2022 Challenge Case on Food Insecurity

Food insecurity is defined by Feeding America as a household's inability to provide enough food for every person to live an active, healthy life, and is one way that experts can measure and assess the risk of hunger in each community. Hunger and health are deeply connected, and so the effects of chronic hunger can be profound.

The Pennsylvania Department of Agriculture identifies the following reasons as major causes of increased food insecurity for individuals:

- Lack of Awareness of Existing resources like federal, state, and local programs;
- Existing Benefit Shortcomings because of existing support systems not being able to stretch their network wide enough to cover the increased need down to the last mile;
- Socioeconomic Status, whereby a combination of social, financial, educational, and geographic barriers renders it harder than usual for those in need to access food, some of them experiencing food insecurity newly;
- Supply Chain challenges, considering mismatch between supply and demand arising from a shifting marketplace, causing new problems to grocery stores and charitable food systems.

It must also be mentioned here that the pandemic has severely aggravated the situation, with more than 1.6 million Pennsylvanians having filed for unemployment along with the closure of a lot of non-sustaining businesses. Specific segments of the population – such as older adults, those struggling with mental health, and families with infants or toddlers – have found it more difficult to get food with the need for social distancing. Normal modes of transportation have also been complicated with COVID measures like stay-at-home orders, making it challenging for individuals yet to adapt to availing online services.

> **"I think that people should kind of get over the stigma of what some people consider handouts. That this is what this is for. It's for people who are like me that have given and given and given for many, many years and just fell into [this space of food insecurity] because of COVID."**
> **-Nikki (https://pittsburghfoodbank.org/stories/nikkis-story/)**

Impact from coronavirus

With COVID-19 continuing to spread, and millions of Americans still out of work, one of the nation's most urgent problems has only grown worse: hunger. Even before the pandemic hit, some 13.7 million households experienced food insecurity at some point during 2019, according to data from the U.S. Department of Agriculture. That equates to more than 35 million Americans who were either unable to acquire enough food to meet their needs, or uncertain of where their next meal might come from. The coronavirus pandemic has only worsened the problem. Please refer to Figure 1 for more detailed information.
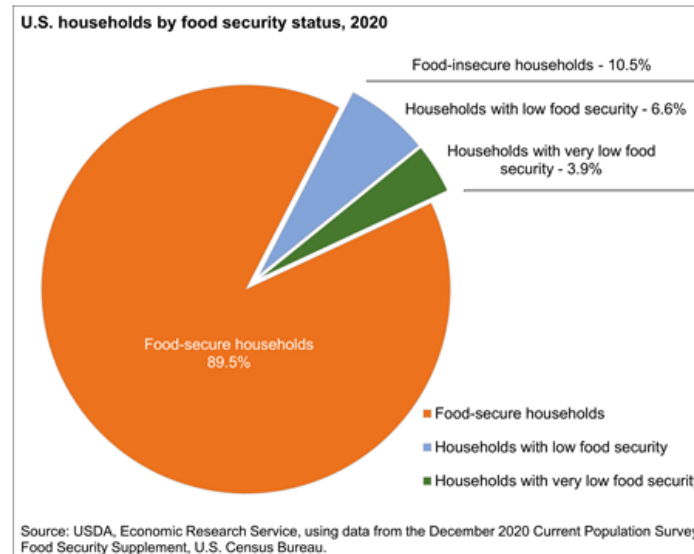

Figure 1: US households by food security status in 2020

According to one estimate by researchers at Northwestern University food insecurity more than doubled because of the economic crisis brought on by the outbreak, hitting as many as 23% of households earlier this year.

With the pandemic ongoing, communities across the country have seen the lines at food pantries stretching longer and longer, and there is no clear end in sight. Before the pandemic, the number of families experiencing food insecurity — defined as a lack of consistent access to enough food for an active, healthy life — had been steadily falling. But now, as economic instability and a health crisis takes over, new estimates point to some of the worst rates of food insecurity in the United States in years.

A portrait of hunger in 2020 at the outset of the pandemic has a distinctive bird's eye view: Enormous traffic jams captured from drone-carrying cameras. Cars inching along, each driver waiting hours for a box or bag of food. From Anaheim, California to San Antonio, Texas to Toledo, Ohio and Orlando, Florida and points in-between, thousands of vehicles carrying hungry people queued up for miles across the horizon. In New York, and other large cities, people stand, waiting for blocks on end.

