# Appendix
Methodology

## Research design and sampling plan

The study team sampled 62 health impact assessments from a list of 414 HIAs in the Health Impact Project's cross-sector toolkit for health as of December 2017.[1] This database includes HIAs that the Health Impact Project collected from a variety of sources, such as published HIA reports, other databases, and HIAs submitted by practitioners. The study team sorted the 62 HIAs selected into three health determinant groups—access to healthy food; employment; or safe, affordable, and healthy housing—and three time cohorts:

1. **Cohort A:** HIAs completed since 2016 or underway at the time the study began.
2. **Cohort B:** HIAs completed in 2014 or 2015.
3. **Cohort C:** HIAs completed between 2009 and 2013.

## Selection of health determinants

The study team considered the following criteria when selecting the determinants for inclusion in the study:

- **Sufficient distribution across cohorts.** Adequate numbers of completed and ongoing HIAs in the Health Impact Project's HIA database.
- **Measurability.** Indicators are feasible to measure, and public data is available to track HIA impact.
- **Proximity of HIA impact on determinant.** Plausibility that HIA might contribute to some change in determinant since HIA completion and/or over the course of the study.
- **Topic of interest.** The degree to which studying the impact of HIA on determinant has the potential to contribute to the field; determinants that can be affected by decisions in sectors outside the built environment, where HIAs have been more widely studied.
- **Absence of extreme confounding.** Determinants where, over the course of the study, there have not been significant national policy, state policy, and/or other events that would skew or overshadow the influence of HIAs on the determinant.
- **Degree of overlap between determinants.** Combination of determinants that are as mutually exclusive as possible (meaning that a high proportion of HIAs included in one determinant are not also included in other selected determinants).
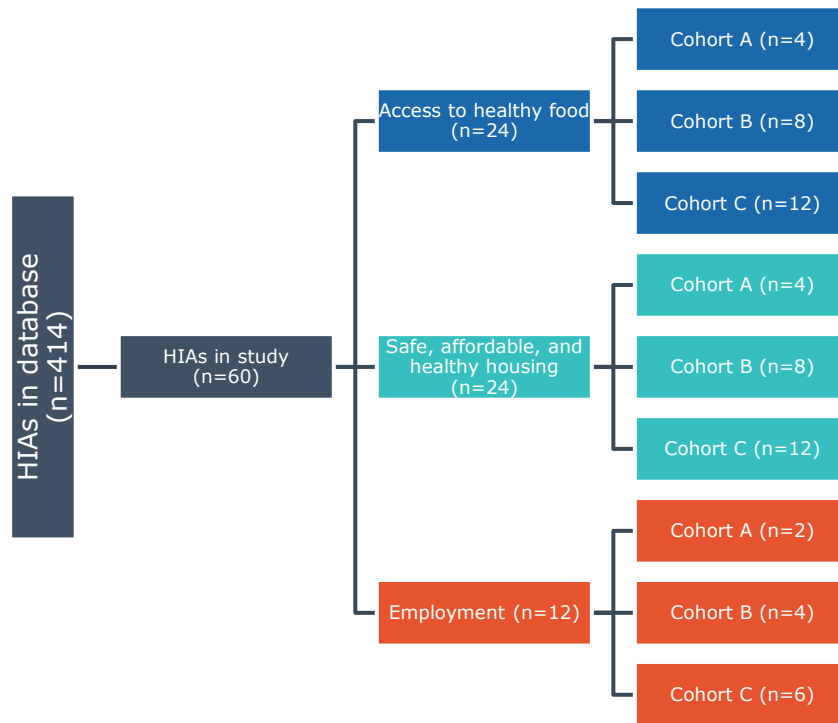
Given the considerations outlined above, the study team selected three determinants for inclusion: access to healthy food; safe, affordable, and healthy housing; and employment. The researchers selected these three to facilitate a comparison of determinants with a relatively strong research base demonstrating short-term impacts of HIAs, specifically access to healthy food and safe, affordable, healthy housing—and one without such evidence: employment.

### Target enrollment in the study

The study team sought to enroll 24 HIAs in the access to healthy food group, 24 HIAs in the safe, affordable, and healthy housing group, and 12 HIAs in the employment group (the determinant on which the impact of HIAs was less well-known). Planned enrollment in cohorts B and C was larger because they were more likely to have appropriate and available public data.

Exhibit 1 depicts planned enrollment in the study, with a target total enrollment of 60 HIAs based on both available project resources and estimated number of cohorts needed for HIAs to yield an effect.

**Exhibit 1.    Planned Enrollment in the Study, by Determinant and Cohort**

```
                                                        ┌── Cohort A (n=4)
                                     Access to healthy  │
                                     food               ├── Cohort B (n=8)
                                     (n=24)             │
                                                        └── Cohort C (n=12)

                                                        ┌── Cohort A (n=4)
  HIAs in database    HIAs in study   Safe, affordable, │
  (n=414)             (n=60)          and healthy       ├── Cohort B (n=8)
                                      housing           │
                                      (n=24)            └── Cohort C (n=12)

                                                        ┌── Cohort A (n=2)
                                     Employment (n=12)  │
                                                        ├── Cohort B (n=4)
                                                        │
                                                        └── Cohort C (n=6)
```

## Exclusion criteria

HIAs were not eligible for the study if they met any of the criteria below:

- Assessed federal-level policies or programs.
- Were "desktop" HIAs that relied primarily on existing data and included little to no community engagement.
- Did not explicitly address one of the three determinants of health considered for this study: access to healthy food; employment; or safe, affordable, and healthy housing. (Determination that the HIA "explicitly addressed" one of the three determinants of health was based on the study team's review of available documents related to the HIA and conference between study team members.)
- Were never completed (if HIA occurred between 2009 and 2015), or where the decision the HIA sought to inform had not yet been made.

Based on these criteria, the 414 HIAs in the Health Impact Project database were narrowed to 195 HIAs that qualified for this study.

## Eligibility and enrollment questionnaire

The study team sent online eligibility and enrollment questionnaires via email between May and July 2018 to the primary contact person listed in the Health Impact Project HIA database. Eligibility questionnaires were sent to all 195 primary contacts for HIAs initially eligible for study inclusion. Enrollment questionnaires were sent to any of the 195 primary contacts who did not respond to the eligibility questionnaire, as well as HIAs still eligible based on information provided in the eligibility questionnaire. In addition, seven primary contacts for HIAs newly funded by the Health Impact Project at the start of the study in 2018 also received the enrollment questionnaire, along with one primary contact for an HIA identified through responses to the eligibility questionnaire for another HIA. In these questionnaires, primary contacts:

- Confirmed that they were the appropriate contact for the HIA and interested in participating in this study.
- Answered questions to assess whether the HIA met any exclusion criteria described above.
- Verified identifying characteristics of the HIA, such as when it was completed.
- Provided contact information for additional HIA stakeholders.

