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**CEI's Neighborhood Housing Conditions  
Survey  
In Academic and Civil Context**

by

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## **CEI's Neighborhood Housing Conditions Survey in Academic and Civil Context**

### **Abstract:**

There is a growing awareness that the condition of the built environment has a substantial impact on health. Systematic housing conditions surveys are a method for developing information about the physical condition of housing. This paper considers the Center for Economic Information's (CEI) Neighborhood Housing Conditions Survey (NHCS) in light of other academic and civic housing conditions surveys. The paper also reviews the method and history of the NHCS. We find that housing conditions surveys are generally designed from scratch for each new research program, the process of translating survey results into policy remains under-developed in the scholarly literature, and heterogeneity between surveys reduces the ability to compare observations across space and time. The NHCS may address some of these issues, suitable as an "off the shelf" template, modifiable to suit programmatic needs and providing a baseline consistency across space and time.

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## **Introduction**

The purpose of this paper is to introduce the Center for Economic Information's (CEI) Neighborhood Housing Conditions Survey. There are two complimentary sections of the paper: the first contextualizes our survey in terms of other similar surveys, the second includes a history of the Neighborhood Housing Conditions Survey's implementation and a description of how the survey is carried out, and. The CEI's Neighborhood Housing Conditions Survey (hereafter NHCS) embodies a consistent methodology for gathering parcel level data about the urban built environment. The NHCS was designed to be a benchmarking tool for the identification and analysis of material public policy but over time the applications of the tool have changed. Taking our cues from well-established connections between the built environment and health outcomes (Krieger and Higgins 2002), we present the NHCS as a promising method for compiling observations about the built environment which constitute social determinates of health. The NHCS has been carried out 22 separate times (spanning the years 2000-2023) in the Kansas City, Missouri metropolitan area. Our survey embodies an archive of information describing the changing parcel level conditions of Kansas City. The basic parcel level GIS necessary to carry out and visualize the survey is now widely available, the NHCS is a good candidate for widespread implementation.

## **Contextualization of the NHCS**

The NHCS uses a standard methodology to generate ratings that are reliable over time, space, and between surveyors; it is readily conceptualized as a type of Systematic Social Observation (SSO), an observational approach the sociologist Albert Reiss described as, "observation and recoding done according to explicit procedures which permit replication and ... which permit the use of the logic of scientific inference." (Reiss 1971) The SSO approach is applied wherever the condition of public space is relevant to the phenomenon being studied (Sampson and Raudenbush 1999; Wei et al. 2005; King 2015; Baggetta and Bredenkamp 2021). SSO as a research methodology is often used by criminologists to understand geographic contributions to incivilities (Sampson and Raudenbush 1999; Odgers et al. 2012). There is, however, no reason for the objective observation of the built environment to be limited to such

applications. Systematic social observation is a profoundly adaptable tool, for instance it is used to understand how buildings and meeting rooms influence the organizational relationships and connections made among Civil Society Organizations (Baggetta and Bredenkamp 2021). The SSO approach is also amenable to applications which seek to quantify the impact of the built environment in the production of health outcomes (Schuch, Curtis, and Davidson 2017), an approach which compliments epidemiological approaches that build on the knowledge of lay persons regarding their own health (Cannuscio et al. 2009).

Though NHCS operates in the tradition of the Chicago School of Urban Sociology the majority of the NHCS sponsors did use the survey for academic purposes. Many different organizations and agencies have sponsored NHCS surveys without the intention of producing peer-reviewed research. The City of Kansas City, Missouri commissioned CEI's original Housing Conditions Survey to inform public housing policy. Other implementations of the survey were sponsored by the Unified Government of Wyandotte County, the National Institutes of Health, the American Recovery and Reinvestment Act, Greater Kansas City Local Initiatives Support Corporation, and the U. S. Department of Housing and Urban Development, among others. The diversity of funders underscores the variety of uses to which the NHCS has been and can be put. The NHCS fills an important niche, providing reliable quantified information about the built environment amenable for use in data-driven planning and assessment of public policy and private initiatives.

In this section we divide visual-assessment housing surveys broadly by academic and civic application. There is considerable overlap between these two categories in practice, with academic work, ideally, supporting civic undertaking and vice versa. The work of the CEI's NHCS falls into both these categories. The NHCS was not designed for academic use, however in the past decade it has increasingly been put to those uses. In our summary of civic applications of housing condition surveys, we draw extensively on the National Neighborhood Indicators Partnership (NNIP). In our engagement with academic work we are focusing on applications relevant to public health and epidemiology (rather than the criminology applications previously mentioned).

## *Civic Applications*

Our review of systematic civic surveys of the urban environment is limited to the work done by the organizations associated through NNIP. By reviewing NNIP parcel level survey work begun between 2006 and 2018 we are able to summarize a representative cross-section of programmatic civic assessments of housing conditions and thereby contextualize the NHCS. NNIP is a “learning network, coordinated by the Urban Institute” representing 30 cities from across the United States (“About NNIP | NNIP” 2023). The organizations associated through NNIP are independent. To qualify for membership in NNIP an organization must be a locally focused data intermediary with recurrently updated information on neighborhood conditions and working on enabling the use of data in policy making and community development. A specific emphasis on the “institutions and residents of distressed neighborhoods” is another important criterion. NNIP is a knowledge sharing network and as such reciprocity and participation in networking events is a requirement of member organizations. There is a tradition of using NNIP to improve public health that reaches back several decades (Howell et al. 2003). The CEI currently an alumni member of NNIP.

A 2018 review of NNIP housing conditions survey initiatives indicated that housing conditions surveys have taken place in Memphis, Pittsburg, Camden, Boston, Cleveland, Dallas, Detroit, Manhattan, Providence, Philadelphia, Atlanta, Memphis, Washington D.C., and Fort Worth (A high-level summary of five of these programs is provided in Supplementary Material S.1). The cost and extent of these surveys varied considerably. For instance, the 2008 survey in Memphis cost \$338,000 dollars for 200,000 parcels (~\$1.70 per parcel), while \$600 dollars were allocated for the Providence survey of 42,000 parcels (~\$0.01 per parcel). Further heterogeneity of the programs extends to the types of structures surveyed (residential, commercial, both), whether photo documents were collected in addition with the survey material, a record of the type of building (vacant, single family, apartment, etc.), how the physical condition of buildings are described (indicating fire damage, codes violation yes/no, detailed ratings of multiple housing characteristics), and the degree to which information was gathered about the surrounding built environment (streetlights, road conditions, the presence of curbs etc.).

The heterogeneity of the NNIP surveys may create the impression that they are a hodge-podge, without substantive similarities. However, such an impression is misleading when taking into account the varied purposes and constraints of these survey initiatives. A memo compiled to guide the Pittsburg NNIP partner (hereafter Gradek Memo) in the creation of a new housing survey instrument enumerates key lessons for the task.

The Gradek memo contains useful advice for designing and implementing a housing conditions survey. Some advice is similar to that which can be found in academic publications; “solicit input of community organizations in developing the collection instrument” (Brown and Kyttä 2014) and “It is best to survey specific elements of a community (individual properties, sidewalks, etc), and aggregate up to block or neighborhood levels to produce totals”(B. Wilson, Wilson, and Martin 2019), institute “Training and data reliability checks” [*Kevin, do you have a good paper on quality control protocols we can cite here?*]. Other advice is no less critical but unlikely to be found in an academic paper. He writes “survey instruments should be “idiot-proof”, “be aware of safety issues”, and that “co-ordination of data collection efforts is essential” for high quality consistent data (Gradek 2009).

Those points notwithstanding, the first point mentioned in the Gadek memo is critical: “Have a clear sense of how the data will be used after it is collected. The purpose should drive the effort” (Gradek 2009). Combining this lesson with the truism that funding is always limited implies that the heterogeneity of the NNIP surveys is by design. The initiatives in which surveys are deployed address a polyphony of concerns thus the instruments will be tuned differently (sometimes radically so) in different locales. Housing conditions surveys are purpose-built instruments subject to limitations in time, funding, and labor power. With that in mind it would be a remarkable coincidence if these surveys exhibited a convergence regarding scale, scope, cost, or category.

The diversity of the NNIP cross section underscores the importance of neighborhood residents and researchers working in a reciprocal manner to identify, collect, and utilize information about the urban environment. This process of reciprocal collaboration is discussed in the scholarly literature as Data Driven Organizing (DDO) whereby the process of collecting information about the environment organizes the stakeholders who are related to the data being

gathered (Teixeira and Wallace 2013). DDO is intended to build on and engage with the tacit knowledge neighborhood residents have about their environment and experiences (Cannuscio et al. 2009). Relevant to this review, the survey mentioned in Teixeira and Wallace (2013) was designed by an NNIP affiliate, instituted in a manner consistent with DDO, and produced new knowledge sufficient for academic publishing. CEI's experience carrying out the NHCS was added to the knowledge base which produced the Pittsburg memo, the survey used in Teixeira and Wallace (2013), and the survey activities alluded to above.

