness navigator project aims to create a foundational knowledge graph that connects people experiencing homelessness (PEH) with essential services such as shelter, food banks, and social services. By leveraging foundational knowledge graph techniques, the project seeks to facilitate easy access to information, enabling users to find the resources they need quickly and efficiently.

- California food banks n = 1,853
- British Columbia food banks n = 101
- New York shelters n = 9
- Pennsylvania shelters n = 208

All taxonomies: Name, Location, Phone, Web Link, Opening Hours, Services, Latitude, Longitude, Service name, Program of facility, Organization, Category, Recommended for, Requirements, Phone, Facility name, Keywords, Contact phone, Website

Dream-KG | Knowledge Graph: Ontology

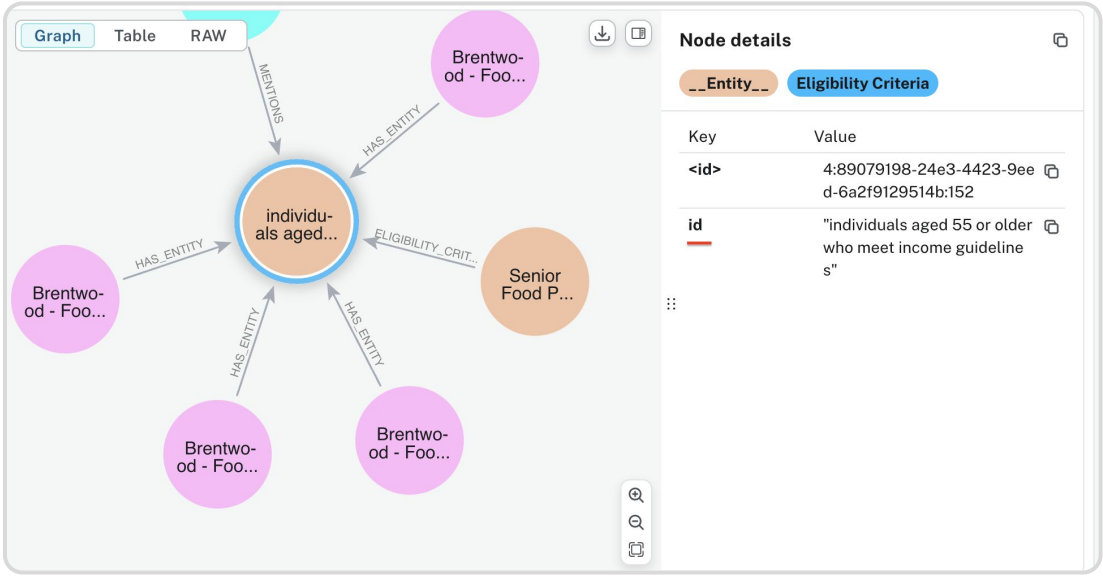
Process: Viewing the columns in information within all 3 files to create a taxonomy then an ontology.



Dream-KG | Knowledge Graph: V1 LLM approach

- Create Text Document
- Read in Custom Ontology
- Connect to OpenAI
- Generate Cypher Code
- Pre-Process Cypher Code*
- Create Knowledge Graph