America's most vulnerable populations — particularly the poor, the sick and the elderly — faced a daily struggle to get food even before COVID-19. Now their numbers and needs are surging due to the economic freeze even as the virus adds a whole series of logistical challenges around the food supply that our society is ill-prepared to meet.

This is the "last mile" food problem that rarely gets talked about but must be solved, because millions of lives are at stake. Food banks across the country are overwhelmed by a level of demand they were not scaled to meet. The scenes this month at a food bank in San Antonio that was swamped by an estimated 10,000 families brought home the scale of the crisis, though versions of that same scenario have played out across the country.

Information on Greater Pittsburgh Community Food Bank

In 2020, over 60 million people turned to food banks and community programs for help putting food on the table, says 'Feeding America', the nation's largest domestic hunger-relief organization. Drilling down more locally, Greater Pittsburgh Community Food Bank (hereinafter referred to as "Food Bank") is one of 200 member food banks nationally under the Feeding America network organization. It serves 11 counties in southwestern PA, supporting approximately 320,000 people who are food insecure. The counties served by Greater Pittsburgh Community Food Bank include Allegheny, Armstrong, Beaver, Butler, Cambria, Fayette, Greene, Indiana, Lawrence, Somerset, and Washington.

The Food Bank has formed a network of 850 partners (or agencies) throughout its 11-county service area. The network includes traditional agencies such as food pantries that provide grocery items and soup kitchens that provide a prepared meal. It also includes senior centers and summer food sites, as well as 150 new community partners that joined the network during the first year of the pandemic. These new community partners provide services to meet critical needs (other than food) for veterans, immigrants, people with disabilities, and families with children. As a result of the pandemic, these organizations saw an increased need for food by the people they serve and reached out to the Food Bank to receive emergency food boxes. The emergency food box program has expanded since then and now includes the City of Pittsburgh Fire Department, community centers, and healthcare providers. More than 120,000 food boxes have been distributed to these community partners since the start of the pandemic.

The Food Bank started off its first COVID-19 response distribution event on March 18, 2020. "During the first distribution we held, the city of Duquesne police chief told us that traffic had backed up three miles down the road to McKeesport, and my heart sank," Greater Pittsburgh Community Food Bank President and CEO Lisa Scales said. "By the end of that week, hundreds of people who were recently unemployed were calling us for help with food or showing up at our facility in desperate need for food."

As per Food Bank's COVID 1-year impact report, they were able to distribute 55.2 million pounds of food (46 million meals) throughout their service area, out of which 11.7 million was all fresh produce. That is a 6 million meal increase from pre-pandemic levels – a 15 percent increase.

Scales said that the report was released to document not only the dramatic increase in need for food assistance during the first year of the pandemic, but also the ways in which the organization changed its food distribution operations to reflect COVID-19 restrictions.

She also explained that the organization has been holding 11 drive-up distributions per month since late in 2020, and that more distribution locations may be added to accommodate demand. "We frequently hear from people who receive food from these distributions that they don't know how they would have made it through the month, that this food is literally a life saver," Scales said. "There have been people who said because of this, they have been able to eat today."

Strategies and operational changes created out of necessity during the pandemic strengthened the operational infrastructure. Some changes will remain from the pandemic, such as home delivery and the Food Bank's expanded network of community partner organizations.

But while she expects the demand and overall levels of food insecurity to decrease as the state returns to pre-COVID normalcy, Scales said that many people will still be struggling for the near future to regain financial and food stability.

> **"I had tears in my eyes when they said I could come. I am down to the last of my food so what this means to me, and my family is – we get to eat for the rest of the month, and I do not have to worry. I can sleep – I haven't slept because in my head, because I'm so worried about making sure we're ok."**
> **-Amy (https://pittsburghfoodbank.org/stories/amys-story/)**

Looking forward, food stability can be facilitated by holding common market days to connect local traders, suppliers, transporters, farmers, and fishers across markets. Communication among market actors can help attract new suppliers, as often suppliers are unaware of the scale of a camp market and the business opportunities it offers. Food supplies can also be stabilized through adequate stockholding in the form of strategic food security reserves as a first line of defense in emergencies, while improving post-harvest handling, packaging, storage, preservation, transport, and distribution of food to reduce losses at all afore-mentioned stages. Animal health can be enhanced, and production possibilities improved, including fish farming, along with fuel provision, to ensure a stable supply of cooked meals. Lastly, research needs to be carried out to be able to introduce measures to improve production, utilization, and preservation of Indigenous and traditional foods, and improve rural food processing technologies.