### *Academic Literature*

With respect to the academic literature on housing conditions surveys we introduce three methods to contextualize the NHCS: the quality of the instrument, the method of gathering data, and the second-order structure of the surveys in the literature. We do not attempt a systematic review of the housing conditions survey literature. Other researchers have performed a systematic review of the housing conditions surveys used in the academic literature (Pineo et al. 2018) we discuss but do not replicate that work.

One method to contextualize the housing conditions survey is by using established metrics to judge the desirable properties of a survey. The quality of a survey instrument can be judged according to the criteria of cost, coverage (or completeness), availability, validity, and accuracy (King 2015). Alternatively the survey instrument can be judged by the outcome of the process it is in service to, *i.e.* a survey used in a project focused on remediating vacant homes can be judged in relation to remediated homes (Pineo et al. 2020).

The five judgement criteria can be applied to sample data to choose among survey options. For instance, the criteria of completeness can help a research team decide between different implementations of a survey, for instance in-person assessment vs. remote viewing (King 2015). To utilize these criteria most accurately the judgment must be based on surveys implemented on the same location (an "apples to apples comparison"). Alternatively, the judgment criteria can help a research team decide among potential surveys to implement. Cost, accuracy, validity all inform the choice of a survey aimed at the parcel geography versus point geography. These criteria touch on issues of scale (*i.e.* zip code v. parcel) and exactness (*i.e.* street centerline vs parcel centroid) enabling the survey to meet its purpose (Zandbergen 2009;

Briant, Combes, and Lafourcade 2010; Kaplowitz, Perlstadt, and Post 2010). Cost per parcel will vary with the geography of choice. Surveys that ascribe observations to larger geographies are, other things equal, less expensive than surveys that focus on smaller geographies (i.e. block level surveys are cheaper than parcel level surveys). The additional criteria of flexibility was suggested in a review of the NHCS (B. Wilson et al. 2018; B. Wilson, Wilson, and Martin 2019); the section which follows provides the details for the reader to make these judgments for themselves.

Alternatively, we can group surveys by how they are implemented. The NHCS is carried out by paid, trained surveyors via slow moving car. Windshield surveys of this sort have an extensive history which is at least as old as the SSO technique (Callan 1971; Keczmerski and Sorter 1984; Nickelson et al. 2013). Other transportation options are possible; it is possible to carry out the survey via bicycle, though this is uncommon (Kwate and Saldaña 2011). A hybrid approach, between in-person and remote-surveying is the video geo-narrative. In that case a digital video recording of housing is made in the field then analyzed in the laboratory (Schuch, Curtis, and Davidson 2017). The last decade has seen the development of the automated assessment of housing conditions via field photography (Odgers et al. 2012; Bader et al. 2015). There is a literature about potential bias in visual assessments and reliability of google street view based instruments (Clarke et al. 2010; Smith, Kaufman, and Mooney 2021). Assessment via moving vehicle forces the surveyors to work at the speed of the machine, and thereby lowering the labor cost of the survey. Remote sensing methods amplifies the imperatives of speed and low labor costs. The technique of survey implementation has implications for data driven organizing. Remote viewing is less amenable to the organization of people in the data gathering process.

A third method for contextualizing the NHCS is with respect to a systematic review of housing surveys utilized in the context of health research (Pineo et al. 2018). The authors of “Urban Health Indicator Tools of the Physical Environment: a Systematic Review” use a five-class taxonomy (spatial scale, purpose, topic, scope and formation) to understand the diversity of “Urban Health Indicator Tools” (UHI). For instance, 145 UHI are identified, 13 of which utilize a comparable spatial scale to the NHCS. The authors refer to that scale as “less than neighborhood level” (Pineo et al. 2018). According to this five-class taxonomy the NHCS is at



the < Neighborhood spatial scale, used for the purposes of local benchmarking and research, on the topic of Health and Wellness related concept, with a broad scope incorporating the environment, health, and economic data, existing in a digital format.

After reviewing the survey instruments themselves the authors identify two implied but unaddressed issues in the academic literature. The first issue is one of missed opportunity: a focus on the development and validation of tools rather than on the way these tools are used in public policy and decision making. The resources that go into the development of a housing conditions survey seldom extends to translating survey findings into policy. In the measurement of the efficacy of the tool (cost, coverage, availability, validity, and accuracy) translation into policy is seldom considered. This is a lost opportunity to consolidate the continuum of ends and means. The second issue follows from the number and diversity of tools available: there is no consensus on how and what to measure in the urban environment; “[d]espite the large number of tools already available, researchers continue to contribute new international indicator sets while implicitly supporting standardization” (Pineo et al. 2018, 614). These issues point to gaps in the state of scientific knowledge and additional areas for research.

In the context of understanding the systematic review it is useful to understand the structure wherein an article about a survey instrument is typically first in a sequence of papers generated by a health research agenda. For instance, the paper “Validity of an Ecometric Neighborhood Physical Disorder Measure Constructed by Virtual Street Audit” (Mooney et al. 2014) introduced a new surveying technique. The survey instrument introduced in this paper was followed by several methodology papers interrogating and expanding the technique (Bader et al. 2015; Quinn et al. 2016; Mooney, Bader, et al. 2017; Rundle, Bader, and Mooney 2022), and several papers applying the technique connecting public health issues with the built environment (Joshi et al. 2017; Mooney et al. 2016; Mooney, Joshi, et al. 2017). This pattern is not a problem in itself, but it does illustrate how the incentives for new publications as part of a burgeoning research agenda support the proliferation of survey techniques.

The pattern of survey proliferation is particularly notable in this case because the research agenda begun with “Validity of an Ecometric...” fits in with the best practices in survey application literature and specifically encourages a type of survey convergence. The Bader et. al

article fits into this literature by incorporating as much geographic variation as possible, as many questions as possible, and a data gathering technique that is as consistent as possible. The Bader article uses Google Street View to rate a random sample of 300 census tracts from metropolitan areas across the USA. Their rating instrument was designed to incorporate as many different existing survey elements as possible including: elements of the Irvine-Minnesota Inventory, the pedestrian Environment Data Scan, the Maryland Inventory of Design Qualities as well as aspects of the Project on Human Development in Chicago Neighborhoods and the New York Housing and Vacancy Survey (Bader et al. 2015, 168). A total of 187 survey items from 300 dispersed census tracts gathered from photographs led to the Rundle et al review of various machine learning approaches to “Urban Health Informatics” (Rundle, Bader, and Mooney 2022). There in an algorithm is trained to automatically perform the visual assessment and in a second stage regression techniques are used to data mine the results (Random forest, LASSO, etc.). Promising as this attempt at survey convergence may seem, this research agenda may be a dead end. Data collection through Google Street View violates the terms of service stated on the website (“Permissions – Google” n.d.), a major hit to the generalizability of the underlying methodology.

This section has conceptually rather than descriptively contextualized the NHCS among civic and academic survey instruments. The NHCS stands closer to the civic applications of housing conditions surveys. The expertise embodied in the CEI staff from implementing the survey was added to the NNIP joint stock of knowledge, flowing from there indirectly to the academic literature. Rather than generating the typical publication pattern of an academic research agenda the NHCS generated years of fugitive literature, reports for clients that were interested in issues of governance and policy implementation. The NHCS has been used in several scholarly publications, but these occurred before the survey technique was separately introduced into the scholarly literature (Kennedy 2011; B. Wilson, Wilson, and Martin 2019; N. J. Wilson et al. 2023). The following section contains descriptive information by which the NHCS can be further understood (history of the survey, how it is carried out, how much information is gathered about each parcel, how many parcels were surveyed, who carried out the survey and for what ends, what are the mechanics of the survey, cost of implementation).

## **Development of CEI's Neighborhood Housing Conditions Survey**

The NHCS was initially developed to measure aspects of the housing stock and residential infrastructure as an aid in community development through community asset mapping. CEI's role in the initial development of the NHCS was funded by a HUD Community Outreach Partnership Center grant at the University of Missouri Kansas City (COPC-MO-97-091). Ed Linnebur of the Kansas City Neighborhood Alliance (KCNA)—a local Community Development Corporation (CDC) operating under a regional charter—had designed the initial survey in collaboration with David Park who was, at that time, Director of the City of KCMO's Department of Neighborhood and Community Services. Designed to focus on the identification of property maintenance code violations, the initial project was called the Neighborhood Codes Academy, and neighborhood volunteers were trained by Ed Linnebur to conduct the survey in roughly 120 faceblocks of KCMO's 49/63 Neighborhood Coalition. CEI staff worked with Linnebur to coordinate data collection with mapping of results using geographic information systems (GIS) desktop computer applications on the city's digital parcel geography. The success of this pilot project established the basis for a long ongoing collaboration between CEI and KCNA on further implementation of the NHCS that lasted until KCNA finally closed its doors in 2006, after which CEI continued the NHCS on its own.