Primary contacts also answered questions about the primary health determinants that the HIA addressed, and the extent to which the HIA addressed those determinants.

## Assignment of HIAs to temporal cohorts and health determinant groups

HIAs were assigned and enrolled in the study based on the primary contact's assessment of the extent to which the HIA addressed each of the three health determinants. If the primary contact indicated that the HIA addressed the determinant to a "great" or "moderate" extent, the HIA was eligible for inclusion in that determinant group. Based on these responses, HIAs were assigned and enrolled in the study in the following manner:

- HIAs that addressed a single health determinant were enrolled in the study first and assigned to their temporal cohort and determinant group.
- HIAs that addressed more than one of the three health determinants were enrolled in the study and assigned to their temporal cohort but were not assigned to a specific determinant group.
- Additional outreach via phone and email was conducted to continue enrolling HIAs in the study to meet enrollment targets.
- Once target enrollment was reached for each temporal cohort, HIAs that addressed more than one of the health determinants were assigned to a specific group. These HIAs were randomly assigned to a determinant group that they had addressed to a "great" or "moderate" extent.

Final enrollment in the study by health determinant and temporal cohort is shown in Exhibit 2.

**Exhibit 2.       HIAs Enrolled in the Study, by Health Determinant and Temporal Cohort**
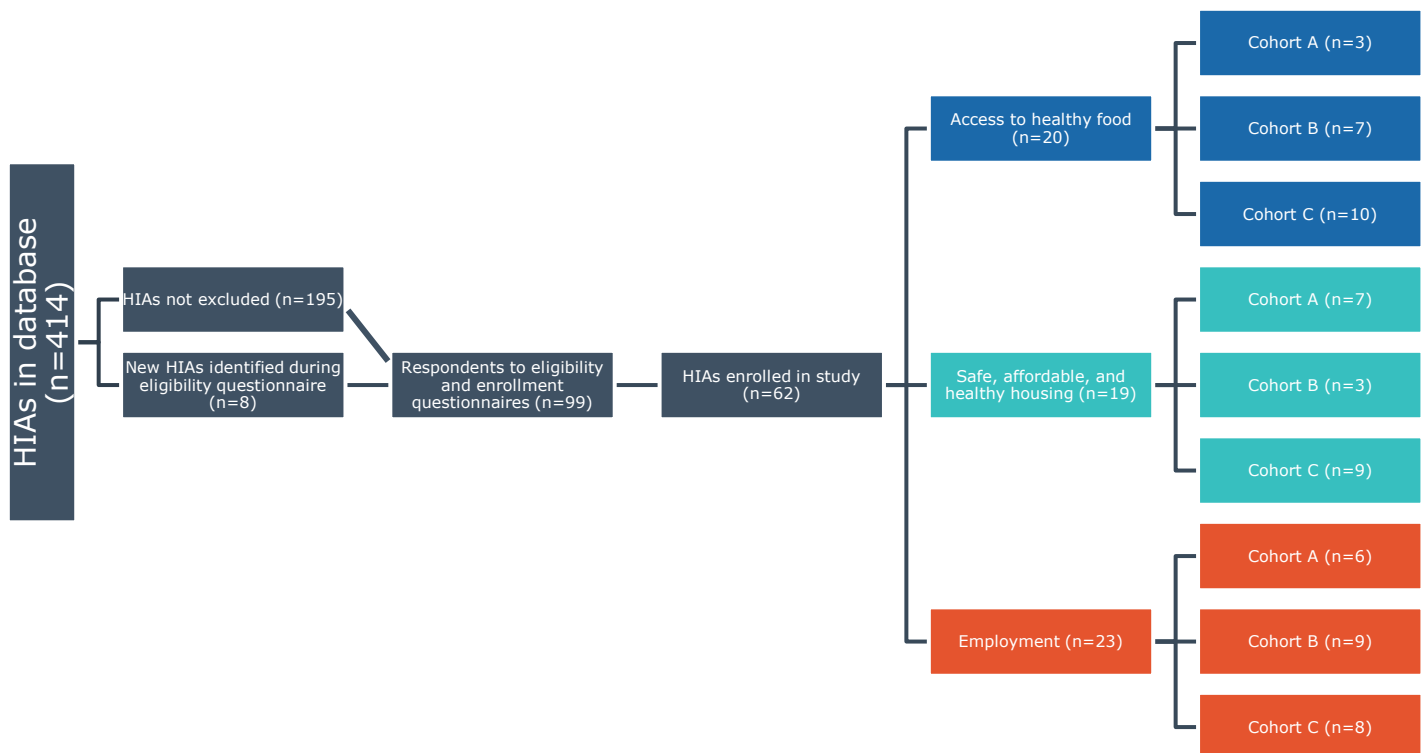


# Data collection and analysis for HIAs enrolled in the study

The study team used the following methods to collect and analyze data about each HIA once enrolled in the study:

## Eligibility and enrollment questionnaire

As described above, eligibility and enrollment questionnaire data was collected from primary contacts via a Qualtrics survey platform. The researchers merged the eligibility and enrollment questionnaires to create a single response set per HIA. The study team used SPSS software to analyze all eligibility and enrollment questionnaire data.

## Document review

The study team reviewed documents related to each HIA selected for inclusion in the study. These documents included:

- HIA final reports.
- HIA websites.
- HIA monitoring and evaluation plans.
- Legislative reports.
- Media reports about progress on the decision the HIA sought to inform.
- Other materials submitted as part of grant deliverables, if funded by the Health Impact Project.

The researchers collected the following information from each HIA related to the study's elements of interest and entered the data into an Excel spreadsheet:

- The geographic region where the HIA took place and the type of decision it sought to inform. Contextual factors related to the HIA, such as prior experience with HIAs among community members, and political factors documented by practitioners that may have influenced the development of the report.
- The HIA's adherence to minimum practice standards.
- Assessment of how equity was integrated into each step of the HIA process.
- Assessment of how the HIA measured impacts and disparities related to the HIA's assigned health determinant group.

Document reviewers on the study team spent 10-15 minutes searching for documents related to each HIA. This amount of time was determined based on pilot testing of the document-review process.

Document retrieval began with the HIA report itself; most elements of interest for document review were completed by reviewing the HIA report along with two to three additional sources. Study team members spent additional time searching for materials if information on elements of interest were missing after reviewing those initial sources. Based on both pilot testing of the document-review process and available resources, reviewers spent two hours at most per HIA.

Document review was done for 57 completed HIAs. For five HIAs still in progress (newly funded by the Health Impact Project at the start of the study in 2018), some information was available through the Health Impact Project or other online resources. However, most elements of interest in document review were missing for these five HIAs.

Once complete, the study team imported all elements from document review into SPSS for cleaning and analysis.

