



Impact of Housing Instability and Social Risk Factors on Food Insecurity Among Vulnerable Residents in San Diego County

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Abstract

To analyze the impact of housing instability and social risk factors on food insecurity using resource center client information. We utilized 2-1-1 San Diego's client database to analyze the association of food insecurity and housing instability among residents from August 2017 to March 2020. 3468 clients had food or housing needs assessed by a risk rating scale. A multiple logistic regression model analyzed the associations between food insecurity and social risk factors including housing, transportation, utility bills, criminal justice, and medical debt. Multiple logistic regression indicates that those with housing instability encounter significantly greater risk of food insecurity (AOR 1.2) for homeless-sheltered, (AOR 2.1) for homeless-unsheltered. Also, utility needs (AOR 1.2) is significantly associated with food insecurity. However, those with medical debt are 48% less likely to have food insecurity. Approximately 77% of clients experienced food insecurity. Those with food insecurity also experienced higher needs in housing and other social risk factors. By further researching the association of food insecurity, housing instability, and other social needs in a population, we can better inform public health strategies that focus on proactive community and resource planning.

Keywords Social determinants of health · Food insecurity · Housing instability · Community health · Community planning

Introduction

The Social Determinants of Health (SDoH) explains that the conditions and quality of living space, education, and community can greatly affect health outcomes [1]. These determinants are “place-based,” meaning that it targets the physical communities in which we live. The five categorical areas of the SDoH, based on the Center for Disease Control and Prevention framework, include economic stability, education, social and community context, health and healthcare, and neighborhood and built environment. It is vital to address the impact of these determinants on predicting health outcomes, disparities, and adverse social conditions of specific populations [2, 3].

Access to resources is an important aspect of the SDoH that can lead to a decrease in the risk of disease. Low-income

or rural neighborhoods often have less community resources available for residents, making healthier foods, healthcare, and other resources harder to access [2]. Safe and affordable housing, access to foods that support healthy eating patterns, and access to health services are just a few examples of resources that can positively affect outcomes in communities, but are also more available with economic stability [2].

Economic stability includes the key issues of poverty, employment, food insecurity, and housing instability [2]. Housing instability is recognized as a pertinent issue in the economic stability domain of the SDoH [4]. Housing instability can cover a multitude of housing situations and includes numerous challenges such as trouble paying rent, overcrowding, moving frequently, staying with relatives, or spending the bulk of household income on housing [2]. The most severe level of housing instability is homelessness—lacking a regular nighttime residence or having a primary nighttime residence that is a temporary shelter or other place not designed for sleeping [5, 6]. In 2015, about 565,000 people were homeless in the United States [7]. In 2019, 567,715 people were homeless with 62.8% of those people being sheltered [7]. Housing instability has been shown to have a causal rather than consequential role in the reproduction of

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urban poverty [4]. Since both housing instability and poverty fall under the economic stability domain, we can see that these issues are not mutually exclusive, but rather go hand in hand when solving overall SDoH factors. Households can have little left over each month to spend on other necessities, specifically food, another social risk factor under the economic stability category [2].

Household food insecurity, a measure of income-related problems of food access, is a growing problem in today's society [2]. Food insecurity is defined as the disruption of food intake or eating patterns because of a lack of money and other resources. It may be influenced by a number of factors including income, employment, race, ethnicity, and disability [8]. In 2018, 37.2 million people in the U.S. lived in food insecure households at some point in time during the year [9].

Food security is commonly conceptualized as resting on three pillars- availability, access, and utilization [10]. Limited access to food is a key indicator of material deprivation that contributes to health inequities across the life cycle, regardless of other hardships [1, 2, 10]. Many studies relate the inadequacy of food security and housing stability to negative health outcomes [11].

Financial hardships, including food insecurity, can further perpetuate negative effects that are associated with unstable housing [12]. These inequities can stem from financial hardships, but it is not clear which issue precedes the other. Current literature shows that tumultuous effects of housing instability can be directly associated with eating-related family routines and that food insecurity is highest among renters compared to homeowners with and without a mortgage. Research also suggests that cost-burden households often do not have finances left for food [4, 13, 14]. Aligning with this evidence, homeless people are disproportionately affected by food insecurity and food insufficiency [15].

When assessing hardships associated with food insecurity, households reliant on social assistance, employment insurance or workers' compensation, and renters experienced higher rates of food insecurity [16]. Housing instability measurements are often self-reported, including difficulty in paying rent, mortgage, or utility bills in the past year. Participants in these studies can be asked whether they had moved in with friends or family because they had no other choice [17]. Household income, home ownership, and main source of income are all predictors of household food insecurity status [16]. This finding is consistent with research suggesting that households' capability to persevere through sudden losses in income or increased expenses is related to food security status [12]. While these factors demonstrate what variables predict housing stability, it still leaves us questioning what factors pose threats to food insecurity.

This study focuses on housing instability and food insecurity with an additional analysis of social risk factors that can

contribute to more severe levels of food insecurity. Often-times people have to choose between rent and food, which can diminish the quality of nutrition consumed in a household. We hypothesize that housing instability increases the likelihood of food insecurity. Furthermore, we predict that social risk factors will further exacerbate food insecurity. In order to complete a more thorough assessment on the intersection of housing instability and food insecurity, it would be beneficial to further analyze other areas of the SDoH and their association with the two key determinants of housing and food.

