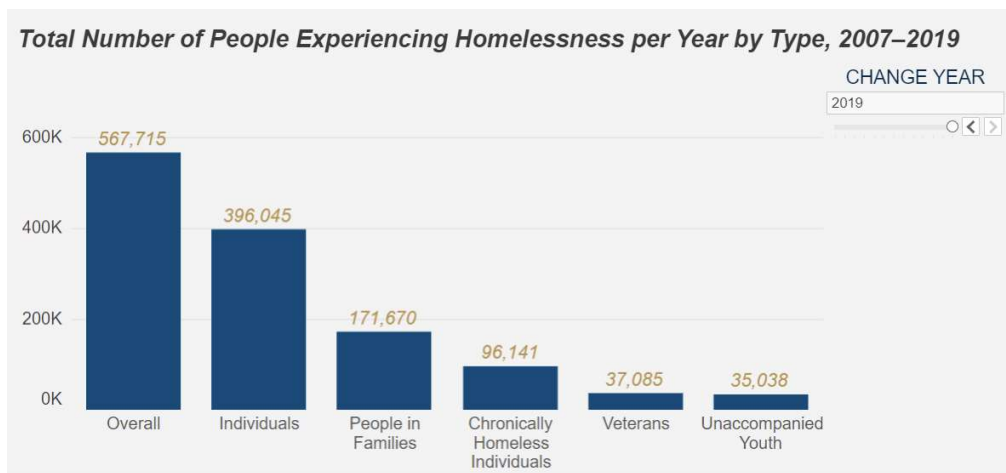


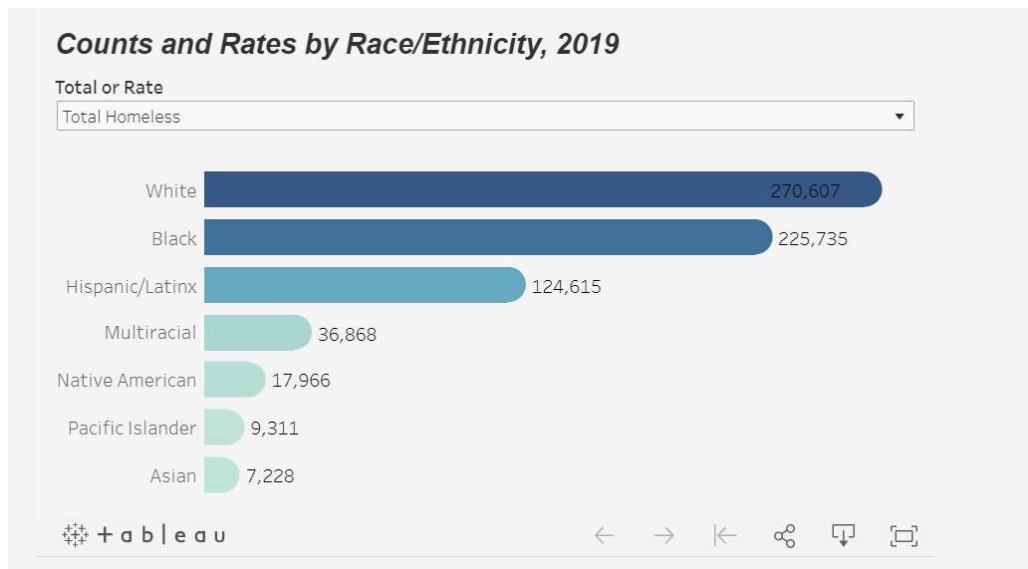
Case Briefing on Homelessness: 2021 Super Analytics Challenge

Background of Homelessness in America

According to the [National Alliance to End Homelessness](#) (“NAEH”), seventeen out of every 10,000 people in the United States were experiencing homelessness on a single night in January 2019 during HUD’s Annual Point-in-Time Count. These 567,715 people represent a cross-section of America, and this number may underrepresent the true prevalence of homelessness. The Annual Point-in-Time Count reported to HUD only includes people who are staying in homeless shelters or those who are found outside or in places not meant for human habitation. In addition, this number does not include the ‘hidden homeless,’ or those people who are ‘couch surfing’, meaning to temporarily stay with family or friends. In terms of context, there are a number of people who might be considered as experiencing homelessness but are not counted within this estimate. Of the reported population, they are associated with every region of the country, family status, gender category, and racial/ethnic group. The following chart from the NAEH provides a breakdown of who these people are:



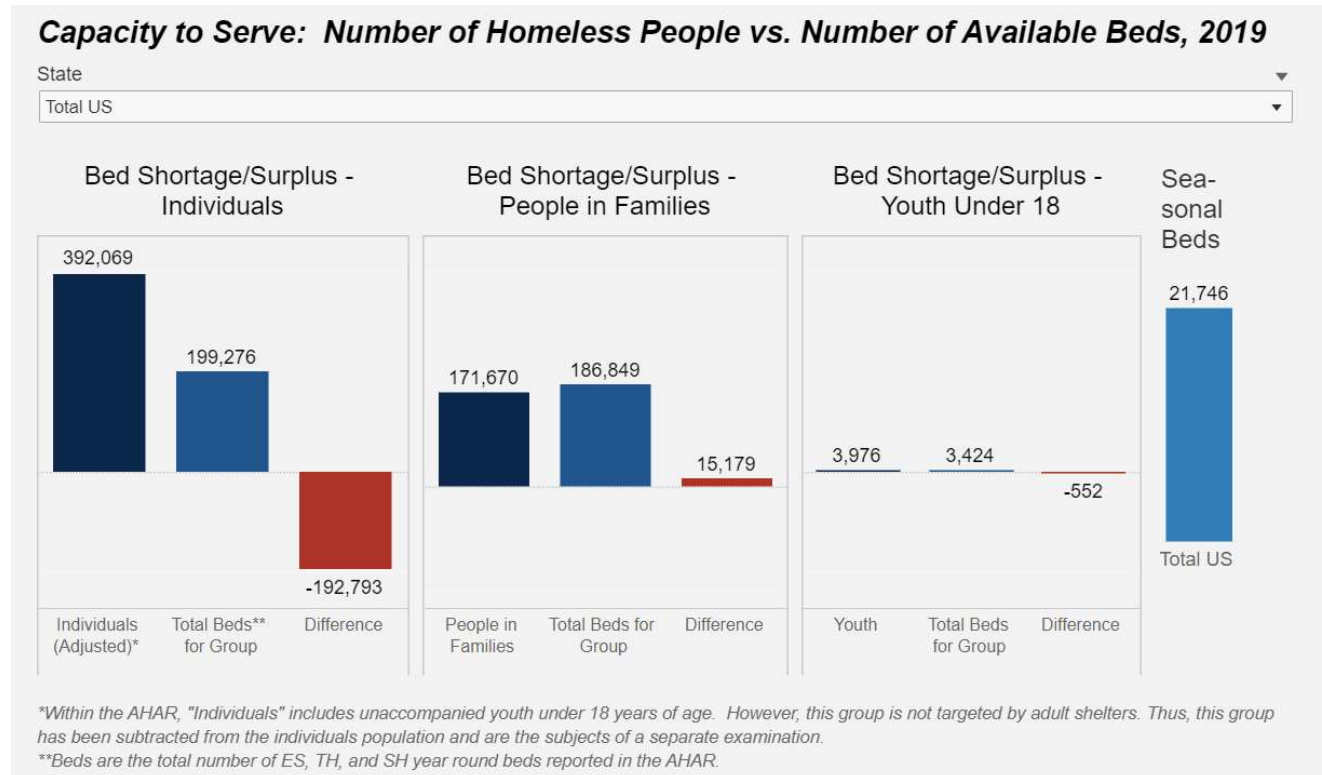
Sadly, 37% of these people are unsheltered according to NAEH and it reports the following breakdown by race and ethnicity:



Case Briefing on Homelessness: 2021 Super Analytics Challenge

[NAEH indicates](#) that, “compared to the previous year, homelessness increased by three percent in the 2019 Point-in-Time Count. This marked the third straight year of national-level increases. Despite this recent increase, the long-term trend has been downward. Overall homelessness has decreased by 12 percent since 2007, the year nation-wide data collection began. The current COVID-19 crisis has the potential to diminish or completely wipe out these modest gains.”

Temporary Housing is a primary service that communities provide to homeless populations; however, as seen in the following chart from NAEH, the supply does not meet the demand:



As outlined in a [Pittsburgh Post-Gazette article](#), “During the winter months, some communities temporarily supplement these year-round beds with seasonal ones. Nevertheless, many people are unsheltered, living on the streets, in abandoned buildings, or other locations not suitable for human habitation. Being unsheltered is mostly a challenge for individual adults, but some families with children are also in these living situations. Nationally, the most common type of homeless assistance is permanent supportive housing (PSH).”