Shortly after the completion of the 49/63 pilot, CEI and KCNA were awarded a contract by the City of KCMO for the survey of ~ 85,000 residential parcels (constituting 100 percent of ~ 60 urban core neighborhoods), financed with Community Development Block Group funding (Bowles 2000). That survey was initially conducted by students recruited from the UMKC Urban Affairs program, but also eventually by paid surveyors, which became the standard methodology going forward. It was completed in the spring of 2002, and results are reported in the Final Report for the City of Kansas City, Missouri (Contract No. 1999-32). In 2001, before the KCMO survey was completed in 2002, CEI and KCNA were awarded another major contract by the City of Kansas City, Kansas to survey another ~ 35,000 residential parcels contiguous with the KCMO urban core, conferring on the NHCS a bona fide regional character. The KCKs survey work was completed in [xxxx] and the final report was issued on [*Title and date of final KCKs final report here*].

The early reporting about the survey articulates a clear vision for the NHCS, “*It is a powerful planning tool and it establishes a baseline that can be used to evaluate the effectiveness of housing policy*” (Eaton, Hernandez, and Olson, n.d., italics original). Early economic reports list eight distinct development agendas in Kansas City before suggesting that the NHCS can be used to evaluate these agendas on a consistent basis (Bowles 2000).

The discussion of indicators and benchmarking in the NNIP guidebook, “Building and Operating Neighborhood Indicators Systems”, frames the significance of the NHCS. An emphasis of the NHCS is on developing benchmarks, or “a reference point or criterion against which to judge one's own performance”, that exist at the finest level of detail that is cost-effective to produce in terms of labor time and money (“Building and Operating Neighborhood Indicator Systems: A Guidebook” 1999, 18). Benchmarking is a part of different kinds of civic work; from directing public infrastructure spending to directing private investment; from characterizing physical neighborhood conditions to supporting research into the nexus of health and the built environment. These systematic housing conditions surveys became the basis of an archive of neighborhood level indicators and a core piece of a data driven neighborhood development model (Bowles and Eaton 2010).

### *Overview of previous surveys*

Beginning in 2000 and continuing through the present day, the CEI has carried out 23 separate housing conditions surveys in the Kansas City metropolitan area. Table 1 describes the NHCS by program, year, date of survey and number of parcels surveyed. Several surveys took place over several years. In some years multiple surveys took place. Some surveys were quite large while others were relatively small. The first KCMO housing conditions survey looked at 82,081 parcels while the Sugar Creek survey looked at only 1,790. In the 23 years of the survey 262,016 parcels received ratings.

The NHCS has been carried out on both sides of the state line in metropolitan Kansas City. It has been funded by federal CDBG program funds, municipal budgets, and by numerous regional nonprofits with an agenda for data-driven community development. The data gathered in the KCMO housing survey was used as pilot data to develop the strategic housing plan of the city of KCMO and to guide infrastructure investment by the city (programs 3, 18). Over it's lifetime, it has been used extensively by neighborhood associations and non-profit community

development organizations to inform and evaluate their programmatic efforts. For almost twenty years, it served as the backbone of CEI’s online neighborhood indicators program.

The method for determining which parcels were to be surveyed has changed from program to program. All programs focused on residential parcels though some gathered data about commercial properties as well (programs 18, 29). Some programs only looked at individual neighborhoods (programs 12 - 16, 22, 24, 25), some looked at multiple neighborhoods while focusing on those expected to have a preponderance of substandard conditions (programs 26, 27). One program focused on Kansas City drew a random sample of parcels from the city (program 30), another program looked at all the houses within randomly drawn circles of 1-mile diameter scattered across the metro area (program 18), yet another held the task of establishing baseline conditions for a federal Urban Green Impact study (program 29).

**Table 1: NHCS Overview - programs, years, dates, # surveyed**

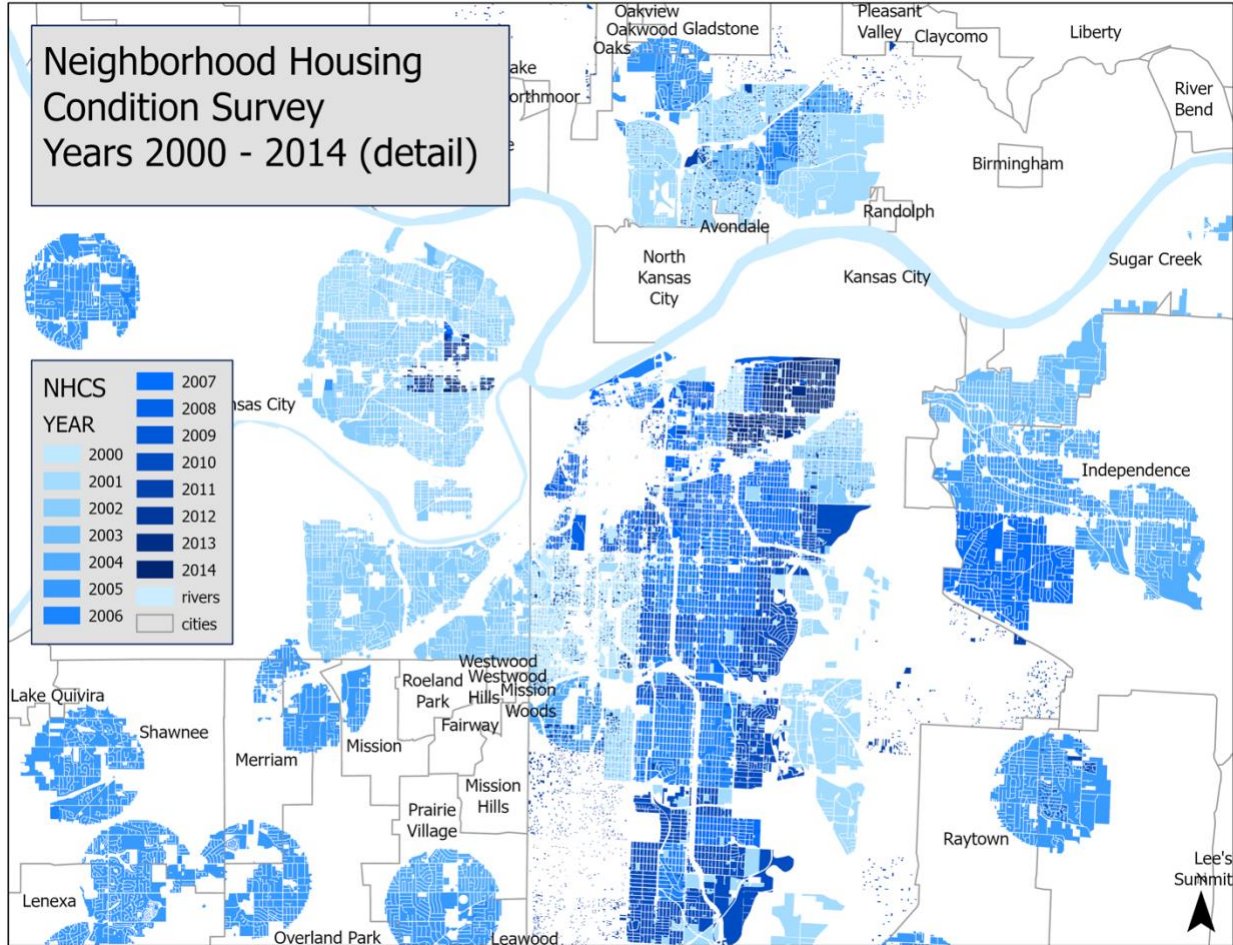
Program #	Name	Year	First Inspection	Last Inspection	Parcels Surveyed
3	KCMo Housing Survey	2000	4/6/00	12/10/00	34893
3	KCMo Housing Survey	2001	1/10/01	12/24/01	47091
3	KCMo Housing Survey	2002	1/7/02	2/25/02	97
6	UMKC HRG Toxic Environment Pilot (residential)	2001	4/8/01	8/10/01	1139
8	KCKs/Wyandotte County Unified Gov't Housing Survey	2001	11/10/01	12/31/01	7230
8	KCKs/Wyandotte County Unified Gov't Housing Survey	2002	1/2/02	12/21/02	24591
8	KCKs/Wyandotte County Unified Gov't Housing Survey	2003	3/1/03	12/12/03	11
12	Blue Valley NHCS 2002	2002	11/8/02	11/21/02	3377
13	Sugar Creek	2003	3/21/03	6/6/03	1790
14	Independence	2003	3/6/03	9/24/03	1964
15	Northland Neighborhoods (Chaumiere, Winwood)	2003	4/11/03	8/3/03	1583
16	Blue Hills NHCS 2003	2003	12/8/03	12/31/03	813
16	Blue Hills NHCS 2003	2004	1/9/04	3/9/04	2378
18	NIH03 Surveys 1&2 (NACS; Survey 1: NHCS/Res; Survey 2: DSI/Nonres)	2004	3/4/04	12/31/04	9777
18	NIH03 Surveys 1&2 (NACS; Survey 1: NHCS/Res; Survey 2: DSI/Nonres)	2005	1/2/05	12/16/05	30888
18	NIH03 Surveys 1&2 (NACS; Survey 1: NHCS/Res; Survey 2: DSI/Nonres)	2006	1/13/06	3/14/06	276