## Population data indicators

For 14 HIAs in cohorts B and C (completed between 2009 and 2015), public data provided information on changes to health determinants over time, as well as changes to health disparities in specific population groups.[2]

### Selection of population data indicators

Multiple publicly available data sources provided indicators that measured different aspects of each determinant group included in this study. The study team identified an initial list of potential indicators during the first phase of the study, drawing from both the Centers for Disease Control and Prevention (CDC) Data Set Directory of Social Determinants of Health at the Local Level[3] and suggestions from members of the study team. This list was not specific to HIAs enrolled in the study or the final health determinants included in the study. Therefore, the study team sought to narrow this list

down to one to three indicators per determinant group once this study's enrollment and design were finalized. The following criteria were used to select a final list of indicators:

- The indicator is collected nationally.
- The indicator can be drilled down to at least the city, if not ZIP code or census tract level.
- Data is available from 2009 to present.
- Data is collected at regular intervals (at least every five years) in order to track change over time.
- The indicator is an outcome that could logically be linked to multiple HIAs in the health determinant group. The study team identified "logical links" to multiple HIAs by categorizing each HIA according to the aspect of the health determinant that it examined based on review of HIA descriptions, enrollment and eligibility questionnaire data, and data collected from HIA document review.

## Methodology for selecting appropriate data for each HIA

Indicators that satisfied these criteria were further reviewed by the study team to arrive at a final set of indicators for each health determinant group.

Once selected, the study team developed methodologies to determine indicators for each HIA, identify study areas, and select appropriate years for analysis:

- **Indicators for each HIA.** The study team collected population indicators associated with the health determinant group to which the HIA was assigned.
- **Geographic area for each HIA.** The study team reviewed each HIA report to identify the HIA study area's specified geographic boundary. Where possible, the study team used boundaries identified in the HIA. When multiple boundaries were identified, the study team prioritized options in the following order: city/county municipality, census tracts, and ZIP codes. When necessary, census block groups and ZIP codes were mapped to corresponding census tracts. When neighborhood/study area boundaries were shown on a map without corresponding census tracts or ZIP codes, the study team used 2010 census tract maps to identify appropriate census tracts. If geographic boundaries were not clearly identified in the HIA, the study team examined the HIA report for additional context about the geographic area and selected a geography that most aligned with the level at which the decision was being considered.
- **Selection of years.** To assess changes in the health determinants to which an HIA may have contributed, the researchers were interested in assessing data before and after the HIA. Because of data considerations and limitations for each source (see below for more details), the study team gathered data about the HIA:

  - At baseline (the year the HIA occurred, or preceding years as close to the year the HIA occurred as possible).
  - At follow-up (five years after the HIA occurred, or as close to five years after the HIA occurred as possible).

  Although additional trend data would provide a more complete picture of change over time in each study area, both the limitations of each dataset and available resources inhibited the ability to examine trends for this study.

## Methodological considerations for specific data sources

The study team used indicators from nationally available datasets, which have different data-collection methodologies that influence the geographic level at which the data is available, the frequency of data collection, and the years for which data is available. These differences influence the years of data that the study team collected, the geographic level used, and data-aggregation methods.

0 describes methodological considerations for each data source.

**Exhibit 3.        Methodological Considerations for Each Data Source**

| Data source | Indicators | Methodological considerations, limitations, and notes |
|---|---|---|
| **American Community Survey (ACS)** | Proportion of housing units whose residents' housing costs are 30% or more of their household income (Table B25106: Tenure by Housing Costs as a Percentage of Household Income in the past 12 months)<br><br>Proportion of housing units vacant (Table B25002: Occupancy Status)<br><br>Unemployment rate (Table S2301: Employment Status)<br><br>Poverty rate (Table S1701: Poverty Status in the Past 12 Months) | **Use of ACS estimates:** Where possible (i.e., when the HIA study area was sufficiently large), the study team used ACS one-year estimates. Otherwise, the team used ACS five-year estimates.<br><br>**Study area:** ACS data for these indicators are available at many geographic levels larger than the census block group. When possible, the study team used the geographic study area as defined by the HIA practitioners. When multiple geographic definitions were provided by the HIA study team for neighborhood-level HIAs, the study team used the census tract definition. For HIAs defined only at the census block group level, the study team identified the most closely aligned census tract for the study area.<br><br>**Selection of ACS years:** For each HIA, the study team based the "pre" sample on the year the HIA was completed, while the "post" sample was five years later (see exceptions below).<br><br>When comparing ACS five-year estimates, the study team selected "pre" estimates whose date ranges start with the year the HIA was completed, and then compared these to the five-year estimate that immediately followed. For example, the "pre" estimate for an HIA completed in 2009 was 2009-13, and the "post" estimate was 2010-14. The study team did this to assess the difference between the first year of the "pre" estimate and the last year of the "post" estimate. In the example above, comparisons of the 2009-13 vs. 2010-14 five-year estimates show the change from 2009 to 2014, since the data for these estimates overlaps for the years 2010-13.<br><br>Since ACS five-year estimates were available only up to 2013-17 at the time of the study, the "pre" and "post" range selection had to be different for HIAs completed in 2013. In this case, the "pre" sample is 2012-16 and the "post" sample is 2013-17, comparing the change between 2012 (the year prior to the HIA, rather than the year of the HIA) and 2017 (four years after the HIA, rather than five years). |
| **U.S. Department of Agriculture Food Access Research Atlas** | Proportion of census tracts (within the HIA study area) that are considered food deserts[*] (Variable: LILATracts_1And10) | **Selection of USDA years:** Data for the USDA Atlas was available only for 2010 and 2015. Note that all Cohort C HIAs focusing on access to healthy food were completed from 2010 to 2013; thus, the year the HIA was completed falls at various points between the 2010 "pre" and 2013 "post" samples.<br><br>**Study area:** All data is available at the census tract, city, county, and state levels. When possible, the team used the geographic study area as defined by the HIA practitioners. For HIAs defined by a jurisdiction definition (such as ZIP code) not available in this dataset, the team identified the most closely aligned census tract or city/county for the study area.<br><br>**Availability of indicators:** While the 2015 USDA Atlas collected a wide variety of indicators, numerous methodological revisions were made to the Atlas from 2010 to 2015. The 2010 dataset includes only census tracts that are considered food deserts. *No data on food access is available for census tracts that did not fit the criteria of food deserts in 2010.* As a result, the data available for comparison from 2010 to 2015 was binary—either a census tract fit the definition of a food desert or it did not. The team therefore aggregated the number of census tracts within the HIA study area that fit the definition of a food desert and compared the change in food desert status over time. |

[*] Food deserts are areas that the U.S. Department of Agriculture has identified as being low income and offering residents limited or no access to healthy and affordable food, specifically where at least 500 people or 33% of the population lives at least 1 mile (in an urban area) or 10 miles (in a rural area) from a grocery store.