Impact of hunger on children

Hunger in children is also a big issue that the US has been tackling for a long time. For a child to have a chance at a bright future, they need to eat healthy meals every day. When they are hungry, children are more likely to be hospitalized, and they face a higher risk of health conditions because they have weakened immune systems. A brain starved of vital nutrients is one that cannot concentrate, setting hungry kids up for failure in school that, in turn, ends up harming the whole society in general.

In non-pandemic times, households with children were nearly 1.5 times more likely to experience food insecurity than households without children, according to the USDA, which reported that 13.6% of households with children experienced food insecurity last year. More than 5 million children lived in these homes.

Then came the coronavirus. An analysis by the Brookings Institution conducted earlier this summer found that in late June, 27.5% of households with children were food insecure — meaning some 13.9 million children lived in a household characterized by child food insecurity. A separate analysis by researchers at Northwestern found insecurity has more than tripled among households with children to 29.5%.

Children are usually protected from substantial reductions in food intake even in households with extremely low food security. Nevertheless, in about 0.8 percent of households with children (322,000 households), one or more children also experienced reduced food intake and disrupted eating patterns at some time during the year.

Statistical facts on food insecurity trends

According to Feeding America's annual Map the Meal Gap report, in 2019, more than 1.35 million Pennsylvanians did not always know where their next meal was coming from.

In 2020, because of the COVID-19 pandemic, these numbers grew substantially. According to a series of data analysis reports compiled by Feeding America, the number of Pennsylvanians facing food insecurity grew to more than 1.77 million, an increase of over 30%.

Feeding America projects that in 2021, because of policies implemented by the federal, state, and local governments to strengthen nutrition assistance programs and the generosity of the private sector, food insecurity rates are likely to improve over the rates seen in 2020. Their projections indicate that the number of Pennsylvanians facing food insecurity will fall to 1.54 million individuals.

Pennsylvania's charitable food network has been an integral partner fighting hunger on the front lines in communities across the commonwealth. Food banks in Pennsylvania typically serve approximately 2.2 million people annually, but since the public health crisis began in March 2020, these food banks have served nearly 356.6 million pounds of food to more than 41.8 million duplicated individuals. This detailed report can be found here.

As per Feeding America, over 108 billion pounds of perfectly healthy food are wasted every year. Feeding America works directly with farmers which ensures that healthy fruits and vegetables that do not make it to the grocery store end up on the plates of families in need instead of a landfill. This is one way by which the food bank can work against food shortage at their end.

In the wake of COVID-19, southwestern Pennsylvania has experienced an overall 31 percent increase in food insecurity in comparison to 2019 rates. Through its work with more than 850 agencies, partners and programs spanning 11 counties of the region, the Food Bank distributed enough food for nearly 45 million meals between July 1, 2020, and June 30, 2021. With a commitment to stabilizing the lives of the families it serves, 3.4 million of these meals were provided through the Food Bank's Supplemental Nutrition Assistance Program (SNAP) application assistance. Figure 2 below shows the detailed food insecurity trends and projects which can be found here.
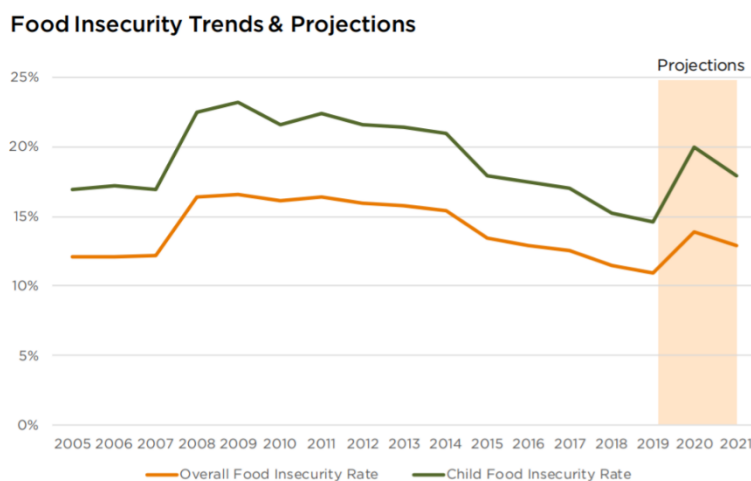