19	Independence 2004 (area 2)	2004	3/16/04	6/18/04	1653
21	Independence 2005	2005	3/5/05	5/12/05	3973
22	cg003 Vineyard	2005	4/22/05	6/9/05	2001
24	KCMo Housing Survey	2006	6/28/06	12/12/06	15473
25	Independence Housing Survey	2007	5/1/05	6/19/07	4705
26	KCMo Housing Survey (2007)	2007	7/26/07	11/21/07	15442
27	KCKs Housing Survey (2008)	2007	9/19/07	9/20/07	484
28	KCMo Housing Survey (2008)	2008	7/7/05	11/9/08	15612
29	Green Impact Zone NHCS (2009 - 2010)	2009	10/6/09	12/2/09	3756
30	KCMo Housing Survey (2010)	2010	6/18/10	10/28/10	15991
31	KCMo Housing Survey (2011)	2011	7/9/11	8/18/11	8101
32	LISC CSI Grant funded Housing Survey (2012)	2012	10/10/12	12/14/12	899
32	LISC CSI Grant funded Housing Survey (2012)	2013	7/28/13	7/28/13	111
32	LISC CSI Grant funded Housing Survey (2012)	2014	7/21/14	7/23/14	446
33	KCMo Blight Study-Lykins/Indian Mound (2012)	2012	11/10/12	12/20/12	329
33	KCMo Blight Study-Lykins/Indian Mound (2012)	2013	1/10/13	9/13/13	5368
34	Impact Lead-Kansas City	2023	1/03/23	5/8/23	3275
Total	23 programs	2000 - 2014	4/6/00	7/23/14	265,517

n.b. The total number of parcels surveyed includes 3,499 parcels with no associated housing conditions observations.

Figure 1 illustrates the patchwork effect created by the 23 NHCS programs each of a different size and scope. Some neighborhoods (e.g. the East Side and Historic North East neighborhoods) were rated several times while other neighborhoods and incorporated places (e.g. Edwardsville, Riverside, Liberty, Lees Summit) received little or no survey attention. The observed variability by year and geography is attributed to funding and motivations changing from program by program. Despite those shortcomings the duration and scale of the NHCS makes it a useful resource for studying the built environment in the Kansas City Metropolitan Area.

Figure 1: Map of NHCS Geography



The survey is flexible across two analytical dimensions, geographic and application. Considered as a whole, the NHCS is a large collection of observations (nearly 5 million data points) at the parcel level. This level of geographic resolution and the volume of observations make the housing conditions survey idea for use in public health applications though this is not the use for which the survey was designed (Kennedy 2011). Many observational analyses are performed at an aggregative geographic level, census tract for instance, though a more refined geography is preferable (Manson et al. 2009; Kaplowitz, Perlstadt, and Post 2010). It is possible to aggregate the parcel level observations in such a way that health analyses can be performed at a personal level, but results can be reported at a higher level such that the anonymity of the participants is not compromised.

The NHCS is comprised of observations of residential and non-residential parcels, with and without a structure. An aspect of the NHCS that makes it useful for applications such as health research is that it gathers objective structural classification as well as gathering conditions data about the structures themselves. Structural classification data include precise street address, structure type (including no structure), use type, structure profile, and whether there is a visible address associated with any structures on the property. Some programs gathered auxiliary information about the parcels such as whether it was a rental property or not, the city and county parcel id, and whether the owner of the parcel lives at the address. This auxiliary information is listed in supplementary material SM 2.

The NHCS is designed to provide up-to-date administrative knowledge about the parcels themselves, descriptive content regarding parcel content and architecture, and ordinal rankings for housing conditions. Updating parcel-level knowledge involves comparing the content of maps made from administrative GIS layers with observations in the world. In practice this means splitting individual parcels into multiple parcels, combining multiple parcels into single parcels, and updating the parcel's visible address whenever it differs from official records. Administrative maps provided to the survey team can be out of date and the NHCS is designed to account for such instances.

The descriptive information gathered by the survey is grouped into four categories: structure type, use type, residential type, structure profile. These categories generate a parcel level inventory of the presence, use, and architectural characteristics of the buildings in the area subject to the NHCS. This architectural information is finer grained than what is available in zoning maps and liberates some of what is in proprietary real estate listings.

The ordinal rankings of housing conditions are the main content of the NHCS. The conditions are grouped into three general categories: structure, grounds, and infrastructure. There are five housing conditions grouped under each of the three categories. The five conditions in the structure category are roof, foundations and walls, windows and doors, porch, and exterior paint. The five conditions in the grounds category are private walks & drives, lawn, vehicles, litter, open storage. The five conditions associated under the infrastructure umbrella are public walks, curbs, streetlights, catch basins, and street condition.

Each of the housing conditions (roof, foundation and walls, windows and doors, porches, and exterior paint) is rated using a five-level ordinal ranking. A score of 1 is the lowest, 5 the



highest. A score of 6 indicates that the condition is not applicable to the condition in question, implying either the lack of a structure on the parcel or the absence of that particular facet of housing (e.g. a home without a porch would receiving a rating of 6 as would a vacant lot). Thus the percentages of parcels with 6 ratings reported in table 3 vary slightly from roof to porch and so forth. The roof rating contains an additional score, 7, which indicates either a flat roof or an obstructed view of the roof. Ratings of 4 and 5 indicate conditions with respectively, good and excellent ratings. There is more variation in the rating system among substandard or worse conditions. Across all conditions a score of 3 or less indicates a substandard housing condition while scores of 1 and 2 indicate severely deteriorated and seriously deteriorated conditions. A rating of substandard or worse suggests a condition that would be violation of Kansas City, MO housing codes.

When summarizing the results of all 23 NHCS programs by housing conditions rating it is important to be circumspect. Much of the metropolitan area has been surveyed more than once, several parts have been surveyed many times, and yet much of the metro area has never been surveyed. These percentages reported in Table 2 refer only to the housing conditions survey in total, we do not expect the housing conditions in various neighborhoods to reflect the percentages reported. Still, general trends in housing conditions are apparent. About 16% of the parcels surveyed are vacant lots and 2.75% of the roofs were un-ratable for one reason or another. Roof ratings also diverge from the rest of other conditions in that it does not contain a preponderance of excellent ratings. Foundation and Walls conditions have the highest percentage of good and excellent ratings and the lowest percentage of each of the ratings substandard or below. All housing conditions exhibit a narrow range (30% – 34%) of good ratings. Critically, the percentage of substandard or worse rating is less than 35% of the total number of surveyed parcels. The outlier again being roof conditions with no other conditions within 8% of its figure. The percentage of deteriorated parcels is uniformly less than 6% with exterior paint exhibiting the largest percentage of ratings of severely deteriorated.

**Table 2: Percentage of housing conditions receiving each rating**

	Rating						
	1	2	3	4	5	6	7
Roof	0.87%	4.92%	28.59%	33.96%	13.03%	16.22%	2.76%
Foundations and Walls	0.33%	0.87%	6.26%	33.76%	42.87%	15.83%	0.00%

Windows and Doors	0.80%	1.63%	8.09%	31.23%	42.35%	15.90%	0.00%
Porch	0.57%	2.29%	13.26%	30.41%	36.17%	17.30%	0.00%
Exterior Paint	1.64%	3.88%	18.66%	34.03%	25.87%	15.93%	0.00%
Private Walks	4.61%	5.27%	20.04%	33.24%	22.22%	14.62%	0.00%
Lawn	1.75%	2.13%	10.83%	27.52%	57.77%	0.00%	0.00%
Vehicles	0.29%	0.73%	2.92%	5.54%	90.53%	0.00%	0.00%
Litter	0.53%	1.21%	5.34%	13.60%	79.32%	0.00%	0.00%
Open Storage	0.44%	0.83%	4.23%	11.42%	83.08%	0.00%	0.00%
Public Walks	5.46%	4.20%	10.26%	20.15%	20.07%	39.86%	0.00%
Curbs	5.83%	8.45%	12.19%	31.38%	25.16%	16.99%	0.00%
Streetlights	1.22%	0.21%	0.38%	3.07%	95.11%	0.01%	0.00%
Catch basins	0.20%	0.26%	0.66%	1.56%	4.77%	92.54%	0.00%
Street Condition	0.72%	0.69%	5.73%	43.04%	49.37%	0.45%	0.00%

When interpreting these statistics and using the housing conditions ratings in more complicated statistical applications, it is important to recall the NHCS is an ordinal rating system. Higher ratings are always indicative of superior conditions, a condition rated at 4 is of superior quality to a 3, 2 or 1. However, the relative magnitudes of the distance between ratings are not consistent across the scale. The change in observed quality between a condition with ratings 2 and 3 is not equivalent to the change in that same condition between 3 and 4. Similarly, the magnitude of change in one condition between two ratings is not equivalent to the magnitude of change between two ratings of a different condition. The only consistency between ratings is that a rating of 3 or lower may correspond to a housing code violation.