## Interviews

The study included in-depth phone interviews with key stakeholders with insights into the policies, programs, projects,

and plans that were the focus of HIAs in the study sample (hereafter referred to as "key stakeholders"). These stakeholders included individuals with decision-making authority regarding the decision the HIA sought to inform, individuals who played a role in how the decision and/or the HIA's recommendations would be implemented, contributors to the HIA process, and HIA practitioners. The study team focused on speaking with individuals who had decision-making authority regarding the policy, program, project, or plan that was the focus of the HIA, including policymakers and people who determined how the decision would be carried out.

The interviews explored stakeholders' perceptions and opinions about determinants of health and health equity over time, contextual factors influencing policy change, and policy changes as a result of the HIA. Interview questions were tailored to the stakeholders' familiarity with the HIA, whether the HIA was complete, and whether the stakeholder was part of the entity with decision-making authority related to the plan, policy, project, or program that the HIA considered. Potential interview respondents were identified through one of several methods:

- Identification by primary contacts for each HIA as key stakeholders in the HIA, or for the program, project, policy, or plan examined by the HIA.
- Review of the HIA report for names of stakeholders and decision-makers who had participated in the HIA process.
- Review of the HIA report for entities (such as government agencies, nonprofits, city councils, or other political bodies) involved in determining whether to implement the program, project, policy, or plan being examined by the HIA, and research into decision-makers who were members of these entities at the time the HIA was conducted.
- Referral by other interview respondents.

Using these methods, the study team identified 231 potential interview respondents for the 62 HIAs enrolled in the study. Study team members conducted outreach to these potential interview respondents via email and phone. The researchers planned to conduct interviews with stakeholders representing 60 HIAs (see Exhibit 4) but ultimately completed interviews with 44 stakeholders representing 30 HIAs because of low response rates (see Exhibit 5).

The study team completed interviews in three rounds. The first took place between December 2018 and February 2019 and focused on stakeholders associated with HIAs in Cohort A. The second round took place between May and August 2019 and reached stakeholders associated with cohorts B and C. Follow-up interviews were attempted with Cohort A respondents in September 2019; one interview was completed. Due to a low response rate among Cohort A respondents at follow-up, this interview was excluded from final analysis.

**Exhibit 4.** Planned Number of Interviews and HIAs by Health Determinant Group and Cohort

| Cohort | Access to healthy food (n=24 HIAs) | Safe, affordable, and healthy housing (n=24 HIAs) | Employment (n=12 HIAs) |
|---|---|---|---|
| A (n=10 HIAs) | 8 | 8 | 4 |
| B (n=20 HIAs) | 10 | 10 | 5 |
| C (n=30 HIAs) | 14 | 14 | 7 |

**Exhibit 5.** Completed Number of Interviews and HIAs by Health Determinant Group and Cohort

| Cohort | Access to healthy food (n=8 HIAs) | Safe, affordable, and healthy housing (n=12 HIAs) | Employment (n=10 HIAs) |
|---|---|---|---|
| A (n=9 HIAs) | 1 | 3 | 9 |

| | | | |
|---|---|---|---|
| B (n=10 HIAs) | 5 | 9 | 3 |
| C (n=11 HIAs) | 5 | 7 | 2 |

The study team primarily relied on a deductive coding method for interviews, collaborating on a code book to be used during analysis. The code book also allowed for inductive coding where appropriate. All interviews were transcribed and coded using Atlas.ti qualitative software.

## Community questionnaire

The original study design planned for community questionnaires in 10 locations across the country where an HIA took place. The purpose of this community questionnaire was to understand resident perceptions of changes in community conditions since the time the HIA took place, as well as resident perspectives on the contribution of the HIA to those changes. Target audiences for the community questionnaire included residents involved with the HIA, residents who lived in the community at the time the HIA took place, and residents currently living in the community where the HIA took place. As such, some questions in the questionnaire required prior familiarity with the HIA, while others required no familiarity with it.

Because the community questionnaire focused on long-term outcomes in community conditions, only HIAs in Cohort B (n=19) and Cohort C (n=27) were considered for the community questionnaire. These 46 HIAs were assessed against three additional criteria that would help to identify HIAs that could provide the most robust insights into the effects, if any, of HIAs on community conditions. HIAs were considered for inclusion if:

- The HIA examined a neighborhood, city, or county-level decision.
- The decision the HIA sought to influence had been made.
- At least some of the HIA recommendations were implemented.

Of the 46 HIAs in cohorts B and C, 23 met these criteria. The primary contact for each of the HIAs that met these criteria was contacted in February 2019 to assess their interest and availability for this part of the study. Initial phone conversations were held with each primary contact who responded to describe the purpose, methods, and shared responsibilities for the primary contact and for Harder+Co. All primary contacts were offered a $400 honorarium as a thank-you for their time.

After initial outreach, 10 HIAs were identified as potential candidates for conducting the community questionnaire. Based on preliminary feedback from these contacts, the study team decided to move forward with piloting the questionnaire in three locations to assess the effectiveness of selected data-collection methods and gain initial insights into data collected from these sites.

After piloting the questionnaire in these locations, the study team decided not to pursue additional questionnaire sites because of the level of resources needed to effectively collect data. All hard-copy responses were entered into Qualtrics with existing responses received through the online survey platform. Data were exported into SPSS for cleaning and analysis.

Exhibit 6 summarizes key information about the three sites where community questionnaires were collected, along with the number of responses received. The following sections provide additional detail about each HIA and site-specific administration methods.

**Exhibit 6.**     **Community Questionnaires Were Completed in 3 Cities Where HIAs Took Place**

| HIA name | Location | Temporal cohort | Determinant group | Total respondents | Respondents familiar with the HIA |
|---|---|---|---|---|---|

| | | | | | |
|---|---|---|---|---|---|
| The Crossings at 29th and San Pedro streets | Los Angeles | C | Housing | 112 | 58 |
| Potential full-service grocery store development in a food desert | Indianapolis | C | Food | 91 | 21 |
| Columbia Transit system expansion | Columbia, Missouri | C | Employment | 84 | 38 |

## The Crossings at 29th and San Pedro streets

This HIA was conducted in 2009 to assess the potential health impact of the development of the Crossings, a five-phase development that included affordable housing and services for low-income families in South Los Angeles.

- **Target geography:** The area surrounding the intersection of 29th and San Pedro streets in South Los Angeles. The HIA focused specifically on the four-block area around this intersection, though data collection expanded to a larger area.
- **HIA process:** The HIA was conducted by Human Impact Partners in collaboration with the Los Angeles Association of Community Organizations for Reform Now (ACORN). Data collection for this HIA included analysis of public data, a survey of over 200 community residents, and field observation.
- **HIA recommendations:** The HIA outlined recommendations that addressed the housing development itself (including housing size, affordability, and marketing to local residents), as well as broader community conditions such as neighborhood safety, walkability, public transportation access, healthy food retail, and education.
- **Outcome of the decision:** Results of the HIA were shared with the city council and the housing developer, which planned to use the HIA recommendations to inform housing rates. The housing development at 29th and San Pedro streets was constructed, though the number of units constructed as of this writing (34) is lower than originally anticipated.
- **Primary contact:** A community organizer who was involved in the HIA and helped to collect survey responses from community residents for the assessment agreed to be the primary contact for this community questionnaire.