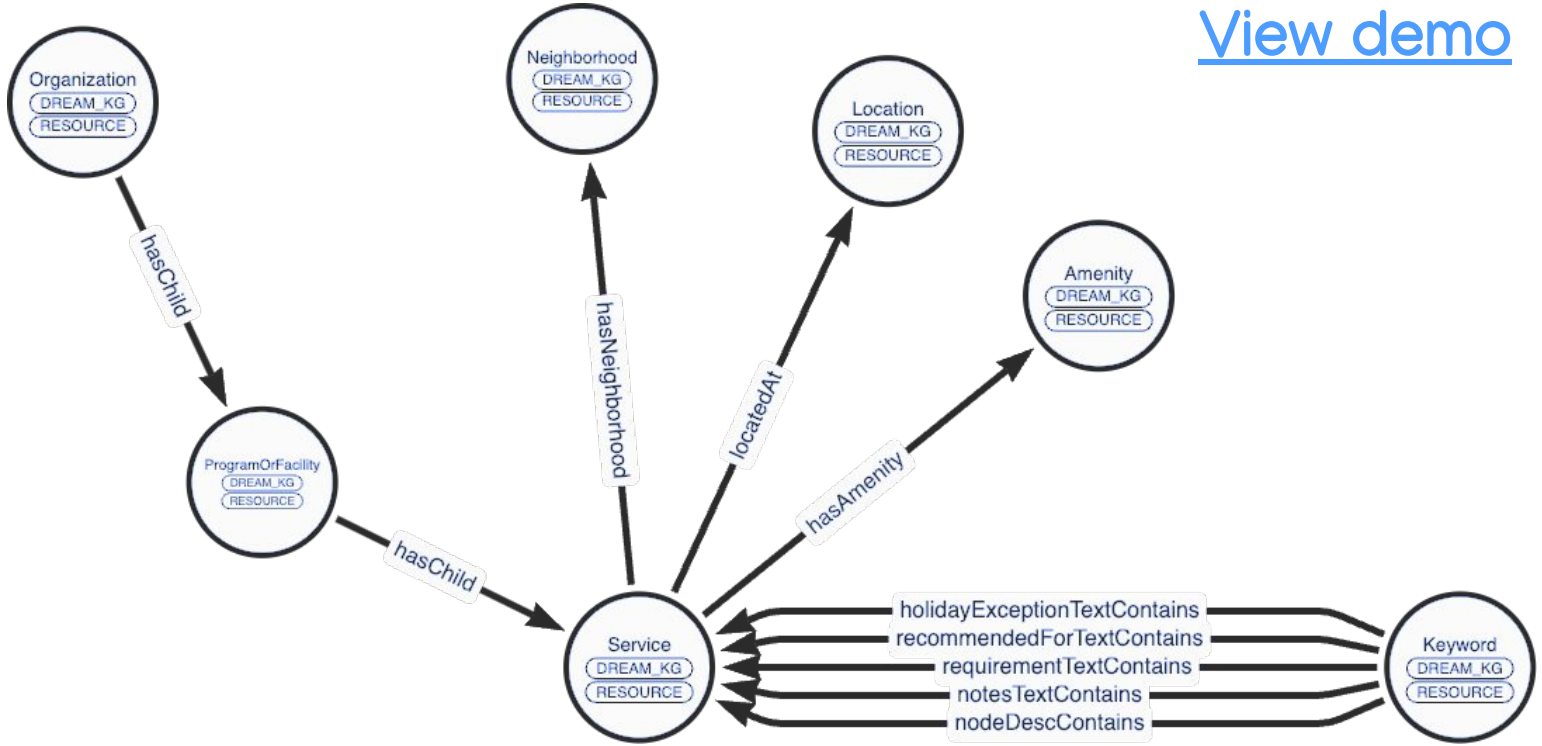
View demo



* Manual post-processing was done but automatic tasks would be ideal here

Dream-KG | Knowledge Graph: V2 Model

[View demo]



Dream-KG | User Experience

Goals: To help People Experiencing Homelessness (PEH) find resources near them, so that they can improve their quality of life.

Target users:

- People experiencing homelessness with access to a smartphone with working internet.
- English speakers (initially)

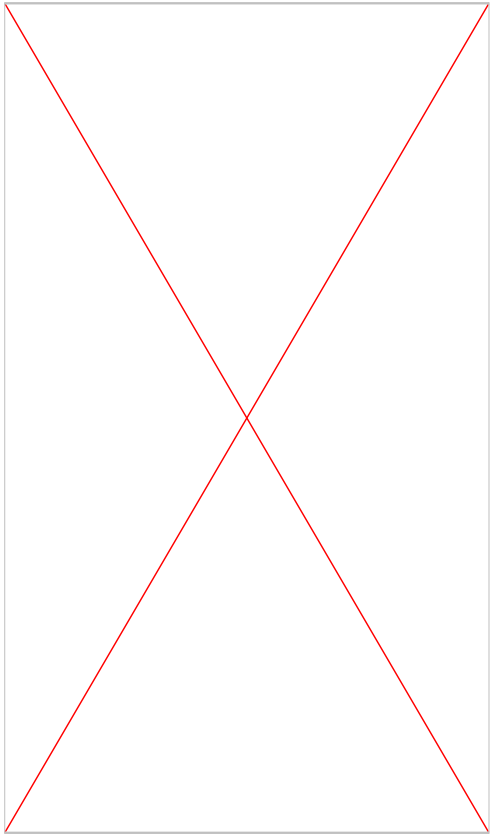
Features:

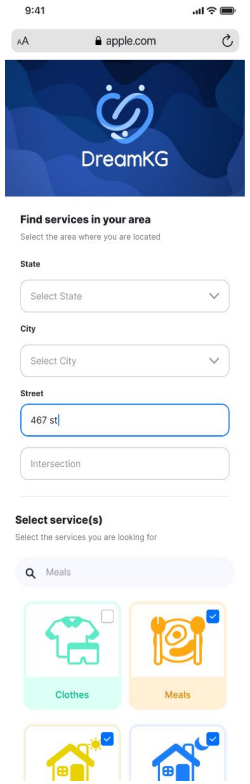
- Find services for PEHs based on their location or distance from specific street
- Provide information about self-care services available in their areas

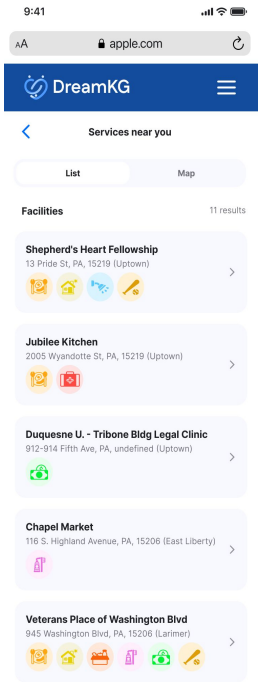
Design considerations:

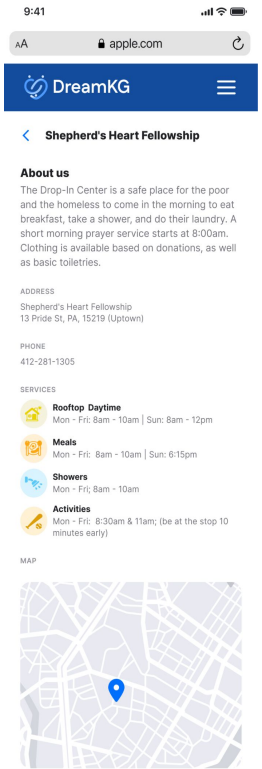
- Minimal and intuitive flow
- Easy to understand imagery/iconography
- Use of simple language

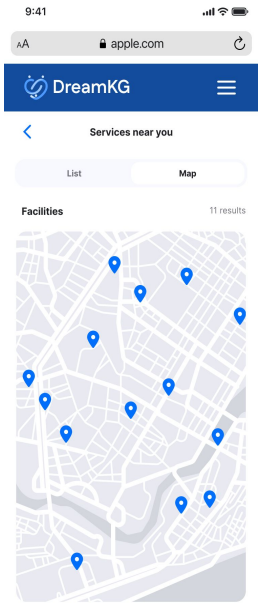
Dream-KG | User Interface: Service locator (Design proposal and prototype)

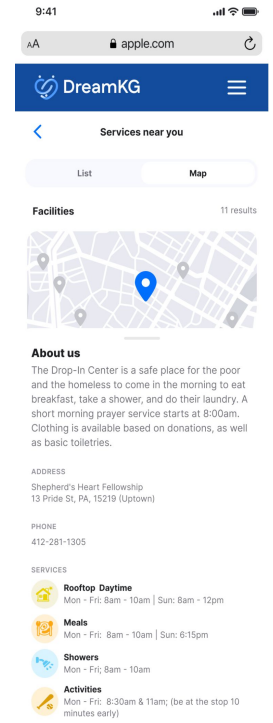












Dream-KG | User Interface: Service locator (Web implementation)

[View demo]

Dream-KG | Conclusion

- Although an LLM can take a custom ontology and generate Cypher code needed for a Knowledge Graph, automatic post-processing is necessary.
- A manual knowledge graph approach can include more granularity and supervised NER techniques; however, it may require more pre and post processing of the data.
- A simplified service search process is presented, optimized for users with low literacy levels. The final user interface needs to be connected to the KG model.

Dream-KG | Future steps

- Our Knowledge Graph and Service Locator Tool was purely focused on People Experiencing Homelessness (PEH) we would like to expand it to government stakeholders as well.
- Non-LLM Approach, a schedule filter sub-hierarchy would be designed and implemented.
- Optimize the prototype for mobile use, and implement the visual design to improve usability.
- Implement voice description to different elements of the tool to enhance accessibility.
- Design a network of case workers with credentials and contact of service providers.