Figure 2: Food Insecurity Trends & Projections

Food insecurity in the Greater Pittsburgh Service area

The Food Bank services a large geographic area of southwestern Pennsylvania including Allegheny, Butler, Lawrence, Beaver, Washington, Greene, Fayette, Somerset, Cambria, Indiana and Armstrong counties. The City of Pittsburgh is inside the jurisdictional boundary of Allegheny County, while the greater metropolitan area of Pittsburgh is greater than just this county. From a population density perspective, the city of Pittsburgh and Allegheny County represent close to half of the population service area. It is important to be aware that Pennsylvania, including this area, also has a large rural population relative to other regions in the United States. This includes a rich tradition of agricultural production with high yields of food supply. Simply put, while this service area is urban, it is also rural.

Figure 3 below depicts a good picture of the situation *just* in Allegheny County right now. It is indictive of a data source for a specific jurisdiction. When reviewing this data, if you are examining the broader Food Bank service area, you will need to collect data for the entirety of the region.
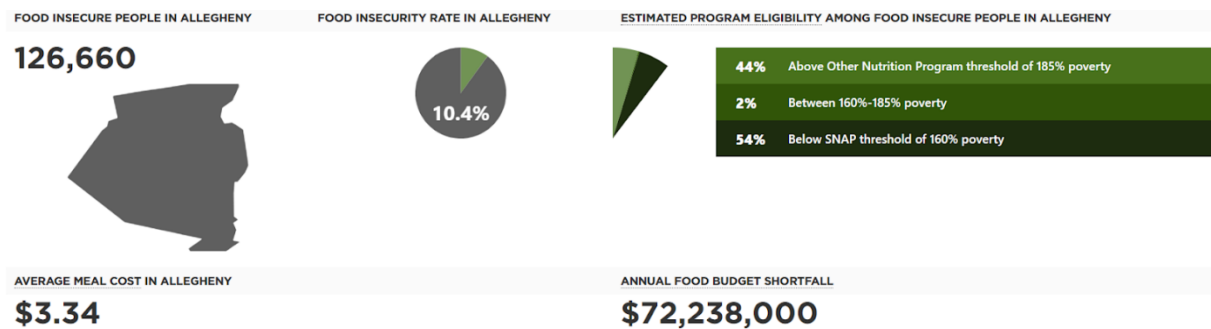

Figure 3: Food Insecurity Information on Allegheny County

Food insecurity has increased by more than 40 percent in this region, due to the COVID-19 pandemic and its economic impact. More than 360,000 people in the 11-country region are "food insecure," according to a report released last week from anti-hunger organization Feeding America.

The region's food insecurity rate is 10.4 percent based on the most recent estimates in 2019, according to the research, which factors in economic indicators such as unemployment and poverty rates.

The rate is much higher for children, as has been the case in the US as well. Feeding America's estimated that in 2020 more than 112,000 kids, or about 24 percent of children, in the 11-county surveyed region were food insecure.

Food security is built on three pillars: food availability, food access and food use. Once an imbalance of any of these three components occurs, food inequality results. Food security is dependent on ensuring that all groups of people are fed adequately. Unfortunately, due to uneven distributions of various resources (including food), only certain regions can consume enough.

Data and Analytics as Opportunities to Better Serve the Food Insecure Population

As shared by the Greater Pittsburgh Community Food Bank, there is a stigma related to hunger. Many people that the Food Bank serves are working, and half of all people are children or the elderly. It is important to put a face to the food insecure. Consistent access to nutritious food is also a challenge. Families are making trade-offs such as paying for medicine or for food; or paying a gas bill or paying for food. For many communities' access to stores offering fresh food is limited, both in urban and rural areas. When and how people receive food or meals, and how far people need to travel is important. Food assistance may be unavailable nearby at a time convenient for their working schedules. There is both a temporal and location aspect to food insecurity.

