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Tech Led Solutions to Address Food Insecurity during a Global Pandemic

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Summary: COVID-19 has increased childhood food insecurity rates. The Children's Hospital of Philadelphia collaborated with Food Connect and Common Market to deliver produce boxes to food-insecure families. Food Connect leveraged technology to use texting, scale delivery integrations, and optimize routing to deliver 95,000 pounds of food over a 16-week period.

Key words: COVID-19, food insecurity, technology, text messaging, delivery.

Food insecurity, defined as a lack of consistent access to enough food to live an active and healthy lifestyle, affects 14.3 million American households. The U.S. Department of Agriculture (USDA) estimates that one in six children live in food-insecure households.¹ Childhood food insecurity is associated with poor health outcomes which can increase the risk for heart disease, type 2 diabetes, and some cancers.² Children who experience food insecurity are also at increased risk of negative developmental outcomes including behavioral and emotional problems and poor academic performance.^{2,3}

While the novel coronavirus (COVID-19) has affected all aspects of life, it has had a particularly marked impact on food insecurity. During the pandemic, it is estimated that food insecurity has doubled among households with children.⁴ Students receive one-third to one-half of their daily caloric intake from school meals.⁵ However, with

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school closures and the transition to remote learning, children have lost access to these meals. In response, families are resorting to unhealthier but less expensive food choices with one-third of families increasing their consumption of high-calorie snack foods and 47% increasing their consumption of non-perishable processed food.⁶ These unhealthier foods can weaken immune defenses and subsequently increase susceptibility to COVID-19, leading to a bidirectional negative impact between COVID-19 and food insecurity.⁴ Additionally, children with pre-existing medical conditions, such as obesity and diabetes, are at risk of developing severe illness from COVID, making them a particularly vulnerable population.⁷

In order to address the added food security challenges presented by the pandemic, the Children's Hospital of Philadelphia worked with two food-focused organizations, Common Market and Food Connect, to deliver fresh produce directly to the homes of food-insecure families. Through this unique partnership, Common Market sourced and packaged produce from local farms, CHOP identified food-insecure recipients, and Food Connect delivered the food directly to families' homes. This paper will highlight this strategic cross-sector partnership and demonstrate how Food Connect's technology resources were leveraged to meet the needs of food-insecure families during the height of the COVID-19 pandemic.

Food Connect

Food Connect is a 501c3 nonprofit organization (<https://www.foodconnectgroup.com/>) using technology to provide on-demand hunger relief solutions that combat food insecurity and help increase food equity in marginalized communities. Food Connect technology helps connect surplus food and hunger relief efforts quickly so logistics, matching, and distribution happen effortlessly. Food Connect's smart technology aims to strategically combine data to provide meaningful hunger relief solutions. For example, an organization may have a database of food shelters and their hours. However, combining the food shelter data onto a map with immediate food-pickup requests and driver availability integrations helps optimize distribution of resources and increase food access efficiently. Each one of these pieces of data taken individually will not help make an optimal decision. Instead, only when they are combined in a meaningful way do they constitute smart technology that enables better decision-making to combat food insecurity.

Since 2015, the Food Connect mobile application platform has enabled organizations to schedule a donation of food or meals at any time. The donation request is matched within the Food Connect logistics system to direct food donations to hunger relief organizations on an as-needed basis. With the ability to match donations to local organizations serving communities in need, Food Connect has helped food vendors across the country minimize waste while delivering much needed resources to the food-insecure community.

In March 2020, the COVID-19 pandemic served as the impetus for Food Connect to adapt their program model to deliver food directly to the homes of families in need. To this aim, Food Connect collaborated with CHOP and Common Market in order to facilitate the delivery of produce boxes directly to the homes of food-insecure families.

Figure 1. USDA food box.

Through this cross-sector collaboration, Food Connect used technology resources to implement multi-language texting communications, scale delivery integrations, and optimize routing.

From Farm to Patient

In response to increased food insecurity caused by the pandemic, the USDA announced the Farmers to Families program. In April 2020, the USDA worked with national, regional, and local distributors to purchase up to \$4 billion in fresh produce, meats, and dairy products from local farms and distribute to families in need.⁸ In Philadelphia, Common Market was selected as the vendor to source and prepare produce boxes for distribution to various non-profit organizations serving families in need. Common Market is a mission-driven distributor of sustainable and local farm products and served as the necessary operational infrastructure to connect farms, in need of new distribution channels, to regional community organizations. Each produce box contained six to eight seasonal fruits and vegetables (see Figure 1).

Children's Hospital of Philadelphia was selected as a partner to receive produce boxes for distribution among patients from four community-based urban sites within the CHOP Care Network. The CHOP Care Network in West and South Philadelphia has over 132,000 visits per year and serves a primarily minority and low-income patient population. More than half the families served live at or below the poverty line and

greater than 73% receive health coverage through Medical Assistance.⁹ Given that food insecurity disproportionately affects communities of color and households with children, we knew that the patients served at CHOP's urban primary care centers were likely to experience higher rates of food insecurity during the COVID-19 pandemic and would benefit from immediate food access programming. The USDA program was also well aligned with CHOP's broader community impact initiative that aims to address hunger and other key social determinants of health.¹⁰ The addition of Food Connect's technology platform to facilitate the home delivery of produce allowed the program to address the challenges of transportation, access, and food security during the height of the pandemic. U.S. Department of Agriculture funding directly provided the produce boxes and CHOP funded the home delivery of the boxes.