Through a series of conversations with the primary contact, the study team identified the following site-specific methods:

- **Questionnaire availability.** The questionnaire was made available online and in hard copy in both English and Spanish.
- **Questionnaire distribution.** The primary contact identified in-person data collection as the best method for residents in these communities. The primary contact attended several meetings hosted by community organizations, including the South-Central Neighborhood Council, Alliance for California Community Empowerment, and a local senior center. At these community meetings, the primary contact provided background information about the questionnaires, distributed questionnaires, and collected completed questionnaires from residents. Questionnaires were also distributed to some residents door-to-door or through other one-on-one interactions.
- **Incentives.** Residents received $10 Starbucks gift cards as a thank-you for their time.
- **Data-collection dates:** Data was collected from late May through early July 2019.

## Potential full-service grocery development in a food desert

This HIA was conducted in 2013 to assess the potential health implications of the project in Indianapolis.

- **Target geography:** The Meadows neighborhood on the northeast side of Indianapolis.

- **HIA process:** The HIA was jointly conducted by faculty at the Richard M. Fairbanks School of Public Health at Indiana University and the Marion County Public Health Department. Data collection for this HIA included analysis of public data, an assessment of existing convenience and grocery stores using the Nutritional Environment Measurement Survey, a survey of neighborhood residents, and interviews and focus groups with key informants.
- **HIA recommendations:** The HIA outlined five priority recommendations, including negotiation with the potential new grocery store to ensure inclusion of services that would meet community needs.
- **Outcome of the decision:** The grocery store (Save a Lot) was built in the Meadows neighborhood and has opened to the public.
- **Primary contact:** A Fairbanks School of Public Health professor who led the HIA served as the primary contact for the community questionnaire.

Through a series of conversations with the primary contact, the study team identified the following site-specific methods:

- **Questionnaire availability.** The questionnaire was made available online and in hard copy in both English and Spanish.
- **Questionnaire distribution.** The primary contact taught a hands-on summer course in health impact assessment and volunteered her master of public health students to support the data collection during the summer. Students received talking points and outreach materials, as well as an online training from Harder+Co. staff on outreach strategies. The primary contact and the students distributed questionnaires at several community locations (Save a Lot, a local library, a neighborhood school, the YMCA, a Goodwill store, a neighborhood association meeting, and a senior grocery distribution site).
- **Incentives.** Residents received $10 Target gift cards as a thank-you for their time.
- **Data-collection dates.** Data was collected in May and June 2019.

## Columbia Transit system expansion

This System Expansion HIA was conducted in 2012 to assess the potential expansion or changes to bus routes in Columbia, Missouri, to improve neighborhood connectivity and residents' access to key locations.

- **Target geography:** The city of Columbia.
- **HIA process:** The HIA was led by the Columbia/Boone County Department of Public Health and Human Services, in collaboration with Central Missouri Community Action and PedNet. Data collection for this HIA included analysis of public data, community meetings, and a community survey about transportation and access to health care and employment.
- **HIA recommendations:** The HIA outlined recommendations centered around improving physical activity, exposure to the outdoors, access to basic needs including employment, and creation of a more livable community.
- **Outcome of the decision:** Results and recommendations from the HIA were used by Go COMO, the local transit agency, to design its new transit system. In addition, the city implemented the HIA's recommendation to add a business community representative to its public transit advisory commission.
- **Primary contact:** A senior planner at the Columbia/Boone County Department of Public Health and Human Services served as the primary contact for this community questionnaire.

Through a series of conversations with the primary contact, the study team identified the following site-specific methods:

- **Questionnaire availability.** The questionnaire was made available online and in hard copy in both English and

Spanish.

- **Questionnaire distribution.** Initially, Harder+Co. and the primary contact agreed to rely primarily on online distribution methods as a first step toward reaching residents of Boone County. This route was chosen because of the potential to share the questionnaire via a newsletter received by all public utility subscribers, as well as active social media accounts used by the Columbia/Boone County Department of Public Health and Human Services. Ultimately, the public utility newsletter declined to share the questionnaire due to space constraints. The questionnaire was shared via the department's Facebook and Twitter accounts. While initial advertisements brought in a small number of responses, the questionnaire also received a large number of responses that appeared fraudulent. As a result, Harder+Co. and the primary contact decided to move forward with distribution of paper copies of questionnaires to community residents. The primary contact also worked with partner departments to make the questionnaire available at community locations, including the department's front desk, clinic, WIC location, and bus transfer points.
- **Incentives.** Residents received $10 Walmart gift cards as a thank-you for their time.
- **Data-collection dates.** Data was collected from June through September 2019.

## Synthesis of data using rubric analysis

The study team used a rubric approach to synthesize data across multiple sources related to each outcome. For this study, two separate rubrics were developed:

- The **impact rubric**, which assessed the degree to which available evidence suggests HIAs contributed to improvements in the study's outcomes.
- The **quality rubric**, which assessed the completeness and relevance of data for each HIA and provided additional insights into HIA practice and evaluation.

The sections below describe how each rubric was designed and how data was analyzed to calculate rubric scores.

### Impact score

The study team developed a rating scale to assess the impact of enrolled HIAs on each of the study's six outcomes. The rating scale included four levels:

- **Minimal impact.** Available evidence suggests that HIAs in the health determinant group have made limited contributions to improvements in the outcome.
- **Emerging impact.** Available evidence suggests that HIAs in the health determinant group are beginning to contribute to improvements in the outcome.
- **Established impact.** Available evidence suggests that HIAs in the health determinant group have contributed to a moderate level of improvement in the outcome.
- **Advanced impact.** Available evidence suggests that HIAs in the health determinant group have contributed to a high level of sustained improvement in the outcome.

For each level, the study team developed a definition describing the amount of evidence needed (including the key criteria and the percentage of HIAs meeting those criteria) to be classified at that level. Impact scores were calculated for each outcome and each health determinant group.

To calculate an outcome's impact score, the study team analyzed and reviewed all data for the outcome specific to one health determinant group. The study team reviewed, discussed, and compared evidence across all data sources to the rubric's impact score definitions to arrive at group consensus about the impact score for the specified outcome and health determinant group.

0 presents the impact score rubric, including the outcomes, associated dimensions for each outcome, and descriptions

of criteria needed to achieve each level of impact.