For the Food Bank, the number of pounds of food served is a key metric – a common metric across the Feeding America network. A key question that the organization asks of themself is: are we getting more food out and reaching more vulnerable people, or is the food commonly going to the same people? They cannot tell if Jane Doe at a drive-up is the same person who visited a pantry that week. Where is the food going? To whom?

From a data perspective, a current initiative is to bring systems and data together. Lack of integrated data hinders the ability to generate service insights. Per points of distribution, many of the traditional partners are run by volunteers who are seniors. For them, data entry is difficult and needs to be simplified. The organization also recognizes a need to plan ahead, in terms of a post-pandemic situation where they may have less volunteers helping out and even lesser donations coming through.

Data & Food Insecurity

A potential application of predictive analytics is to identify gaps to better serve the community. There are vulnerable groups being deprived from the initiatives of food banks due to a temporal or location mismatch, more than the lack of food provisioning itself. Meeting vulnerable populations at a time and place which is easier to access with more nutritious food is an example of closing a gap. A goal of the Food Bank is therefore to better connect groups providing services, such as veterans associations, to tie in meal services.

Leading businesses, health and not-for-profit organizations are harnessing the power of data and analytics to solve problems related to food insecurity 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 are enabling new and novel applications of analytics to support decision making and planning. Issues around food security are no exception. For example, Food21 worked with local stakeholders, research partners, and data science experts to develop the [Food Abundance Index (FAI)](), which attempts to combine the strengths of existing measures of food access and availability and examines food security based on five-dimension criteria of access, diversity, quality, density, and affordability.

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 an obvious way to think about the primary types of analytics.
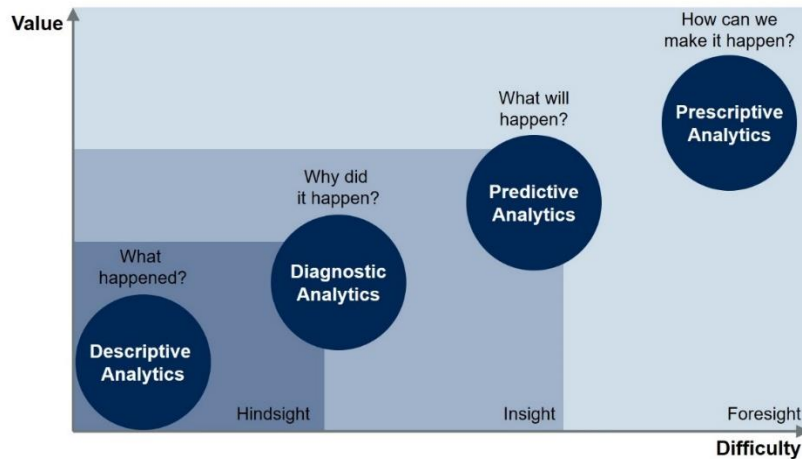
The Challenge Objective

The Greater Pittsburgh Community Food Bank has been on track to acquire data to utilize in a more predictive form of analytics, to help better serve the population of the community that are suffering from food insecurity. For instance, there are numerous ways that data and analytics-related solutions can increase the impact that the organization is having, and in various avenues. Here are related questions that the Food Bank has shared:

Food Limitations:

- How does the constantly increasing interest in supplying fresh food impact how many people a food bank can serve, line length, and/or distribution opportunities/challenges?
- The more efficient companies become with their supply chain (i.e., reduce excess use of produce / food items), the *less food there is available to the Food Bank*. How do we plan for and counterbalance this trend?
- Food consumption is complex – calories, volume, and nutrition all serve a role. What is the best mix of food purchased or requested as donations by the Food bank to best serve those in need?

Distribution Constraints:

- How can line length be reduced?
- The "*last mile*" is a challenge - especially in a sometimes-unpredictable supply scenario - how can this be optimized or planned for?
- How can we measure and optimize *the equitable distribution* of food?
- Is poundage the *right metric*? If not, what is better, how can it be measured and used to help reduce food insecurity and hunger?
- Food Mobility is a critical factor in facilitating food delivery in the last mile – are transportation modes optimized to maximize benefits to those in need?