The NHCS is not a codes enforcement tool, surveyors do not report parcels in violation to municipal authorities, however the NHCS is indexed to municipal building codes. In this way the NHCS provides more information than a dichotomous codes violation while maintaining the possibility that it could be collapsed into such a system and potentially used in combination with similarly structured ratings systems.

Training and Quality Control

The NHCS includes comprehensive training and quality control procedures. As mentioned, the survey was designed for a rating of 3 or lower to suggest a housing condition in violation of local building codes; this design feature connects the internal ordinal ratings system

to the independent judgement of codes enforcement and the associated legal establishment. To ensure the ratings are consistent from program to program and researcher to researcher everyone that administers a field survey is required to complete a three-part classroom-and-field training regimen. The instructor needs to understand the survey instrument and its application in the real world.

The structure of training through in-class and field instruction is consistent with best practices discussed in the published literature (Caughy, O'Campo, and Patterson 2001; Teixeira and Wallace 2013). For the first several years of NHCS application, the survey developer with our KCNA partner served as trainer. After KCNA closed its doors, senior CEI staff took over that role. The classroom session is focused on learning the ratings guide that is contained in supplementary material SM2. After the classroom session there is an in-field instructional session where the ratings guide is demonstrated with examples from the neighborhood. These two sessions are each approximately 3-4 hours long. The field examination is focused on 2 certification blocks, approximately 70 parcels. To pass their field examinations potential raters must return ratings with scores which have an absolute mean difference of less than one when compared with the scores established by the trainers. If potential surveyors fail their field exam they return to the classroom for additional instruction. Similarly, to prevent a drift in ratings during large survey operations, a brush up course is required after three months in the field. After one has gone through the training, certification, and survey process she is qualified to instruct others in carrying out the survey.

There are a few steps required before training can begin. The team will need access to REDCap (the current version of the NHCS runs on this software) and tablet computers with which to fill out the survey questionnaire, supplementary material SM3 contains a printout of the current version of the REDCap survey. The team will need a GIS layer corresponding to parcel geography of the certification area and the area which is intended to be surveyed. (Typically, this layer originates as and is obtained from a municipal digital land cadaster.) The software should be pre-loaded with block and parcel level identification variables; these will save the surveyors the time of entering the address and other identification information while in the field. The survey trainers should have the certification blocks chosen and the ratings established before the training process begins.

After certification surveyors go into the field to record their observations. In addition to their tablets with which to perform the survey, the rating team brings a high-resolution map of the neighborhood being surveyed to orient themselves and to mark up with notes about the urban landscape. Surveyors also use a tracking sheet to organize notes about differences between the GIS parcel layer and observed neighborhood conditions.

There is a structured process of generating certified datasets after the field surveys have been completed. First the comments on the paper map and tracking sheet are examined line by line and used to update the GIS parcel map. This routinely involves splitting and merging parcels in GIS to reflect the built environment. Then the tracking sheet is reviewed for ambiguities not accounted for in the survey proper. In the third step the REDCap data is joined to the administrative parcel layer in GIS. After this join process the survey observations are ready to be visualized. Typically, ‘structure type’ is the first layer visualized as a test for survey completeness. Field after field are visualized and examined for inconsistencies. A comprehensive list of inconsistencies is created and the survey team is sent back into the field to resolve these issues. These ‘mop-up’ observations are merged with the GIS data. Now the survey results are certified and ready for use.

There are two important points to note about NHCS ‘certified’ data sets. First, while the parcel geography modified in the field for the purposes of the survey typically originates as part of a legal land survey and property ownership land cadaster record, once modified and adopted for the survey it no longer possesses that precise and legal character. It may reflect numerous inexact field observations unverified in property ownership records. Second, the modified parcel geography and the collected survey data (for any given area, neighborhood, etc.) constitute a ‘matched set.’ That is, the survey data can only be properly attached to, mapped, and spatially analyzed with the modified parcel geography for which it is certified.

### *Implementation History*

In its two decades of use the neighborhood housing conditions survey has gone through several iterations. The survey currently exists as a REDCap survey; REDCap is a secure and proprietary web-based platform for building and managing surveys and databases. The NHCS began as a paper survey that was scanned into a database after the field work and before the GIS

work (do we know when these transitions happened?). Migrating away from the paper survey eliminated the possibility of transposition error and accelerated the process of data entry. After the original KCMO and KCKs surveys, the first digital implementation of the NHCS was via Personal Desktop Assistant (PDA). Survey datasets were downloaded to PDA, taken into the field for data collection, and collected data was then uploaded to an Microsoft Access database where error correction and consolidation took place. An Excel spreadsheet was then exported as the certified dataset. Beginning with completion of the very first KCMO survey in 2001, NHCS results were uniformly published online by CEI's CityScope internet map server and neighborhood indicators service. Version 2.1 of CityScope was decommissioned in 2020 during the long COVID pause and has not since been restored.

The original 2000-2001 KCM) housing condition survey cost approximately \$350,000 for a survey of 82,081 parcels (~\$4.25 per parcel). In 2014 the cost of an additional survey of 2,559 parcels was estimated at approximately \$20,000, about \$7.50 per parcel. Smaller surveys are more expensive on a per parcel basis than larger surveys. Larger surveys benefit from economies of scale and are more economical than smaller surveys because they both run into the same fixed costs. These costs include the University overhead for facilities and administration as well as the cost of training and certification born by the CEI alone. Logically, the largest NHCS program benefited the most from economies of scale and this was also the survey carried out on paper and transcribed. This means that it is difficult to see the cost saving benefit from the digitization of the survey in the retrospective per parcel cost of implementation.

## **Discussion**

The CEI's NHCS stands astride from prior academic and civic housing surveys on several fronts. The flexibility of the NHCS in terms of what it has been used for—benchmarking, public policy, community development programming, and health research—is unique among the survey literature we have reviewed. The depth of information gathered—ratings of fifteen five-level housing conditions and an additional ten classes of observations all at the parcel level—is unique among the survey literature we reviewed, particularly with regard to how many years the NHCS has been used.

There are aspects of the NHCS as a dataset that would still benefit from investigation. For instance, we do not know the pace at which housing quality changes. Our twenty years of observational data have captured gentrification and neighborhoods in decay. It may be possible to observe how housing conditions spread, in terms of both improvement and deterioration. There is no reason to expect these changes to be consistent across housing types and among neighborhoods with significant differences (in terms of age of housing stock, population demographics, population density, etc). Such research would be a welcome addition to the body of longitudinal research into neighborhood change.

There are some issues with housing conditions surveys that should be considered. As a ‘windshield’ survey there are visibility limitations (vegetation, inaccessible streets, flat roofs) that impact the completeness of the survey. Parcel level observations are atomizing by their nature. As an investigative tool observational metric parcel level observations may be warranted, however there is a gestalt aspect of neighborhood-ness that exists beyond parcel level. This is one tool among many and should not be thought of as making systematic thinking irrelevant or unnecessary. A neighborhood does not emerge from a simple summing up of its houses and houses don’t exist only at the parcel level (crucial aspects of infrastructure like electrical and water service are networked). The NHCS is only as useful as the ends to which it is put.

There is an implicit acceptance of the legal framework that structures the NHCS ratings system in terms of local building codes. The survey is indexed to Kansas City codes enforcement and this may not be appropriate if we are to study housing expansively. For instance there are some living situations—encampments of the unhoused for instance—which are an important part of the built environment but do not translate well into the NHCS ratings schema. Conversely the 5-level ordinal scoring is superior to a dichotomous pass-fail building code indicator. The NHCS schema facilitates the investigation of associations between health and the built environment with refined precision at the upper and lower ends of the ratings spectrum.

The method of survey implementation is related to the ideals of data-driven organizing. Implementation via the windshield survey, remote viewing, or google maps all separate the survey team from the neighborhood being surveyed. Recall, one of the motivating logics of DDO is that the process of gathering information about the neighborhood organizes the constituents towards the overall goals of the project. Survey methods which operate at a remove from the neighborhood may impair this aspect of DDO. Addressing this question is a suitable research

topic; does survey implementation technique have an effect on the implementation of overarching project goals? This question fits well within a larger research agenda which seeks to connect housing condition surveys to their use in policy implementation. Answers to these questions about implementation and the connection between survey instruments and the policies they are used for may be contained in the back catalog of NNIP housing conditions surveys. The totality of the NNIP housing conditions surveys represents a large diverse dataset that is national in scope; the systematic examination of these NNIP surveys as a group may yield insight into these questions of how the surveys themselves are used in policy implementation and the upstream questions that seek to connect survey implementation with the down-stream policy goals.