**Exhibit 7.        Impact Score Rubric**[*]

| Outcome | Dimension | Advanced impact | Established impact | Emerging impact | Minimal impact |
|---|---|---|---|---|---|
| Implementation of HIA recommendations | Inclusion of HIA recommendations into policy, program, plan, or project | Most HIAs with available data indicate that all recommendations were implemented, or there are plans to implement them | Most HIAs with available data indicate that some or all recommendations were implemented, or there are plans to implement them | Some HIAs with available data indicate that some recommendations were implemented, or there are plans to implement them | Most HIAs indicate that no recommendations were implemented, or that there are no plans to implement them |
| Impact on awareness of assigned health determinant | HIA raised awareness of health determinants for community | Most HIAs with available data show evidence of raising awareness of health determinants among community members AND decision-makers | Most HIAs with available data show evidence of raising awareness of health determinants among community members OR decision-makers | Some HIAs with available data show evidence of raising awareness among community OR decision-makers | Few HIAs with available data show evidence of raising awareness among community OR decision-makers |
| | HIA raised awareness of health determinants for decision-makers | | | | |
| Capacity building | Capacity of community facing inequities to influence decisions | Most HIAs with available data show evidence that communities facing inequities have increased capacity to influence decisions after the HIA | Some HIAs with available data show evidence of increased capacity among communities facing inequities to influence decisions after the HIA | Some HIAs with available data show evidence of increased capacity among communities to influence decisions after the HIA, but communities are not necessarily those facing inequities | Few HIAs with available data show evidence of increased capacity among communities facing inequities to influence decisions after the HIA |
| Sharing power | Inclusiveness of governments and institutions (change in decision-making attitudes or behaviors) | Most HIAs with available data show evidence of greater inclusiveness of governments and institutions, with special attention to communities facing inequities | Some HIAs with available data show evidence of greater inclusiveness of governments and institutions, with special attention to communities facing inequities | Some HIAs with available data show evidence of greater inclusiveness of governments and institutions, without special attention to communities facing inequities | Few HIAs with available data show evidence of greater inclusiveness of governments and institutions |
| Changes in determinants of health | Changes in selected health determinants (in general) | Most HIAs with available data show evidence that the HIA | Some HIAs with available data show evidence that the HIA | Some HIAs with available data show evidence that the HIA contributed to | Few HIAs with available data show evidence that the HIA |

| | | | | | |
|---|---|---|---|---|---|
| | HIA's influence on changes in health determinants | contributed to improvements in the health determinant, including decreased disparities | contributed to improvements in the health determinant, including decreased disparities | improvements in the health determinant, *but without any decrease in disparities* | contributed to improvements in the health determinant |
| | Changes in disparities of selected determinants of health | | | | |
| Changes in determinants of health equity | HIA's influence on determinants of health equity | Most HIAs with available data show evidence that the HIA contributed to improvements in at least one indicator of health equity (including government-community relationships, experiences of racism, OR systematic allocation of resources) | Some HIAs with available data show evidence that the HIA contributed to improvements in at least one indicator of health equity (including government-community relationships, experiences of racism, OR systematic allocation of resources) | Some HIAs with available data show evidence that the HIA contributed to changes on the pathway toward improvement in at least one indicator of health equity (including government-community relationships, experiences of racism, OR systematic allocation of resources) | Few HIAs with available data show evidence that the HIA contributed to changes on the pathway toward improvement in at least one indicator of health equity (including government-community relationships, experiences of racism, OR systematic allocation of resources) |

\* The following definitions apply throughout the rubric:

- **"Most HIAs"** means at least 75% of HIAs with available data.
- **"Some HIAs"** means 30% to 74% of HIAs with available data.
- **"Few HIAs"** means less than 30% of HIAs with available data.

## Data-quality score

Each data source was assessed based on the completeness and quality of data collected and on targets set out in the original study design. The data-quality score rubric (see Exhibit 8) included four levels, based on the total possible sum of data-quality subscores for each outcome. The total possible sum was divided into quartiles:

1. **Strong data.** Sum of subscores is 75% to 100% of the total possible sum.
2. **Good data.** Sum of subscores is 50% to 74% of the total possible sum.
3. **Fair data.** Sum of subscores is 25% to 49% of the total possible sum.
4. **Poor data.** Sum of subscores is 0% to 24% of the total possible sum.

The following methods were used to develop data-quality subscores for each data source:

- **Eligibility and enrollment questionnaires.** For each outcome, each dimension (where applicable), and each health determinant group, the study team calculated the data quality subscore for eligibility and enrollment questionnaires using the following formula:

  (Number of HIAs with data available for the outcome) ÷ (Total number of completed HIAs enrolled in the

health determinant group)

The implementation of HIA recommendations outcome was assessed only for HIAs complete at the time of the eligibility and enrollment questionnaires. Therefore, HIAs still in progress were not included in this subscore calculation.

- **Document review.** For each outcome, each dimension (where applicable), and each health determinant group, the study team calculated the data quality subscore for document review using the following formula:

   (Number of HIAs with data available for the outcome) ÷ (Total number of completed HIAs enrolled in the health determinant group)

The implementation of HIA recommendations outcome was assessed only for HIAs complete at the time of document review. Therefore, HIAs still in progress were not included in this subscore calculation.

- **Key stakeholder interviews.** For each outcome, each dimension (where applicable), and each health determinant group, the study team rated each interview based on the following scale*:*

   o **Rating of 2.** The interview respondent was informed about both the outcome and part of the decision-making entity considering the project, plan, program, or policy considered by the HIA.

   o **Rating of 1.** The interview respondent was informed about the outcome or part of the decision-making entity considering the project, plan, program, or policy considered by the HIA.

   o **Rating of 0.** The interview respondent was informed about neither the outcome nor part of the decision-making entity considering the project, plan, program, or policy considered by the HIA.

   o **Missing.** Three outcomes areas (implementation of HIA recommendations, changes in social determinants of health, and changes in determinants of health equity) were assessed in interviews only if the HIA was complete at the time of the interview. If the HIA was still in progress, a rating was not calculated.

The study team then calculated the final data quality score for each outcome, each dimension (where applicable), and each health determinant group using the following formula:

   (Sum of interview ratings) ÷ (Total number of target numbers in the original study design)

- **Community questionnaire data.** For each outcome, each dimension (where applicable), and each health determinant group, the study team calculated the data quality subscore for community questionnaire data using the following formula:

   (Average number of valid responses across questions associated with the outcome) ÷ (Target number of responses for those questions in original study design) ÷ (Target number of community questionnaire sites in original study design)

- **Population data indicators.** For each outcome, each dimension (where applicable), and each health determinant group, the study team calculated the data quality subscore for population data indicators using the following formula:

   (Total number of HIAs with public data indicators available) ÷ (Total number of HIAs in cohorts B and C)

Once calculated, the study team summed subscores for each outcome and each health determinant group and compared those scores with the four levels in the data-quality rubric. (See Exhibit 9.)