Impact Monitoring & Responsiveness:

- How impactful have *digital marketing campaigns* been and can we use digital marketing in a unique way to increase food security?
- How can we measure the *impact of Impact Grants* and how should we use those dollars to have a bigger, more equitable impact?
- Are there predictive analytic techniques to identify *vulnerable groups not being serviced*, and to provide a gap analysis on the intersection points (time/place) to reach these groups?
- What are the root causes of food insecurity, and can the Food Bank use existing resources to address those causes?

<u>Your Team's Answer to the Challenge</u>

Your Team has been hired to provide The Greater Pittsburgh Community Food Bank with the objective of providing the following three-phase deliverable:

Phase 1. Problem Framing: The *identification of a question* to answer (the "High Impact Question") that can have a near term impact on improving the food insecurity issue for the region 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 Food Bank is currently contemplating (listed above) or an entirely new HIQ that has been developed by the Team. The Team can even modify one of the existing prompts to form a revised HIQ that they want to solve. However, the deployment must be cost-effective, in that the "solution" must be affordable and implementable by the Food Bank.

Phase 2. Solution Design and Modeling: A *data and analytics model* that provides the insights necessary to support the benefits articulated in the first phase of the deliverable. If the Team chooses to shift to another HIQ, based on judges' feedback, or data analysis yielding other avenues, they may do so. A reservoir of data has been provided to the Team, and further data may be provided by the Food Bank as requested by the Team – if such data is available. The Team may also acquire data from own research or public sources to augment the Food Bank-provided data or the data sources provided already. 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.

Phase 3. Final Solution Presentation: *Storytelling* is a critical aspect of gaining organizational 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 a combination of impact, feasibility, and affordability.

Rubrics

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

Rubric for Phase 1: Problem Framing

- How well did the team define the problem through HIQ and are the elements of the HIQ defined in detail?
- Additional evaluation points will be credited to those teams that create an original HIQ or modify an existing HIQ which indicates the team's creativity and depth of knowledge.
- Is the quality of the research (i.e., pre-work) that supports the HIQ "high"?
- 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 expected use of the solution/model output well defined – i.e., how will it be used?
- Was there significant thought given to the data that is available to model a solution and were creative new data sources identified?
- Is the proposed solution practical (think budget/cost, capability, resources) and can it be deployed?
- Does the solution have up/downstream implications – how pervasive and permanent can the solution be?

Rubric for Phase 2. Solution Design and Modeling

- 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 for Phase 3. Final Solution Presentation

- Recommendation/Analysis
  - The solution is innovative, original, and 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 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 the ability to view the analytics project in a productization and agile way. All 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 added 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.

A Word About Additional Data Sources

The Team is allowed, and even encouraged, to use their own research and data sources in addition to the ones provided.

Please note that Greater Pittsburgh Community Food Bank has been gracious enough to share their datasets related to the case above. Should you feel there is more information needed from them, you can request it through us, according to the following procedure:

1. A three-day minimum notice is needed to be given to the Food Bank if additional data is required (however, delivery may occur sooner or later than that date depending on resource availability).
2. A detailed description of the data being requested must be provided to the organizers via email, stating the subject "SAC 2022 Additional Data Request".
3. The Food Bank Team will respond back whether the data requested is indeed available and when approximately the data can be provided.

The Food Bank may operate on a first come first served basis if the requests are overwhelming. Data provided will also be made available to all Teams.

Data Sources used in this Case Development / Links that can be useful to Participants

The following is a resource of both research and literature related to food security as referenced in this Case or otherwise reviewed. This list also includes potential data sources that you may want to incorporate in your solution. Additional data, for example from the grocer Giant Eagle, and research from other sources are being made available to project teams through the Canvas platform. (https://canvas.pitt.edu/courses/148247/modules/items/2593249)

Pennsylvania Department of Agriculture – About Food Insecurity in Pennsylvania
https://www.agriculture.pa.gov/Food_Security/Pages/About-Food-Insecurity.aspx

Job Gains Slowed Again In August As Employers Added 1.4 Million Jobs
https://www.npr.org/sections/coronavirus-live-updates/2020/09/04/909433912/job-gains-slowed-again-in-august-as-employers-add-1-4-million-jobs

Food Security in the U.S. – Key Statistics & Graphics
https://www.ers.usda.gov/topics/food-nutrition-assistance/food-security-in-the-u-s/key-statistics-graphics/