Finally, given the odious uses to which the legibility of housing conditions have been used in the 20th century—of which redlining is the most notorious (Gotham 2014; Rothstein 2017)—it is important the NHCS and similar surveys are not used as a tool of discrimination and displacement.

### **Conclusion**

Works remains to be done, we do not completely understand the information contained in the collected NHCS data. For instance, rate of change analysis could be accomplished by selecting only those parcels that are rated in more than one program. Comprehensive correlation analysis between the several housing, grounds and infrastructure ratings should be performed for the individual homes within the variety of geographies and temporalities. Local incidence of spatial autocorrelation can be performed to discover patterns in the housing, grounds, and infrastructure ratings between parcels.

An algorithm can be devised to associate the parcel level observations of the early years of the NHCS with the more recent block level NHCS. The ‘eyeball’ nature of the housing conditions survey implies it may be possible to automate future surveys through a combination of remote sensing observations and artificial intelligence ratings. However, questions remain as to whether the correct direction for housing surveys is towards their automation or towards something more in keeping with DDO.

There are several advantages to the NHCS as designed and implemented. The parcel level observations of housing, grounds and infrastructure conditions are at a usefully precise geographic level resolving major issues around the modifiable aerial unit problem [cite]. The process of actively looking at the city can create a feedback loop which can allow researchers to find, in essence, that for which what they did not set out to look. Surveying every parcel in a specified geography allows researchers to update municipal records. These updates are relevant to vacant parcels and postal addresses but are less relevant to updating vacant structures. The NHCS as it has been carried out is a labor-intensive operation, but this can be understood as an advantage to the degree to which it produces detailed, useful information that is otherwise unavailable. Surveying the entire metropolitan area on a regular basis could be the basis of a ‘shovel-ready jobs program’ while the results of the survey could feed into targeted employment programs.

Parcel level GIS is attainable for every city in the United States and is useful for many applications: to direct funds for public infrastructure where they are most needed, to further the understanding of the nexus of housing and health, and to capitalize on the current state of knowledge about housing and health for directed investment. The accumulation of longitudinal housing conditions will aid all of these agenda. Conversely there is value in the ability to find unexpected connections that are not an explicit aspect of research design. This is a vote against the lean, just-for-purpose surveys.

Work needs to be done to consolidate survey instruments such that observations of housing conditions are consistent across space and time. There is value in the ability to synthesize housing condition observations across unconnected research aims and civic applications. There should be an “off the shelf” survey available for civic and academic use and a clearing house for modifications and extensions of common survey designs such that surveys can be both fit for purpose and connected across agenda. The NHCS in its comprehensive design and extensive history is a good candidate for consideration towards such an end.



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Supplementary Material SM1: Taxonomy of NNIP Housing Conditions Survey

	Memphis	Manhattan	Philadelphia	Reading, PA	Providence
<b>Property Type</b>	Vacant lots Duplex, tri-plex or quad Apartments Parks/playground Single Family Home	Vacant lot Building Apartment Mixed Use Single Family Home Commercial Only	0-6 scale	Mixed residential/commercial Small commercial & industrial properties Small or medium-sized "infill" vacant lots	
<b>Building ID</b>	Property Name Picture	Survey Date Surveyor Name Photo# & Camera # Address Mark property on map Number of Stories	Picture Address		Picture Address
<b>Yard Signage</b>	None For sale For rent Both: Company info	Yes/No If yes; contact info For sale For rent			
<b>Occupancy</b>	Occupied Vacant Unknown	Commercial Vacant: Residential Vacant: Yes/No/Unsure			Included in tax records
<b>Commercial space</b>		Yes/No; if yes, # of floors Part of a commercial row: Yes/No Are adjacent commercial spaces vacant: Yes/No Are adjacent spaces residential: Yes/No If yes, are they vacant: Yes/No/Unsure			
<b>Property Boarded</b>	Open Partially Boarded Boarded up	Windows and/or Door Sealed Yes/NO If yes, with: Wood/Cement/Chain/Gate/Other			Check
<b>Posted</b>	Red or white flag from code enforcement				
<b>Multiply Properties on One Parcel</b>	check if applies				
<b>Foreclosure Information</b>	Evidence of Foreclosure Foreclosed Property in Good condition Foreclosed Property in Poor condition				External Databases
<b>For Parks Only</b>	Broken playground equipment Tall grass Overflowing trash receptacles) Unusable tennis/basketball court Litter Graffiti				
<b>Structural Problems</b>	Cosmetic Repairs Only Some structural repairs needed Extreme Dilapidation Burnout Outbuilding/Garage needs repair/replacement	Roof: Open/Partially Missing/Shingles Missing, Worn/Good Condition/NA Gutters: Most Missing, Falling/Some Damage/Good Condition/NA Walls: Major openings, collapse/minor openings, leaning/good condition/NA Windows: Most missing, broken/several missing, broken/good condition/NA Porch/Stoop: Missing/Falling Deteriorated/Worn/Good Condition/NA			Unsecure Fire Damage
<b>Evidence of construction</b>		Yes/No If yes, type: Scaffold/Visible Permit/Other			
<b>Recommend Site Visit</b>		Yes/No; if yes why: Partially abandoned/Not boarded, looks vacant/Other			
<b>Grounds</b>	Evaluate	Lot Unkempt: Yes/No			
<b>Debris/Dumping</b>	Evaluate				
<b>Crime and Disorder</b>	Squatters Public consumption of drugs or alcohol Prostitution Group loitering Physically/Verbally threatened Chop shop Other suspicious/inappropriate commercial activity Graffiti sprayed on exterior walls Drug dealing Panhandling Animal Threatening Pedestrians Suspected Animal Abuse Steady stream of "drive-thru" or pedestrian traffic	Graffiti: Yes/No			
<b>Vacant Lots</b>		Condition: Fenced/Empty/Overgrown/Garbage Dump/Parking			
<b>Anecdotal Evidence</b>		Additional comments			
<b>Block Condition</b>	Faulty streetlights Roadway in Poor Condition Signs damaged or missing Animal Control Issue Unkempt median Curbs in poor condition				
<b>Adjacent Sites</b>					

**Supplementary Material 2:  
Housing Inventory Ratings Descriptors Sheet**

Category	Residential-1	Non Residential-2	Vacant Lot-3	Parking Lot-4	Park-5	Residential Commons-6
Structure Type	Intended use for people to live in	Intended use for people to work in	No structure on parcel	Parcel used to park vehicles	Parcel used for public recreation	Common area around residential structure

Category	Residential-1	Non Residential-2	Mixed-3	U/R-4	N/A-5
Use Type	Used for people to live in	Used for people to work in	Used for living and working	Unable to rate intended use	Vacant lot

Category	Detached-1	Detached-2	Attached-3	Apartment-4	Non Residential-5	N/A-6
Residential Type	Single family dwelling	Duplex-2 family unit	Attached structure, multifamily	One building for multifamily	Intended use for people to work	Vacant lot

Category	Single Level-1	2-Story-2	3- Story-3	4-6 Floors-4	7+ Floors-5	N/A-6
Structure Profile	Single story structure	Two story structure	Three story structure	Four to Six story structure	Seven or more story structure	Vacant lot

Category	Yes-1	No-2			
Visible Address	Address visible from street	Address not visible from street			

