THE CHILD OPPORTUNITY INDEX MAPPING APPLICATION'S "1930S HOLC NEIGHBORHOOD RATINGS" LAYER: TECHNICAL DOCUMENT

November 3, 2023

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diversitydatakids.org
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INTRODUCTION

In our research on child opportunity at diversitydatakids.org, we study how neighborhoods in the United States offer or deny children resources that foster healthy development. Central to our work are racial/ethnic inequities, specifically the ways in which Black and Hispanic children are often concentrated in neighborhoods without the education, health and environment or socioeconomic resources to support their wellbeing. The 1930s maps created by the Home Owners' Loan Corporation (HOLC) show us how neighborhood opportunity has been hoarded for certain groups for the past century. These maps, which graded neighborhoods' "mortgage security" based, in part, on the racial and ethnic makeup of who lived there, used the color red to delineate the most risky or "hazardous" graded neighborhoods, giving rise to the term "redlining." While the influence of these maps was not deterministic, and they were not the first instance of government-sanctioned segregation and community disinvestment, they offer us a window into the history of neighborhood opportunity and its connection to past and present racial/ethnic inequities.

To assist researchers, advocates and others in exploring the connections between historical HOLC grades and contemporary child neighborhood opportunity, as measured by the Child Opportunity Index, diversitydatakids.org has created several resources, including:

1. A "1930s HOLC Neighborhood Ratings" layer for the Child Opportunity Index (COI) mapping application, which overlays historical HOLC area data and boundaries from the Mapping Inequality project on top of COI data and census tract boundaries, displaying the proportion of each current tract area that was originally rated "A," "B," "C" or "D" by HOLC.
2. A publicly available dataset of novel classification typologies from original peer-reviewed research produced by diversitydatakids.org (Noelke, Outrich, Baek, Reece, Osypuk, McArdle, Ressler & Acevedo-Garcia, 2022). These typologies reconcile historical HOLC area boundaries and contemporary census tract boundaries. They range from a simple four grade classification ("Mainly A," "Mainly D," etc.) to more complex but predictively optimal classifications.
3. A 2022 journal article which describes the motivation and methodology used to create the new HOLC-based census tract classifications, along with associated replication code and materials. A non-technical blog post summarizing the paper is also available.

With these resources, we hope to encourage current and new users of our data to learn about the history of structural racism and opportunity hoarding and sharing in their communities, including what has changed and what has not in the past century, and to prompt questions about which policies and reforms can lead to more equitable neighborhoods.

SOURCES OF HISTORICAL REDLINING DATA

In the 1930s, the Home Owners' Loan Corporation (HOLC) created maps to quantify variation in real estate credit risk across U.S. metro areas. HOLC was created as part of the New Deal to help struggling homeowners refinance their mortgages during the Great Depression. HOLC tasked field agents and local officials to collect and provide information that was then translated into maps, capturing variation in presumed mortgage loan default risk across neighborhoods. HOLC assigned neighborhoods to one of four color-coded letter grades summarizing their risk assessment: D = "hazardous" (red), C = "definitely declining" (yellow), B = "still desirable" (blue) and A = "best" (green). Neighborhood classifications were not

only informed by real estate characteristics such as the quality of the housing stock, but also by neighborhood demographic traits such as race/ethnicity, religion and nativity. "A" ratings were primarily assigned to affluent White neighborhoods, while "D" ratings were assigned to neighborhoods that had a greater share of Black, lower class or immigrant residents. Virtually all Black families lived in "D"rated areas.