How Much Has Food Insecurity Risen? Evidence from the Census Household Pulse Survey
https://www.ipr.northwestern.edu/documents/reports/ipr-rapid-research-reports-pulse-hh-data-10-june-2020.pdf

Greater Pittsburgh Community Food Bank – Covid-19 Response Impact Report
https://www.pittsburghfoodbank.org/wp-content/uploads/2021/03/COVID-1-year-impact-report-3.16.20-2.28.21.pdf

Children Incorporated
https://childrenincorporated.org/our-work/

About 14 million children in the US are not getting enough to eat
https://www.brookings.edu/blog/up-front/2020/07/09/about-14-million-children-in-the-us-are-not-getting-enough-to-eat/

Human Services Acting Secretary Visits The Greater Pittsburgh Community Food Bank For Hunger Action Month
https://www.media.pa.gov/pages/dhs_details.aspx?newsid=756

The Impact of the Coronavirus on Food Insecurity in 2020 & 2021
https://www.feedingamerica.org/sites/default/files/2021-03/National%20Projections%20Brief_3.9.2021_0.pdf

Food Insecurity in Allegheny County
https://map.feedingamerica.org/county/2019/overall/pennsylvania/county/allegheny

Food Abundance Index
https://business.pitt.edu/wp-content/uploads/2021/04/FOOD-ABUNDANCE-INDEX-FINAL-2012_0.pdf

Millions of hungry Americans turn to food banks for 1st time
https://apnews.com/article/race-and-ethnicity-hunger-coronavirus-pandemic-4c7f1705c6d8ef5bac241e6cc8e331bb

Solving 'the Last Mile' so Hungry People Can Eat Will Be an Issue That Outlasts Coronavirus
https://morningconsult.com/opinions/solving-the-last-mile-so-hungry-people-can-eat-will-be-an-issue-that-outlasts-coronavirus/

The State of Food Security And Nutrition In The World
https://www.fao.org/3/ca9692en/CA9692EN.pdf

Testimonials

https://pittsburghfoodbank.org/stories/nikkis-story/

https://pittsburghfoodbank.org/stories/amys-story/

Real Stories of Hunger: Cathy

2020 FeedPGH Report
https://apps.pittsburghpa.gov/redtail/images/16669_FeedPGH_Print_Version_11.18.21.pdf

District Specific Data
https://apps.pittsburghpa.gov/redtail/images/10267_All_Districts_Report_2020.pdf

COVID-19 Pandemic Driving Increased Food Insecurity In Southwestern Pennsylvania

https://pittsburghpa.maps.arcgis.com/apps/dashboards/258efdabee52426f8335890733e8ef49

Rising Food Insecurity in Children in Allegheny Country
https://triblive.com/local/regional/greater-pittsburgh-food-bank-announces-coalition-to-deal-with-childhood-hunger/

https://stacker.com/pennsylvania/counties-highest-rate-food-insecure-children-pennsylvania

Impact Grants
https://pittsburghfoodbank.org/wp-content/uploads/2022/01/Impact-Grant-FAQs-1.pdf

The Economic Drivers of Food Insecurity
https://public.tableau.com/app/profile/feeding.america.research/viz/MaptheMealGap-TheEconomicDriversofFoodInsecurity/CorrelationofFactors

Food Insecurity in the US by the Numbers
https://www.npr.org/2020/09/27/912486921/food-insecurity-in-the-u-s-by-the-numbers

Measure and Map Access to Grocery Stores
https://storymaps.arcgis.com/stories/9658b5befb944256bb587bc9b268a09a

Food Abundance Index Map – Access
https://fai.cdas21.com/access/

Food Abundance Index Map – Diversity & Density
https://fai.cdas21.com/map/

Neighborhood Atlas for Mapping
https://www.neighborhoodatlas.medicine.wisc.edu/

More on Food Abundance Index
https://www.youtube.com/watch?v=Y8HAtP0sZPg

Map the Meal data from Feeding America
Hunger & Poverty in the United States | Map the Meal Gap (feedingamerica.org)

An ESRI Measure & Map Access to Grocery Stores
Measure and Map Access to Grocery Stores (arcgis.com)

ESRI's ArcGIS Living Atlas (includes numerous data 'layers')
Living Atlas of the World | ArcGIS

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