**Exhibit 8.        Data-Quality Score Rubric**

| Outcome | Dimension | Strong | Good | Fair | Poor |
|---------|-----------|--------|------|------|------|

| Implementation of HIA recommendations | Inclusion of HIA recommendations into policy, program, plan, or project | Sum of average data subscores across HIAs and data sources is between 3 and 4 | Sum of average data subscores across HIAs and data sources is between 2 and 2.9 | Sum of average data subscores across HIAs and data sources is between 1 and 1.9 | Sum of average data subscores across HIAs is between 0 and 0.9 |
|---|---|---|---|---|---|
| Impact on awareness of assigned health determinant | HIA raised awareness of the health determinant for community | Sum of average data subscores across HIAs and data sources is between 3 and 4 | Sum of average data subscores across HIAs and data sources is between 2 and 2.9 | Sum of average data subscores across HIAs and data sources is between 1 and 1.9 | Sum of average data subscores across HIAs and data sources is between 0 and 0.9 |
| | HIA raised awareness of the health determinant for decision-makers | | | | |
| Capacity building | Capacity of community facing inequities to influence decisions | Sum of average data subscores across HIAs and data sources is between 2.25 and 3 | Sum of average data subscores across HIAs and data sources is between 1.5 and 2.24 | Sum of average data subscores across HIAs and data sources is between 0.75 and 1.4 | Sum of average data subscores across HIAs and data sources is between 0 and 0.74 |
| Sharing power | Inclusiveness of governments and institutions (change in decision-making attitudes or behaviors) | Sum of average data subscores across HIAs and data sources is between 1.5 and 2 | Sum of average data subscores across HIAs and data sources is between 1 and 1.4. | Sum of average data subscores across HIAs and data sources is between 0.5 and 0.9 | Sum of average data subscores across HIAs and data sources is between 0 and 0.4 |
| Changes in determinants of health | Changes in selected health determinants (in general) | Sum of average data subscores across HIAs and data sources is between 3 and 4 | Sum of average data subscores across HIAs and data sources is between 2 and 2.9 | Sum of average data subscores across HIAs and data sources is between 1 and 1.9 | Sum of average data subscores across HIAs and data sources is between 0 and 0.9 |
| | HIA's influence on changes in health determinants | | | | |
| | Changes in disparities of selected health determinants | | | | |
| Changes in determinants of health equity | HIA's influence on determinants of health equity | Sum of average data subscores across HIAs and data sources is between 2.25 and 3 | Sum of average data subscores across HIAs and data sources is between 1.5 and 2.24 | Sum of average data subscores across HIAs and data sources between 0.75 and 1.4 | Sum of average data subscores across HIAs and data sources is between 0 and 0.74 |

**Exhibit 9.     Data-Quality Subscores, by Data Source, Outcome, and Health Determinant Group**

| | Eligibility and enrollment | Document review | Key stakeholder interviews | Community questionnaires | Population data indicators | Sum of data-quality subscores |
|---|---|---|---|---|---|---|

| Implementation of HIA recommendations | | | | | | |
|---|---|---|---|---|---|---|
| Access to healthy food | 0.6 | 0.6 | 0.4 | NA | NA | 1.6 |
| Employment | 1.0 | 0.4 | 0.6 | NA | NA | 2.0 |
| Safe, affordable, and healthy housing | 0.6 | 0.5 | 0.8 | NA | NA | 1.9 |
| **Impact on awareness of assigned health determinant** | | | | | | |
| Access to healthy food | NA | NA | 0.9* | NA | NA | 0.9 |
| Employment | NA | NA | 1.4* | NA | NA | 1.4 |
| Safe, affordable, and healthy housing | NA | NA | 1.5* | NA | NA | 1.5 |
| **Capacity building** | | | | | | |
| Access to healthy food | NA | NA | 0.5 | 0.1 | NA | 0.6 |
| Employment | NA | NA | 0.9 | 0.4 | NA | 1.3 |
| Safe, affordable, and healthy housing | NA | NA | 0.9 | 0.2 | NA | 1.1 |
| **Sharing power** | | | | | | |
| Access to healthy food | NA | NA | 0.5 | NA | NA | 0.5 |
| Employment | NA | NA | 0.9 | NA | NA | 0.9 |
| Safe, affordable, and healthy housing | NA | NA | 0.8 | NA | NA | 0.8 |
| **Changes in determinants of health** | | | | | | |
| Access to healthy food | NA | NA | 0.6 | 0.5* | 0.4* | 1.5 |
| Employment | NA | NA | 0.7 | 1.2* | 1.0* | 2.9 |
| Safe, affordable, and healthy housing | NA | NA | 0.8 | 0.7* | 0.1* | 1.6 |
| **Change in determinants of health equity** | | | | | | |
| Access to healthy food | NA | NA | 0.5 | 0.1 | NA | 0.6 |
| Employment | NA | NA | 0.8 | 0.3 | NA | 1.1 |
| Safe, affordable, and healthy housing | NA | NA | 0.8 | 0.2 | NA | 1.0 |

* Represents the sum of subscores for multiple dimensions assessed with a single data source.

## Demographics of community questionnaire respondents compared to American Community Survey data

The study team compared the demographics of questionnaire respondents to the demographics of the HIA study area (as documented in the American Community Survey [ACS] 2013-17 five-year estimates) for each of the three community questionnaire sites to understand how these populations differed from each other.

### The Crossings at 29th and San Pedro streets

Compared to ACS 2013-17 estimates:

- A higher percentage of questionnaire respondents spoke Spanish.

- A higher percentage of respondents were female.
- Questionnaire respondents had a higher median age.
- A higher percentage of respondents had incomes below $35,000.

## Potential full-service grocery store development in a food desert

Compared to ACS 2013-17 estimates:

- A higher percentage of questionnaire respondents spoke English.
- A lower percentage of respondents were Hispanic or Latino, and a higher percentage were African American.
- A higher percentage of respondents were female.
- A higher percentage of respondents had incomes below $35,000.
- The mean number of children per household was higher among respondents.

## Columbia Transit system expansion

Compared to ACS 2013-17 estimates:

- A higher percentage of questionnaire respondents spoke English.
- A higher percentage of respondents were Hispanic or Latino, and a higher percentage were African American or multiracial.
- A higher percentage of respondents were female.
- A higher percentage of respondents had incomes below $35,000.
- A higher percentage of respondents had a high school education or less.
- Mean household size and mean number of children per household were higher among respondents.

For detailed demographic data related to the community sites, please email healthimpactproject@pewtrusts.org.

# Public data

## Access to healthy food

This study examined the number of food deserts[4] in census tracts aligned with six HIAs completed between 2012 and 2014. The analysis compared the number of census tracts with food deserts within each HIA's study area in 2010 and 2015 to determine whether there had been an increase or decrease in the number of food deserts within each area during that time frame.

As shared in the report, the data was inconclusive as to whether HIAs decreased food deserts overall, with no discernable pattern emerging. (See Exhibit 10.) For three of the six HIAs, U.S. Department of Agriculture data showed no food deserts in 2010 or 2015. Each of these three HIAs focused on small geographic areas composed of very few census tracts. The remaining three HIAs focused on relatively larger geographic areas (entire counties or an entire state); two of those HIAs showed a small *increase* in the number of food deserts, and one HIA showed a small *decrease* in the number of food deserts.