Thank you

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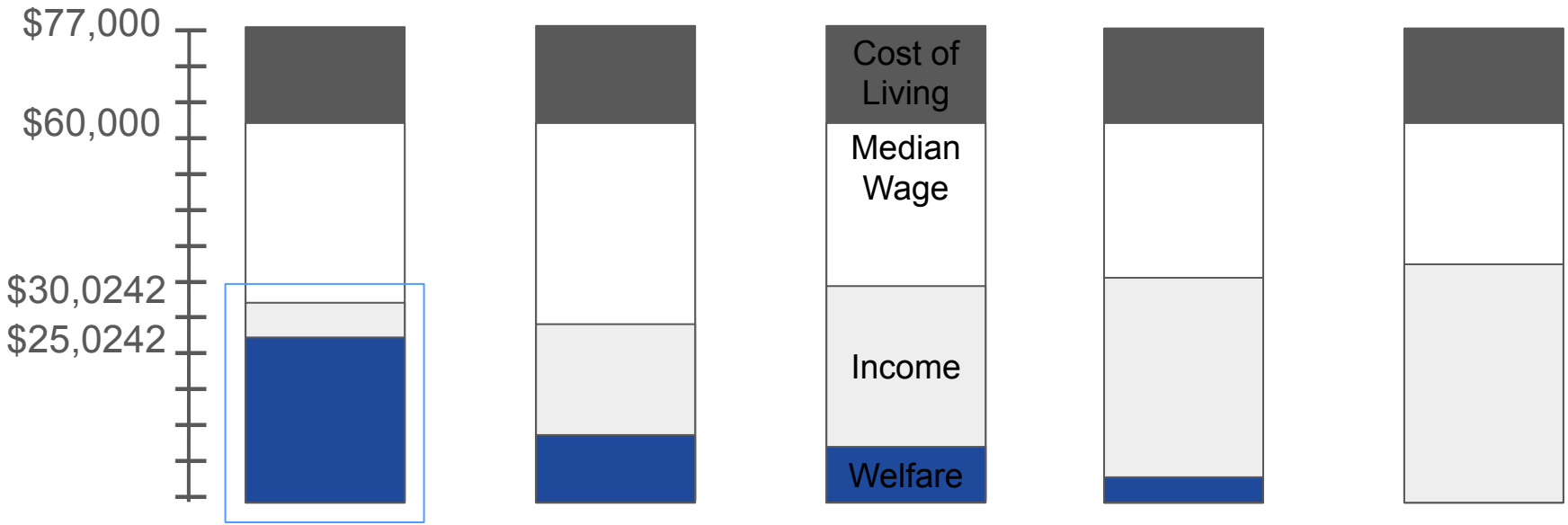
APPENDIX

More Benefits



Welfare is from the following federal government programs:

1. SNAP Benefits: fns.usda.gov/snap/allotment/cola
2. Federal Poverty Level (FPL): aspe.hhs.gov/poverty-guidelines
3. Medicaid: medicaid.gov/medicaid/eligibility
4. Section 8: hud.gov/topics/housing_choice_voucher_program_section_8
5. EITC: irs.gov/credits-deductions/individuals/earned-income-tax-credit-eitc

Pretotype

Beacon Light Mission [edit source]

Beacon Light Mission is a charitable organization located in Wilmington, California, United States, dedicated to providing meals, shelter, and resources to individuals experiencing homelessness. [edit source]

Services and Programs [edit source]

Core Services [edit source]

- Meal provision (27,732 meals per year)
- Shelter (11,880 bed assignments per year)
- Shower and hygiene services (14,436 showers per year)
- Clothing distribution
- Case management
- Social workers

Operational Details [edit source]

- Shower days: Tuesday and Thursday
- Meal time: 7:30-8:00
- Preaching
- Waiting
- Singing
- Office work
- Cleaning

Contact Information [edit source]

- Address: 525 Broad Avenue, Wilmington, CA 90744
- Phone: (310) 830-7063 | (310) 518-3667
- Website: https://beaconlightmission.org/
- Facebook: @BeaconLightMission

Organizational Structure [edit source]

- Affiliation: Citygate Network
- Executive: Mr. Lemp (until October 2024)
- Type: Nonprofit charitable organization
- Classification: Christian interdenominational chapel

Volunteer and Community Engagement [edit source]

Volunteers participate in various activities including:

- Cooking
- Preaching
- Waiting
- Singing
- Office work
- Cleaning

History [edit source]

- Founded in 1914 by Curtis D. Wilbur
- Located in Wilmington, Los Angeles County, California

Identifiers [edit source]