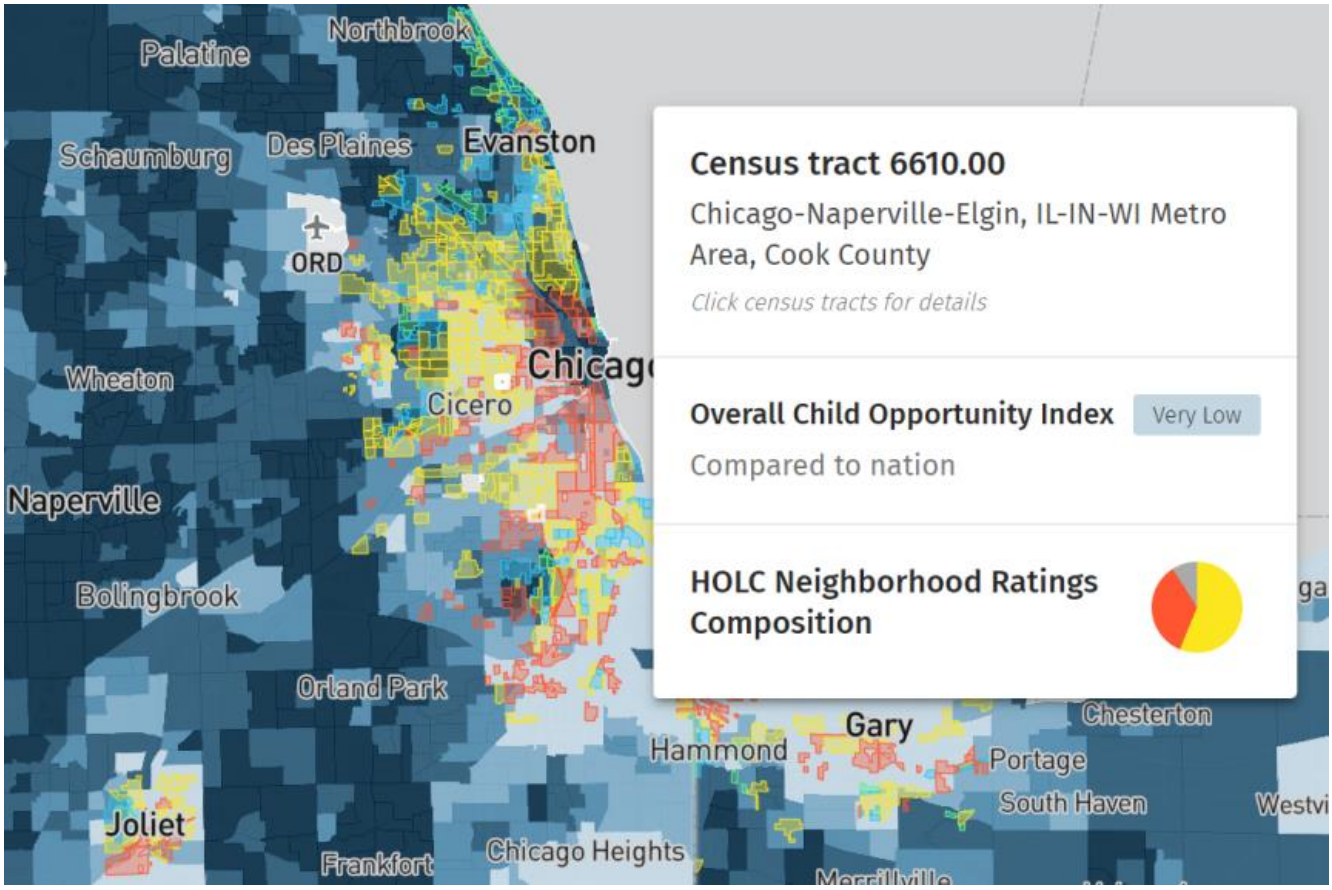
The original HOLC maps were created on paper, making them difficult to use for analysis. In the past decade, however, the Mapping Inequality Project at the University of Richmond has digitized HOLC maps from archival material stored in the National Archives. The Project also transcribed the area descriptions accompanying every HOLC rated area, and it maintains an interactive map that visualizes HOLC rated areas and allows users to explore the area descriptions underlying the ratings. Finally, the Project has digitized map files (shapefiles) that digitally encode area boundaries and their HOLC ratings, published under a Creative Commons license. We use these mapping files in our diversitydatakids.org redlining mapping application and in creating classification typologies that reconcile HOLC area boundaries and contemporary census tract boundaries.