Category	1	2	3	4	5	U/R=6	N/A=7
<b>Roof Rating</b>	Hole-sagging-rot, F & S	No hole-sagging-rot, F&S	Serious deterioration	Slight deterioration	No deterioration	Cannot be seen	If it is a vacant lot
<b>Foundation &amp; Walls</b>	Hole, bulges, +25% gone	Slight leaning, +25% rot	No leaning, -25% replace	Needing some paint	Well protected		If it is a vacant lot
<b>Windows &amp; Doors</b>	Open to entry, W&D miss	No entry, few openings	Some broken, needing paint	No broken, need paint	No broken, no painting		If it is a vacant lot
<b>Porches</b>	Serious leaning, rot, unsafe	Slight leaning, rot, safe	Evidence of lean, paint need	No leaning, paint needed	No leaning or paint needed		If it is a vacant lot
<b>Exterior Paint</b>	+50% need paint, +2wks	50-10% need paint +2wk	-10% need paint, no rot	No peeling, some fading	Paint in great shape		If it is a vacant lot
<b>Private Sidewalks &amp; Drive</b>	+1 trip & miss, grvl, weeds	No trip, +cracks, all replaced	+50% needs to be replaced	Few cracks, some patching	No cracks present		If they are not present
<b>Lawn &amp; Shrubs</b>	3' high, shrubs cover entries	1-3' high, shrubs unkempt	1' high, shrubs some shape	-1' high, weeds, shrubs ok	-6" high, shrubs great		
<b>Vehicles</b>	+3 auto,disabled,unlicensed	1-3 auto,<1dis or unlicensed	1 auto, parked in yard, drive	1auto unlicensed, disabled	No vehicles in yard, dis, unl		
<b>Litter</b>	Trash & brush, dump truck	Trash & brush, pick up load	Trash & brush,1-5trashbags	Trash & brush, 1 trash bag	No Trash & brush present		
<b>Open Storage</b>	Would fill 2 car garage	Would fill 1 car garage	Would fill a storage shed	Cluttered appearance	No unacceptable items		
<b>Sidewalk</b>	+1 trip & + ½ missing	½-1/4 missing, 1 trip	No trip, cracks,-1/4 replace	Cracks present, no replace	No cracks, in good shape		If it is not present on propty
<b>Curb</b>	No curb, but exists on block	+1/2 curb needs replacing	-1/2 curb needs replacing	Some wear, no replace	No wear, in good shape		If it does not exist on block
<b>Street Lights</b>	No street lights on block	+8 houses apart, tree issue	+6 houses apart, tree issue	5 houses apart, some tree	5 houses apart, no tree		
<b>Catch Basins</b>	Severe condition; dangerous, H <sub>2</sub> O	Severe condition; no danger	Leaf, trash, blocking drain	Some leaf, trash, still works	No blocking, good cond.		No catch basin present
<b>Street Condition</b>	+7 potholes, serious hazards	6-3 potholes, deteriorated	-2 potholes, just patching	No pot holes just cracks	No cracks, smooth surface		

# Supplemental Material SM3: CEH Housing Conditions Survey

Please complete the survey below.

Thank you!

Today's date:

\_\_\_\_\_

Primary surveyor:

\_\_\_\_\_

Secondary surveyor:

\_\_\_\_\_

Block:

\_\_\_\_\_

Parcel ID:

\_\_\_\_\_

Parcel existing address:

\_\_\_\_\_

Block ID and parcel counter (SID)

\_\_\_\_\_

Name of the block

\_\_\_\_\_

Side of street of parcel

\_\_\_\_\_

Address street number

\_\_\_\_\_

Address street number extension

\_\_\_\_\_

Address street direction

\_\_\_\_\_

Address street name

\_\_\_\_\_

Address street type

\_\_\_\_\_

Concatenated Parcel Address

\_\_\_\_\_

Toggle to show or hide "Ratings Cheat Sheets" for Classification ratings below.

Show Ratings Cheat Sheets?

Is the parcel's address visible from the street?

Yes  
 No

Does the visible address match the existing address?  Yes  
 No

(If there is no previously listed address for this parcel, mark "no")

Parcel existing address: [parcel\_current\_address]

Please enter the correct parcel address:

---

Structure Type:  Residential (intended for living in)  
 Non-residential (intended for working in)  
 What is the structure of the parcel?  Vacant Lot (no structure on parcel)  
 Parking Lot (for parking vehicles)  
 Park (for public recreation)  
 Residential Commons (common area)

STRUCTURE TYPE Ratings Cheat Sheet:

Residential: The structure was built for residential use.  
 Non-residential: The structure was built for other than residential use.  
 Vacant Lot: There is no structure on the parcel.  
 Parking Lot: Parcel is used to park vehicles  
 Park: Parcel is used for public recreation  
 Residential Commons: Common area around residential structure

Use Type:  Residential  
 Non-residential  
 How is the parcel currently being used?  Mixed (both residential & non-residential)  
 Un-ratable (use cannot be determined)  
 Not applicable (parcel has no structure)

USE TYPE Ratings Cheat Sheet:

Residential: The structure is being used residentially.  
 Non-residential: The structure is being used other than residentially.  
 Mixed: The structure is being used both residentially and non-residentially.  
 Un-ratable: The parcel's current use cannot be determined.  
 Not applicable: Applies to parcels with no structure.

Residential Type:  Detached-1 (single family dwelling)  
 Detached-2 (duplex)  
 Attached (e.g. row housing, sharing roofs, etc.)  
 Apartments  
 Non-residential  
 Not applicable (parcel has no structure)

RESIDENTIAL TYPE Ratings Cheat Sheet:

Detached-1: Single family dwelling  
 Detached-2: Duplex: Designed and built as a duplex, not converted from single-family.  
 Attached: Structures such as row housing, sharing roofs, and outside walls.  
 Apartments: All other (non-institutional) multi-family residential units.  
 Non-residential: Applies to all non-residential structure types.  
 Not applicable: Applies to parcels with no structure.



- Structure Profile:
- Single level
  - 2-story
  - 3-story
  - 4-6 floors
  - Over 6 floors
  - Not applicable (parcel has no structure)

**Structural Conditions**

- Are there obvious and "meaningful" interior renovations underway?
- Yes
  - No

- Are there obvious and "meaningful" renovations underway to exterior features?
- Yes
  - No

- Toggle to show or hide "Ratings Cheat Sheets" for Structural Conditions ratings below.
- Show Ratings Cheat Sheets?

- Roof:
- 1: Severely deteriorated
  - 2: Seriously deteriorated
  - 3: Substandard
  - 4: Good
  - 5: Excellent
  - 6: Not applicable
  - 7: Un-ratable

ROOF Ratings Cheat Sheet:

- 1: Severely deteriorated: Holes, sagging rafters, F&S rotting/missing
- 2: Seriously deteriorated: No holes, sagging not severe, 5+ shingles missing/deteriorated, F&S moderate damage.
- 3: Substandard: No holes or sagging. Less than 5 shingles missing. F&S slight damage.
- 4: Good: No holes or sagging. Shingles show slight wear/discoloration. F&S show no rot or deterioration.
- 5: Excellent: No holes, sagging, rot, or deterioration.
- 6: Not applicable: Parcel has no structure.
- 7: Un-ratable: Roof cannot be seen.

- Foundations and walls:
- 1: Severely deteriorated
  - 2: Seriously deteriorated
  - 3: Substandard
  - 4: Good
  - 5: Excellent
  - 6: Not applicable

FOUNDATIONS AND WALLS Ratings Cheat Sheet:

- 1: Severely deteriorated: Large holes, bulges, leans. 25%+ of siding has rot/deterioration.
- 2: Seriously deteriorated: Slight leaning but no structural failure. 25%+ of siding has rot/deterioration.
- 3: Substandard: No leaning. Some siding needs replacing, but it is less than 25%.
- 4: Good: No leaning or siding that needs replacing. Surfaces do need some painting.
- 5: Excellent: No leaning nor siding to be replaced. Surfaces are adequately painted.
- 6: Not applicable: Parcel has no structure.

- Windows and doors:
- 1: Severely deteriorated
  - 2: Seriously deteriorated
  - 3: Substandard
  - 4: Good
  - 5: Excellent
  - 6: Not applicable

---

**WINDOWS AND DOORS Ratings Cheat Sheet:**

- 1: Severely deteriorated: Open to entry, many windows & doors missing/boarded.
  - 2: Seriously deteriorated: A few windows & doors missing/boarded, but structure is not open to entry.
  - 3: Substandard: All windows & doors in place, but some broken glass. Needs paint on frames.
  - 4: Good: No broken glass, doors are secure. Needs paint on frames.
  - 5: Excellent: All conditions are secure and all frames are adequately painting.
  - 6: Not applicable: Parcel has no structure.
- 

Porches:

- 1: Severely deteriorated  
 2: Seriously deteriorated  
 3: Substandard  
 4: Good  
 5: Excellent  
 6: Not applicable
- 

**PORCHES Ratings Cheat Sheet:**

- 1: Severely deteriorated: Serious leaning/sagging, rot/deterioration is extensive, parts of porch missing. Porch does not appear safe.
  - 2: Seriously deteriorated: Slight leaning/sagging, moderate rot/deterioration, all porch parts present. Porch appears safe to use.
  - 3: Substandard: Slight leaning/sagging but no rot or deterioration. Some paint is needed.
  - 4: Good: No leaning or sagging, but some paint is needed.
  - 5: Excellent: No leaning or sagging, and all components are adequately painted.
  - 6: Not applicable: Parcel has no porch.
- 

Exterior paint:

- 1: Severely deteriorated  
 2: Seriously deteriorated  
 3: Substandard  
 4: Good  
 5: Excellent  
 6: Not applicable
- 

**EXTERIOR PAINT Ratings Cheat Sheet:**

- 1: Severely deteriorated: Over 50% peeling, extensive rot/deterioration, parts of walls missing. 2+ weeks to prep for painting.
  - 2: Seriously deteriorated: 10-50% peeling, moderate rot/deterioration. < 2 weeks to prep for painting.
  - 3: Substandard: < 10% peeling, no rot/deterioration. Some paint is needed.
  - 4: Good: No peeling paint, but some fading is present. Fresh paint is needed.
  - 5: Excellent: All components are adequately painted.
  - 6: Not applicable: Parcel has no structure.
- 

**Grounds Conditions**

Are there obvious and "meaningful" renovations underway to grounds conditions?