- EIN (Employer Identification Number):

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95-1661697
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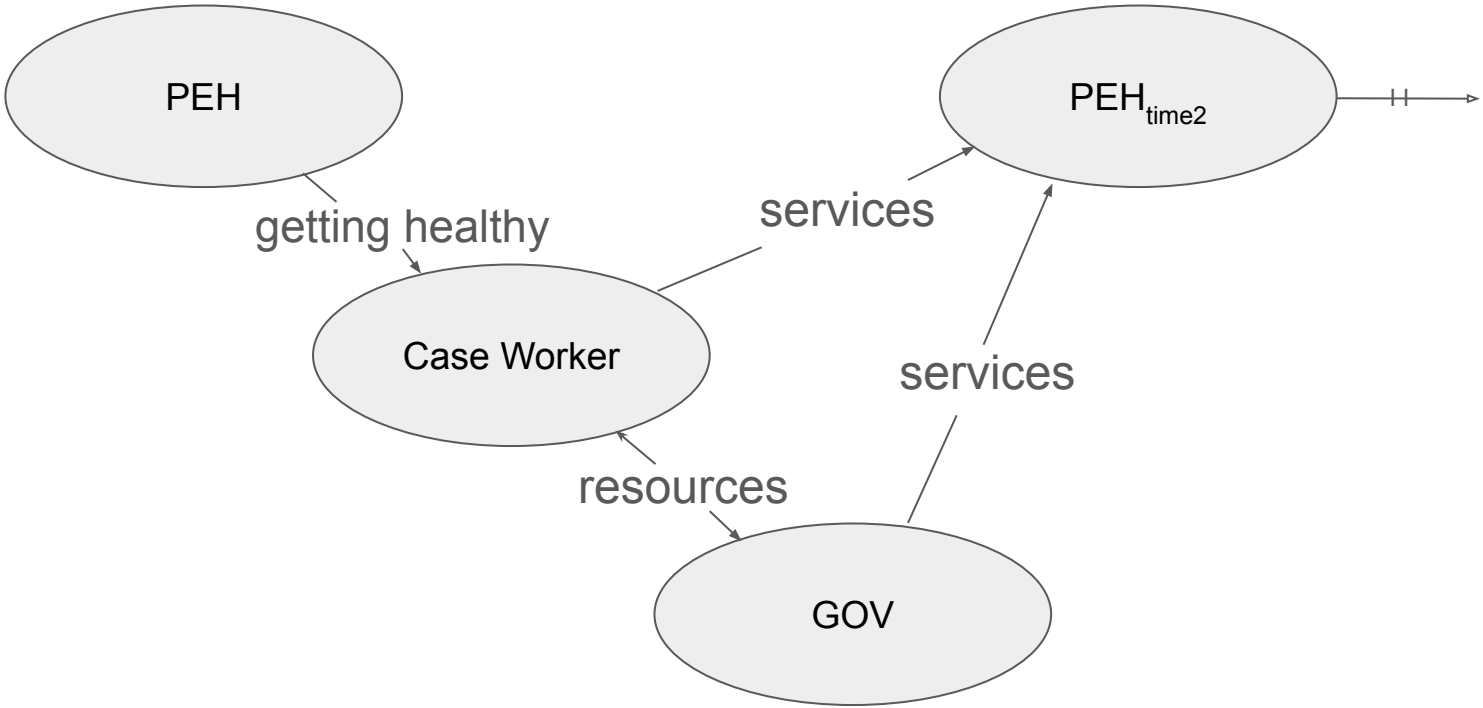
References [edit source]

https://www.wikidata.org/wiki/Q131158873

https://github.com/aspratle/Knowledge-Graph-and-UX-UI-Design-for-Homelessness/blob/main/use_case

Stakeholder Workflow



Suggestions for NOW

Federal Register :: 60-Day Notice of Proposed Information Collection: Data Collection and Reporting for HUD's Homeless Assistance Programs-Annual Performance Report and System Performance Report; OMB Control No.: 2506-0145

- ➔ Information on each credential hour would improve quality
- ➔ Apply our Chat capability for Stakeholder's to query HMIS to improve clarity
- ➔ Advanced AI safety check for homeless users improves utility

DATA

Features

- Facility Name
- Services
- Location
- Eligibility

Unknowns

- Recency of Data
- Facility funding
- Facility Capacity

Limitations

- Services and Eligibility can be in Structured or Unstructured Text Form
- Static Limited Data