Recruitment and Data Sharing

Recipients of the food boxes were identified by CHOP through a combination of food insecurity screening and need-based referrals by providers and social workers over a two-week period. One urban site electronically screened all patients for food insecurity using the Hunger Vital Sign, a validated two-item measure derived from the United States Household Food Security Survey Module.¹¹ Referrals from CHOP meant that Food Connect's primary recipient was now a vulnerable patient rather than a community-based organization and data-sharing was required to follow Health Insurance Portability and Accountability Act (HIPAA) guidelines. Identified families were contacted by phone by a CHOP program coordinator to obtain consent to participate in the program and share contact information with Food Connect for purposes of the delivery.

Technology and the Digital Divide

Food Connect aims to create solutions that incorporate the latest technology while recognizing the dynamics of the digital divide, defined as the gap between those who do and do not have access to technology.¹² This required finding the right balance between using technology to ensure efficient communication without compromising usability for patients who might not be familiar with high-tech solutions. A key feature of Food Connect's program model is the use of a multi-language texting platform to facilitate on-demand communication and delivery tracking for recipients. Upon enrollment, 97% of participants confirmed their ability to receive text messages for the program. Participants who were not able to receive text messages were called via telephone for all delivery communications and program updates. On the day of each delivery, patients received text messages providing updated arrival times of the Food Connect drivers. Patients had access to a driver tracker map to monitor the driver's progress. Additionally, patients had the ability to confirm delivery through Food Connect's contactless delivery confirmation functionality. These features increased the reliability of the program and helped to ensure successful delivery.

and partnership resources, Food Connect ensured a balanced and scalable approach to supporting the program. Establishing an expanded driver support model with the dispatching team was built on balancing the timing, skill, availability, and commitment of the driver resources. Food Connect requires training and use of the Food Connect Driver application, which helps a driver with navigation and delivery communications. With the expansion of the program model, Food Connect actively hired numerous drivers new to the Food Connect technology platform.

Program Outcomes: How Food Delivery Played Out

The Children's Hospital of Philadelphia enrolled a total of 389 patient families into the program where they received a weekly box of fresh fruits and vegetables delivered directly to their home. The program operated for 16 weeks from June 1st – September 18th, 2020. Food Connect used their technology resources to successfully deliver a total of 4,770 boxes, which translates to 95,400 pounds of food and just under 80,000 meals. A survey was distributed at the end of the program and 100 out of 389 participants responded. Eighty-one percent (81%) of participants reported high levels of satisfaction with the quality of the food and 93% affirmed that the delivery component was very important to them.

In addition, there were direct measurable benefits to the local economy. The Common Market's mission is rooted in supporting local farmers, and more than 30 regional producers in need of additional distribution networks were supported through this program. Children's Hospital of Philadelphia received 4,770 food boxes, representing more than \$45,000 worth of local investment in regional family farms. Finally, beyond securing jobs on our area's farms, the program also supported new jobs, including 60 positions in the Common Market warehouse and approximately 1,200 hours of paid work for delivery drivers.

Conclusion

The Children's Hospital of Philadelphia collaborated with Food Connect and Common Market to identify food-insecure patients and offer home delivery of fresh produce boxes. Food Connect used its technology resources to implement multi-language texting communications, scale delivery integrations, and optimize routing to deliver over 95,000 pounds of food directly to families over a 16-week period.

While the USDA support has ended, the hospital is keen to explore how technology partnerships can be used to support future social determinant programming. There were valuable lessons learned that may be of interest to others seeking to implement technology partnerships within a health system. Ensuring that patient data are shared securely and are in compliance with HIPAA regulations can be a challenge when working with partners outside of a hospital setting. We recommend clearly outlining data-sharing expectations in written agreements with partners. The exclusion of non-English speaking patients can often pose an equity challenge in settings that do not have adequate translation resources. Multilingual text capabilities helped reduce

barriers to communication for families whose native language was not English and was an effective way to communicate program updates with families. Food Connect's delivery alerts coupled with chat and phone support helped families participate in the program more easily.

The technology integrations and collaboration highlighted in this program are significant advances in creating sustainable food systems that make healthy food more accessible to marginalized communities. It is now possible for multiple sets of data to interact with each other to make meaningful decisions as they relate to hunger relief solutions. Future directions for this work would benefit from the exploration of secure and HIPAA-compliant integrations with hospital-based systems to streamline community-based referrals. The future of food access interventions rests on our collective ability to support cross-sector collaborations and support investments in innovation to further unlock efficiencies that are ripe within the hunger relief space.

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