- Yes  
 No
- 

Toggle to show or hide "Ratings Cheat Sheets" for Grounds Conditions ratings below.

Show Ratings Cheat Sheets?

---

Private sidewalks and driveways:

- 1: Severely deteriorated  
 2: Seriously deteriorated  
 3: Substandard  
 4: Good  
 5: Excellent  
 6: Not applicable

---

**PRIVATE SIDEWALKS & DRIVEWAYS Ratings Cheat Sheet:**

- 1: Severely deteriorated: Tripping hazards and/or sections missing. Gravel driveways have severe weeds.
- 2: Seriously deteriorated: Numerous cracks over 1/2" wide, no tripping hazards. Full surface needs re-paving.
- 3: Substandard: Numerous cracks over 1/2" wide, no tripping hazards. Over 50% of surface needs re-paving.
- 4: Good: Only a few cracks over 1/2" wide, no tripping hazards. Some patching or sealing of cracks is needed.
- 5: Excellent: No cracks wider than 1/2" present in either the sidewalk or the driveway.
- 6: Not applicable: Parcel has no structure/sidewalks/driveway.

---

**Lawns and shrubs:**

- 1: Severely deteriorated  
 2: Seriously deteriorated  
 3: Substandard  
 4: Good  
 5: Excellent

---

**LAWNS AND SHRUBS Ratings Cheat Sheet:**

- 1: Severely deteriorated: Grass over 3 ft. high. Shrubs not trimmed in years (windows & doors covered).
- 2: Seriously deteriorated: Grass 1 to 3 ft. high. Shrubs not trimmed in the past year (overgrowing home).
- 3: Substandard: Grass is about 1 ft. high. Shrubs still have shape but need trimming.
- 4: Good: Grass is under 1 ft. and shrubs don't need trimming. Weeds (e.g. dandelions) present.
- 5: Excellent: Grass under 6 inches high. Yard appears cut regularly and has few/no weeds.

---

**Vehicles:**

- 1: Severe problem  
 2: Serious problem  
 3: Substandard  
 4: Good  
 5: Excellent

---

**VEHICLES Ratings Cheat Sheet:**

- 1: Severe problem: Over 3 vehicles parked in yard, several disabled/unlicensed.
- 2: Serious problem: 1-3 vehicles parked in yard, at least one disabled/unlicensed.
- 3: Substandard: One operable, licensed vehicle parked in yard. OR, 1+ disabled/unlicensed vehicles in driveway.
- 4: Good: No vehicles parked in yard, may be one vehicle in a driveway unlicensed/disabled.
- 5: Excellent: No vehicles parked in yard. No unlicensed/disabled vehicles present.

---

**Litter:**

- 1: Severe problem  
 2: Serious problem  
 3: Substandard  
 4: Good  
 5: Excellent

---

**LITTER Ratings Cheat Sheet:**

- 1: Severe problem: Piles of trash that would take a dump truck to haul in one load.
- 2: Serious problem: Piles of trash that would take a full-size pick-up to haul in one load.
- 3: Substandard: Trash scattered across property. Would fill between one and five 30-gallon trash bags.
- 4: Good: Some litter. Would not completely fill a 30-gallon trash bag.
- 5: Excellent: There is no litter present.

---

**Open storage:**

- 1: Severely deteriorated  
 2: Seriously deteriorated  
 3: Substandard  
 4: Good  
 5: Excellent

---

**OPEN STORAGE Ratings Cheat Sheet:**

- 1: Severe problem: Numerous items in yard that should be stored. Would overfill a 2-car garage.
  - 2: Serious problem: Numerous items in yard that should be stored. Would fill a 1-car garage.
  - 3: Substandard: The items stored outside would fit inside a small storage shed.
  - 4: Good: No unacceptable items outside, but numerous items that still seem cluttered.
  - 5: Excellent: No unacceptable items present. Few other items, no cluttered appearance.
- 

Accessory structure:

\*\* Was present in KCMoNHCS Rating Guide but not Residential Cheat Sheet \*\*

- 1: Severely deteriorated
  - 2: Seriously deteriorated
  - 3: Substandard
  - 4: Good
  - 5: Excellent
  - 6: Not applicable
  - 7: Un-ratable
- 

**ACCESSORY STRUCTURE Ratings Cheat Sheet:**

- 1: Severely deteriorated: Roof holes larger than hubcap, sagging walls, peeling paint. Hazardous.
  - 2: Seriously deteriorated: Roof holes smaller than hubcap, 1-2 walls swaying, peeling paint. Not yet hazardous.
  - 3: Substandard: Missing shingles, loose gravel, peeling paint, no sagging walls. Not hazardous.
  - 4: Good: Only one apparent issue facing the structure.
  - 5: Excellent: No issues facing the structure; it is a sound building.
  - 6: Not applicable: Parcel does not have an accessory structure.
  - 7: Un-ratable: Accessory structure cannot be clearly seen.
- 

**Public Infrastructure Conditions**

Are there obvious and "meaningful" renovations underway to public infrastructure conditions?

- Yes
  - No
- 

Toggle to show or hide "Ratings Cheat Sheets" for Public Infrastructure Conditions ratings below.

Show Ratings Cheat Sheets?

---

Public sidewalk:

- 1: Severely deteriorated
  - 2: Seriously deteriorated
  - 3: Substandard
  - 4: Good
  - 5: Excellent
  - 6: Not applicable
- 

**PUBLIC SIDEWALK Ratings Cheat Sheet:**

- 1: Severely deteriorated: Sections missing, broken, or heaved. Tripping hazards. 50%+ sections need replaced.
  - 2: Seriously deteriorated: Tripping hazards. 25%-50% of sections need replaced.
  - 3: Substandard: Cracks over 1/2" wide are present, but no tripping hazards. Less than 25% needs replaced.
  - 4: Good: Only a few cracks present. Some patching needed but no full section replacement.
  - 5: Excellent: No cracks or tripping hazards.
  - 6: Not applicable: Parcel has no public sidewalks.
- 

Curbs:

- 1: Severely deteriorated
  - 2: Seriously deteriorated
  - 3: Substandard
  - 4: Good
  - 5: Excellent
  - 6: Not applicable
-

---

**CURBS Ratings Cheat Sheet:**

- 1: Severely deteriorated: No curbs present, with or without open ditch drainage.
  - 2: Seriously deteriorated: Curbs are present and display severe deterioration. More than 50% of curb needs replaced.
  - 3: Substandard: Curbs show deterioration. Up to 50% of curb needs replaced.
  - 4: Good: Some wear/deterioration but no sections missing.
  - 5: Excellent: No wear. Curbs are benefit to water control within neighborhood.
  - 6: Not applicable: Not applicable to this parcel.
- 

Streetlights:

- 1: Severely deteriorated
  - 2: Seriously deteriorated
  - 3: Substandard
  - 4: Good
  - 5: Excellent
- 

**STREETLIGHTS Ratings Cheat Sheet:**

- 1: Severe problem: No streetlights on block.
  - 2: Serious problem: Streetlights are more than 8 houses apart. Lights appear broken/blocked.
  - 3: Substandard: Streetlights are more than 6 houses apart. Lights work but appear blocked.
  - 4: Good: Streetlights are 5 houses apart. Tree limbs near lights, but not blocking illumination.
  - 5: Excellent: Streetlights less than 5 houses apart. No tree limbs growing near lights.
- 

Catch basins:

- 1: Severely deteriorated
  - 2: Seriously deteriorated
  - 3: Substandard
  - 4: Good
  - 5: Excellent
  - 6: Not applicable
- 

**CATCH BASINS Ratings Cheat Sheet:**

- 1: Severely deteriorated: Broken/collapsed, creating danger.
  - 2: Seriously deteriorated: Deteriorated, needs replacing but does not create dangerous situation.
  - 3: Substandard: Not deteriorated, but substantially blocked with leaves/litter.
  - 4: Good: Leaves/litter present but still functions adequately.
  - 5: Excellent: No defects or leaves/litter present. Perfect operational condition.
  - 6: Not applicable: Parcel has no catch basin.
- 

Street condition:

- 1: Severely deteriorated
  - 2: Seriously deteriorated
  - 3: Substandard
  - 4: Good
  - 5: Excellent
- 

**STREET CONDITION Ratings Cheat Sheet:**

- 1: Severely deteriorated: Uneven surface, 7+ potholes present, dangerous. Resurfacing needed on entire block.
- 2: Seriously deteriorated: Pavement deteriorated, 4-6 potholes present. Resurfacing is needed.
- 3: Substandard: 3 or fewer potholes. Patching, not resurfacing, is needed.
- 4: Good: No potholes. Some cracks, but none wider than 2 inches.
- 5: Excellent: No potholes or cracks.