THE DIVERSITYDATAKIDS.ORG "1930S HOLC NEIGHBORHOOD RATINGS" MAPPING APPLICATION LAYER

To visualize the relationships between HOLC grades and the geography of contemporary child opportunity (as measured by the Child Opportunity Index 2.0), we created a layer to our COI mapping application that combines the two data sources. Because the geographic areas rated by HOLC do not align with present-day census tract boundaries, our map app shows the historical HOLC rated areas, along with their HOLC risk grades, on top of tract-based COI Levels. The HOLC layer of the map includes portions of all census tracts that are at least 1% covered by a HOLC rated area. These 14,639 census tracts (2010 tract definition) represent 20% of all U.S. tracts.

Geographic boundaries of HOLC rated areas and census tracts are not the same. In fact, 60% of tracts (that are at least 1% covered by HOLC ratings) intersect with more than one historic HOLC rated area, each with its own HOLC grade (Noelke et al., 2022). To visualize this information at the tract level, our interactive map reports the proportion of each tract's area that was rated A, B, C or D or was "unrated" by HOLC. Users can see this information in a pie chart, along with the COI Level of the tract, by hovering over the tract in the app (**Figure 1**). Clicking on the tract opens a panel of "Location details," providing the exact percentages of the tract's area covered by each HOLC grade, as well as comprehensive information on the component indicators (such as poverty rate) that go into that tract's COI Score.

Figure 1. Mapping application showing proportion of tract with each HOLC rating and COI Level



Source: https://www.diversitydatakids.org/maps/

NEW CLASSIFICATIONS OF CENSUS TRACTS IN TERMS OF HISTORIC HOLC RATINGS

The 1930s HOLC Neighborhood Ratings mapping layer is visually informative but less useful for performing quantitative analysis and summarizing overall patterns. To further such research, we have also produced a number of classification typologies that reconcile historic HOLC areas and their risk grades with current census tracts. Our journal article "Connecting past to present: Examining different approaches to linking historical redlining to present day health inequities" (see here for a non-technical blog post summarizing the paper) describes different approaches to classifying census tracts in terms of HOLC ratings. It considers such questions as: If a census tract intersects with two differently rated HOLC areas, how should we classify it? Do we only consider the rating covering the larger portion of the tract? Can the rating covering a smaller portion of the tract be ignored entirely? Does a tract that is 55% covered with A-rated area and 45% covered with D-rated area belong to the same class as a tract that is 95% A-rated and 5% D-rated? We used a machine learning approach to identify a predictively optimal classification, i.e., a classification that best explains variation in present-day socioeconomic and health outcomes. While the predictively optimal classification has 40 classes, we also derived a more parsimonious classification with 10 classes. This classification performs better predictively than other commonly used approaches to map HOLC ratings to present-day census tracts, and it only performs marginally worse than the predictive optimal classification while being much more parsimonious. In all, we make available data based on three classification typologies:

- A 40-class classification that, based on our analyses in Noelke et al., 2022, optimally explains variation in present-day socioeconomic and health outcomes.
- A 10-class classification, based on our analyses in Noelke et al., 2022, that is nearly as good as the optimal classification in terms of predictive validity, but only uses ten different levels, such as "mainly A," or "mainly A and some C or D."
- A simplified 4-class classification that categorizes census tracts as either mainly A, mainly B, mainly C and mainly D. This classification is likely most practical for many uses.

These classification typologies are available in two online files, one mapping HOLC ratings to 2010 census tracts, (i.e., census tracts as defined for the 2010 Decennial Census,) and one file mapping HOLC ratings to 2020 census tracts. In addition to the HOLC-based class, each file also includes a census tract identifier, the proportion of the census tract that is rated A, B, C, D and unrated. Associated replication code and materials are also available.

WORKS CITED

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