Homelessness in Allegheny County

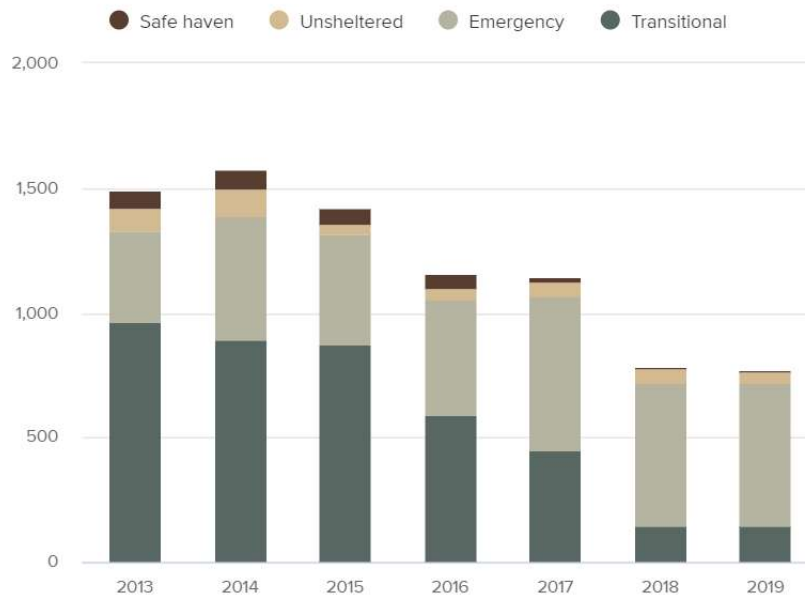
On 2018’s Count Night, Pennsylvania had 13,109 total people experiencing homelessness. It’s important to note that this count represents a single night, and the number of people experiencing homelessness can vary day-to-day. According to the [Pittsburgh Post-Gazette](#), this homeless count represented the eighth highest state population in the nation and more than 600 of those individuals were in Allegheny County. The January 2019 Point-in-Time (PIT) count of homeless people remained fairly stable as compared to 2018.

Case Briefing on Homelessness: 2021 Super Analytics Challenge

[According to](#) the Allegheny County Department of Human Sources (“ACDHS”), “the January 2020 PIT homeless count showed that 887 people were found to be experiencing homelessness, which is 113 more people than in 2019. More people were found to be residing in locations not meant for habitation (also known as street homeless) when compared to previous PIT counts. There were more families with children served in 2020 than in 2019, and the size of these families was also slightly larger (an average of 3.5 people per family in 2020 compared to 3.3 in 2019). There was an increase in the number of households without children (i.e., those not in a family unit), from 535 in 2019 to 617 in 2020.” These are large percentage increases in a short amount of time.

The 2020 increase in homeless people is a significant change from the downward trend that Allegheny County has experienced from 2014 through 2019 as shown in the following chart created by the ACDHS. Data trends can be reviewed at this [dashboard](#), which includes the years of PIT Count Data in Allegheny County. In addition, there is also a [data brief](#) for the 2020 PIT count.

HOMELESSNESS IN ALLEGHENY COUNTY BY HOUSING TYPE, 2013-19



Unsheltered: residing in places not meant for human habitation, such as outside, in a tent, in a car, under a bridge, etc.

Emergency: residing in a short-term emergency homeless shelter.

Transitional: residing in transitional housing, where people can stay up to two years.

Safe Haven: a type of low-barrier shelter.

Source: Allegheny County DHS | Graphic: Chance Brinkman-Sull/Post-Gazette

Allegheny County has a [number of departments battling the homeless issue](#): “The ACDHS and the Office of Community Services (OCS) is committed to reducing housing insecurity in Allegheny County. Through the Allegheny Link, individuals and families who are homeless or at risk of becoming homeless can find specialists to direct them to safe alternatives. The OCS Housing Navigator Unit works with area landlords and service providers to increase the number of affordable units occupied by persons receiving services through DHS and others in need of supported housing.”

Case Briefing on Homelessness: 2021 Super Analytics Challenge

The Allegheny County Bureau of Homeless Services, working with several different non-profit agencies, [provides assistance](#) to help coordinate programs across the county. Its mission is to prevent and reverse homelessness in Allegheny County.

Resources are limited and fortunately, in December 2020, Allegheny County was awarded \$1.2 million in funding from the Pennsylvania Department of Community and Economic Development as part of the federal coronavirus funding that was allocated to Pennsylvania. In fact, Allegheny County [received the largest allocation](#) and the county will “put it to immediate use,” Allegheny County Executive Rich Fitzgerald said in a statement. It is important to note that this \$1.2 million supplements Allegheny County’s larger annual budget that it leverages to provide services to those experiencing homelessness.