**Exhibit 10.    No Clear Pattern Emerged for Change in the Number of Food Deserts Due to HIAs**

*Number of census tracts designated as food deserts by USDA for 2010 and 2015, for select HIA study areas*

| Year HIA completed | Geographic area | Total census tracts | Food desert census tracts, 2010 | Food desert census tracts, 2015 |
|---|---|---|---|---|
| 2014 | Mecklenburg County, North Carolina (partial) | 2 | 0 | 0 |
| 2012 | Suffolk County, Massachusetts (partial) | 2 | 0 | 0 |

| | | | | |
|---|---|---|---|---|
| 2013 | Marion County, Indiana (partial) | 3 | 0 | 0 |
| 2013 | Kane County, Illinois (all) | 81 | 8 | 6 |
| 2012 | Hawaii County, Hawaii (all) | 33 | 9 | 12 |
| 2013 | Tennessee (all) | 1,496 | 237 | 270 |

## Housing

To examine the potential impacts of HIAs focused on housing, the study team obtained ACS data on two indicators:

- **Housing affordability.** The percentage of the population within an HIA's study area that was considered burdened by housing costs (households spending more than 30% of their income on rent or mortgages).
- **Housing availability.** The vacancy rate within the HIA study area (proportion of housing units that were unoccupied).

This study considered only two HIAs, both of which were at the state level. Data was limited to this small subset of HIAs for several reasons, including limiting the analysis only to HIAs that:

- Informed decisions with a significant housing component.
- Had study areas with a population of 65,000 or more (since ACS one-year estimates were not available for smaller population sizes).
- Were conducted within the time frame for which ACS one-year estimates were available (2009-17).

There was a small reduction in metrics examined for affordability and availability of housing. (See Exhibit 11.) In the case of housing cost burden (affordability), the change was between 2.1 to 3.2 percentage points over three years. In the case of housing vacancy (availability), the change was 0.1 to 0.5 percentage points over three years—in practical terms, the change was trivial. Because these HIAs examined entire states, it is not possible to account for all factors other than the HIA that may have influenced this trend—for example, economic growth, national and state policies, demographic shift, etc.

**Exhibit 11.    Rent-Burdened Households Decreased Modestly, While Vacant Units Were Virtually Unchanged**

*Proportion of rent-burdened households and housing units vacant pre- and post-HIA*

| Year HIA completed | Geographic area | Pre time point | Post time point | % of population overburdened with housing costs | | Vacancy rate (spreadsheet calculated) | |
|---|---|---|---|---|---|---|---|
| | | | | *Pre* | *Post* | *Pre* | *Post* |
| 2014 | Massachusetts | 2014 | 2017 | 32.0% | 29.9% | 9.9% | 10.0% |
| 2014 | Ohio | 2014 | 2017 | 28.6% | 25.4% | 10.8% | 10.3% |

**Employment**

To examine the potential impacts of HIAs focused on employment, the study obtained ACS data on the unemployment rate within an HIA's study area (the proportion of working-age individuals currently unemployed but seeking employment), as well as the proportion of the population within the study area in households determined to be below the federal poverty level.

This study considered six HIAs, five of which were at the state level, and one conducted in a large city. Data was limited to this small subset of HIAs for several reasons, including limiting the analysis only to HIAs that:

- Informed decisions with a significant employment component.
- Had study areas with a population of 65,000 or more (since ACS one-year estimates were not available for smaller population sizes).
- Were conducted within the time frame for which ACS one-year estimates were available (2009-17).

Unemployment rates decreased substantially across all six of the HIAs examined relative to the baseline or pre time point. (See Exhibit 12.) Changes were in the range of -1.3 to -3.8 percentage points difference compared to baseline. Excluding the largest and smallest changes, the range was from -2.1 to -2.7 percentage points. While these changes may indicate improvement in these indicators, they are likely due to larger shifts in employment on a macroeconomic scale, which mirror national trends within the same time period. Therefore, it is difficult to attribute this change to the impact of HIAs, without accounting for external factors.

Changes in poverty level were mixed across HIAs, without a clear trend. Poverty worsened for three HIAs and improved for the remaining three HIAs. Again, it is likely that these figures were heavily influenced by national and state trends and demographic shift. However, even if this change could be wholly attributed to the impact of HIAs, there is no clear pattern since HIAs were split between improvement and worsening of poverty.

**Exhibit 12.     Unemployment and Poverty Increased During the Great Recession, and Decreased After It**

*Change in unemployment rate and poverty rate for select HIA study areas, pre- and post-HIA*

| HIA completed | Geographic area | Pre time point | Post time point | Unemployment rate (%) | | % below poverty level | |
|---|---|---|---|---|---|---|---|
| | | | | *Pre* | *Post* | *Pre* | *Post* |
| 2014 | Massachusetts | 2014 | 2017 | 6.7% | 4.6% | 11.6% | 10.5% |
| 2014 | Los Angeles | 2014 | 2017 | 9.0% | 6.3% | 19.8% | 17.4% |
| 2009 | Massachusetts | 2009 | 2014 | 9.1% | 6.7% | 10.3% | 11.6% |
| 2009 | New Hampshire | 2009 | 2014 | 7.8% | 5.1% | 8.5% | 9.2% |
| 2009 | Maine | 2009 | 2014 | 7.2% | 5.9% | 12.3% | 14.1% |
| 2012 | Kentucky | 2012 | 2017 | 9.3% | 5.5% | 19.4% | 17.2% |

# Endnotes

[1] Health Impact Project, "HIAs and Other Resources to Advance Health-Informed Decisions: A Toolkit to Promote Healthier Communities through Cross-Sector Collaboration," accessed Dec. 15, 2019, www.pewtrusts.org/healthimpactproject/toolkit.

[2] The study team limited this analysis to cohorts B and C based on the availability of data since the HIA took place and on the defined evaluation questions for each cohort.

[3] M. Hillemeier et al., "Data Set Directory of Social Determinants of Health at the Local Level" (Centers for Disease Control and Prevention, 2004), https://www.cdc.gov/dhdsp/docs/data_set_directory.pdf.

[4] For this analysis, a census tract was considered a food desert if it was low income and had low access to grocery stores, defined as containing at least 500 people or 33% of the population living 1 or more miles away from a grocery store in urban areas or 10 or more miles away in rural areas. The USDA definition of a food desert used in this study is not universally accepted. Local researchers and HIA practitioners may have used their own definitions of food deserts, tailored to local conditions. A census tract may not meet the USDA's definition of a food desert while simultaneously being considered or perceived as a food desert by local residents and decision-makers. It is therefore challenging to use standardized, national-level data to assess changes among a diverse set of geographies.