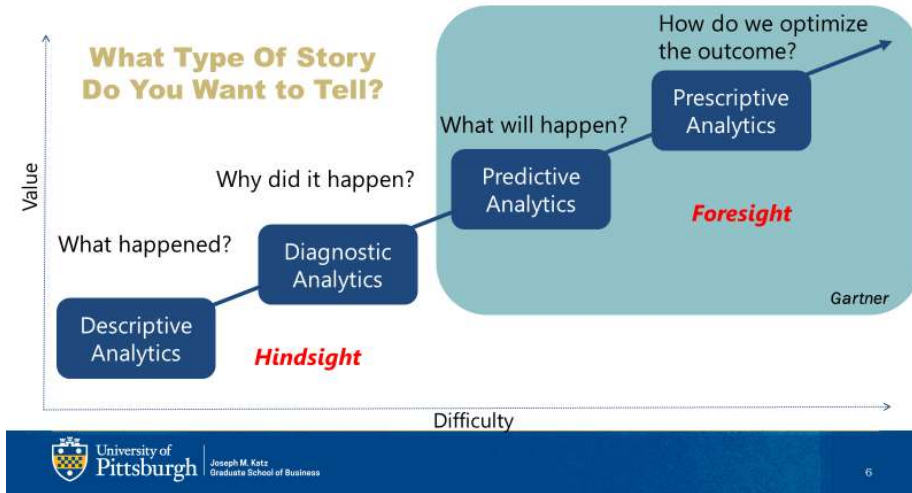
There are numerous resources to learn about homelessness in Allegheny County including a *Pittsburgh Post-Gazette* article, “[Prevention is key in addressing homelessness](#)” written in September 2019 that includes good, general background information. Additional information about the symptoms of homelessness will also be provided to Super Analytics Challenge teams through a resource library curated by Katz and the Advisory Committee.

Data and Analytics as Opportunities to Better Serve the Homeless and Prevent Homelessness

Leading business, health and not-for-profit organizations are harnessing the power of data and analytics to solve problems related to homelessness and to create opportunities for community members. The availability of data, data management tools, inexpensive processing power and data storage, and the plethora of use cases that demonstrate the impact that analytics has on organizations and their objectives enable traditional issues/opportunities to be viewed in new and creative ways. Issues around homelessness are no exception. For example, Allegheny County worked with local stakeholders, research partners, and data science ethicists to develop the [Allegheny Housing Assessment \(AHA\)](#), a decision support tool designed to help prioritize admissions to supportive housing services for individuals or families experiencing homelessness. The tool “uses administrative data from Allegheny County’s data warehouse to predict the likelihood of three types of events occurring in a person’s life if they remain unhoused over the next 12 months: a mental health inpatient stay, a jail booking, and frequent use (4 or more visits) of hospital emergency rooms.”

All forms of analytics are important to building a foundation for driving data- and insights-based decision making. The following diagram produced by Gartner provides a clear way to think about the primary types of analytics:

Case Briefing on Homelessness: 2021 Super Analytics Challenge



Traditional analytics (descriptive and diagnostic) provide core value and tell us what is happening with the population while advanced analytics (predictive and prescriptive) allow us to predict what may happen in the future and whether we can predict an outcome, as well as how we can use the insights from the model to optimize the outcome to the desired state.

The Challenge Objective

The ACDHS has been on the leading forefront of the use of all types of analytics and is looking for innovative uses of data and analytics to drive positive change related to and improvements in Allegheny County's homeless population/condition. For example, the ACDHS is contemplating how to answer the following questions, among others, using data and analytics in a way that drive insights for positive change:

Assessing Service Demand/Community Need:

1. Can we predict which persons experiencing homelessness will become chronically homeless?
2. How much supported and/or affordable housing do we really need in Allegheny County to end homelessness (i.e., modeling out housing gaps)?
3. How can Allegheny County more accurately quantify its homeless population?
4. Can we predict who will become homeless of those that apply for Eviction Prevention/Rental Assistance programs?

Improving Homeless System Constraints

1. How can we decrease the amount of time people stay in rapid rehousing programs without increasing returns to homelessness?
2. How do we know who is ready to move on from permanent supportive housing, without increasing risk of returns to homelessness?
3. Can we predict which families that are experiencing homelessness will be able to move out of a homeless shelter on their own vs those that will need additional housing

Case Briefing on Homelessness: 2021 Super Analytics Challenge

supports (i.e., will need to utilize rapid rehousing or permanent supportive housing programs)?

Understanding Causes and Solutions to Homelessness

1. Do families that receive a Section 8 housing voucher out of the homeless system fare better than families that don't?
2. How does someone's criminal history interplay with their experiences with homelessness? Does it most often lead to homelessness upon release? Or do people end up with jail time due to their time on the street? Does housing decrease likelihood of jail activity?
3. How does someone's behavioral health (mental health/substance abuse) history interplay with their experiences with homelessness?

There certainly may be other impactful questions that Allegheny County should be asking when assessing how to have near-term, positive impact in an affordable way.

Your Team's Answer to the Challenge

Your Team has been hired to provide the ACDHS with the objective of providing the following three-phase deliverable:

1. The identification of a question to answer (the "High Impact Question") that can have a near term impact on improving the homeless condition in Allegheny County and a clear articulation as to why this is the best HIQ to answer in the short term. The benefits of answering the HIQ are a key component of the deliverable for this phase. This HIQ could be one of the questions that the ACDHS is currently contemplating (listed above) or an entirely new HIQ that has been developed by your team. However, the deployment must be cost-effective, in that the "solution" must be affordable to the ACDHS.
2. A data and analytics model that provides the insights necessary to support the benefits articulated in the first phase of the deliverable. Data will be provided by the ACDHS as requested by the Team – if such data is available. The Team may also acquire data from its own or public sources to augment the ACDHS-provided data. The Teams are to use their own database and modeling tools to provide the best model outputs and/or insights from the analytics that indicate the value of answering the HIQ.
3. "Story telling" is a critical aspect of gaining organization buy-in and resources. The delivery of a high impact presentation (in a PowerPoint-like and/or multi-media format) to a senior management/advisory team will determine which recommendation will be implemented first. The presentation should be focused on impact, simplicity of deployment, and affordability.

Rubrics

Specifically, evaluators will be assessing each phase of the deliverable based on common rubrics as follows:

Rubric 1: HIQ

Case Briefing on Homelessness: 2021 Super Analytics Challenge

- How well did the team define the problem and are the elements of the HIQ defined in detail?
- How well did the team communicate the expected solution/impact and does it match the HIQ?
- Is the team addressing a critical need?
- Is the specific population that the team is addressing well-defined?
- Is the quality of the research (i.e., pre-work) that supports the HIQ “high”?
- Is the expected use of the solution/model output well defined – i.e., how it will be used?
- Is the proposed solution practical (think budget/cost, capability, resources) and can it be deployed?
- There are bonus points for innovation:
 - Uniqueness of solution
 - How impactful is the solution on the entire lifecycle of the issue?
 - Is the team solving issues around how problems start and/or beyond the specific impact on the “target” (e.g., family)?
 - Does the solution have up/downstream implications – how pervasive and permanent can the solution be?
 - Creative data sources and possible correlations to the problems/solutions
 - Extended areas of impact – e.g. geography, political, etc. (“if we fix ‘this’, it will have an upstream or downstream impact)

Rubric 2: Model

- How well did the team address the problem (as identified in Phase 1)? (versus addressing a proxy for the problem – i.e., is the target the actual target)
- How performant is the model (e.g., accuracy)?
- Did the team select the right metric to optimize (e.g., specificity versus sensitivity)?
- Did the team drive the outcome to the cost (is the solution cost effective)?
- Is the solution/output:
 - Impactful/meaningful?
 - Usable/pragmatic?
 - Sustainable without significant maintenance?

Rubric 3: Story Telling

- Recommendation/Analysis
 - Solution is innovative, original, creative.
 - Solution is impactful and solves the problem
 - Solution has a component that is specific, feasible and realistic and can be advanced in the next year.
 - Solution demonstrates an understanding of the Allegheny County context and will actually help people.
 - Solution had that special awesomeness or “it factor” – meaning novel and innovative.
- Presentation
 - Presenters worked well together as a team.
 - The team’s visuals support and enhance their presentation

A Word About Agility

To be successful, data and analytics (traditional and advanced) require leadership buy-in and action, a strong data and technology infrastructure, an innovative/entrepreneurial mind set, and

Case Briefing on Homelessness: 2021 Super Analytics Challenge

the ability to view the analytics project in a productization and agile way. All of these aspects are present in this case. Regarding the productization/agility, best-practice organizations view the HIQ as a “product” (requiring definition, programming, math/science, expected return on investment, deployment and governance). Successful product development requires agility – modifying the path as new information unfolds. In this regard, teams should feel free to modify their pathway during each phase and/or at the end of each phase. For example, once receiving feedback on your HIQ from phase one and seeing other teams’ presentations of phase one, teams are welcome to change directions with a new HIQ for phase two. Each phase will be judged independently and thus there will be no penalty for being agile.