Methods

The data comes from *2-1-1 San Diego*- a non-profit information and referral hub that helps people access resources and provides vital data and trend information for proactive community planning. To understand the needs of over 1000 callers per day, *2-1-1 San Diego* captures key demographic information, such as gender, age, and race, as well as specific information on various domains such as housing, nutrition, utilities, and other SDoH. It also utilizes the Comprehensive Social Continuum Assessment (CSCA) to gain a deeper understanding of need within 14 SDoH domains and measures vulnerability on a six-point, Crisis to Thriving scale. The CSCA holistically captures the comprehensive needs of an individual and can be used to consistently and objectively measure risk over time. The CSCA assesses an individual's vulnerability within three major constructs: immediacy, barriers and supports, and knowledge and utilization of community resources [18]. It can also be broken down into Hardship Indicators that provide more specific detail on overall risk level.

This study analyzed the following Hardship Indicators: housing instability, food insecurity, medical financial constraints, transportation barriers, utility payment insecurity, criminal justice, and employment instability. Demographic characteristics were included (age, gender, Federal Poverty Level, race/ethnicity, veteran status, education, health insurance, and employment status). Data included a total of 9213 clients (8/2017–3/2020). Data cleaning in terms of demographic variables and other need assessment variables were implemented to create the sample for this analysis ($n = 3468$). This study adopted a cross-sectional analytic design and utilized the multiple logistic regression technique to investigate the associations between housing instability and other social risk factors and food insecurity.

Dependent Variable: Food Insecurity

The Food Insecurity Hardship Indicator was derived from the United States Department of Agriculture (USDA)

Household Food Security Survey (HFSSM). The HFSSM survey includes 18 questions that indicate food hardships among adults and children in a household [9]. Examples of the HFSSM items include “In the last 30 days, have you had to make a decision between buying food and paying for another need” and “Do you have any support that can help you access your food and nutrition needs?”.

The Food Insecurity Hardship Indicator isolated variables from the Nutrition CSCA domain, specifically pulling metrics on immediacy and prioritization. Hardship Indicators are typically displayed as High, Medium, or Low. For the Food Insecurity Hardship Indicator, for example, a High indicator is someone who often worries about having enough food and sometimes or often does not actually have enough food; who has skipped a meal at least once in the previous month; who has to prioritize their budget to purchase other items instead of food (e.g. rent or housing expenses); and someone who has an immediate need for assistance.

Based on the Food Insecurity Hardship Indicator, a dichotomous variable representing food insecurity was created by defining food insecurity as “High” (Food Insecurity = 1). This food insecurity variable (binary) was used as the dependent variable for the multiple logistic regression for this analysis.

Independent Variables

Housing Instability

Housing status (Stable housing; Homeless-Sheltered; Homeless Unsheltered) of the clients was defined using the housing need assessment data collected through 211 San Diego and CIE. Two groups were classified (stable housing or homeless) based on the type of housing situation and if the client has experienced homeless previously. Stable housing was defined if a client’s housing situation included affordable housing and not in a homeless situation encompassing transitional or supportive housing, long-term care, subsidized housing, and renting or owning a home/apartment for at least 6 months. Homelessness is further broken down into two categories (sheltered and unsheltered). Sheltered can include couch surfing, staying with friends or relatives, or emergency shelters.

Social Risk Factors

Medical finance, transportation, utilities, criminal justice, and employment were the five major risk factors within the SDoH that were assessed in relation to housing instability and food insecurity. These hardships measured whether or not the client experienced each issue. Utility bill hardship was defined as a client’s utility bill status falling into the categories of ‘shut off’, ‘past due’, or ‘utility bill is more than

25% of income. Medical finance hardship was identified as the client experiencing financial strain related to medical cost or medical debt because of disability, accident/injury, death of family members, or medical conditions that makes it difficult to pay for basic needs. Employment hardship was defined as the client being laid off or under-employed that makes it very hard to pay for basic needs. Criminal justice hardship was defined as the client’s legal need related to housing (landlord or tenant issues, discrimination, ADA accessibility, sanitary housing conditions) or legal need related to criminal justice (e.g. felony charge, misdemeanor charge, probation, youth courts, correctional services, parole, criminal record issues). The transportation hardship was identified as clients needing transportation for medical care, work, school, or having health related considerations and barriers that required extra support to obtain transportation. Each of the five social risk factors described above are binary variables (yes/no), indicating if the client is experiencing the hardship.

Demographic Characteristics

Demographic variables included were age, gender, race/ethnicity, veteran, FPL, employment status, education, and insurance. Age was coded by a 10-year interval (under 29, 30–39, 40–49, 50–64, and 65+). Five groups of race/ethnicity were used (White, Black, Hispanic, Asian, and American Indian/Alaskan Native). FPL was recoded into four groups (Under 138%, 139–200%, 201–300%, and 300%+). Education was summarized with three groups (HS degree or below, Some College, and BS degree or above). Employment status had four groups (Employed, Unemployed, Disabled, or Retired). Insurance was recoded into six categories (Private, Medicaid, Medicare, Medi-Medi, Other insurance, and No insurance).

Results

The sample for the analysis of this study included 3468 clients who had called *2-1-1 San Diego* seeking assistance for their needs. The majority of the sample were clients who lived in stable housing (63.4%), aged 50–64 (40%), female (65.1%), White (38.5%), no veterans (92.1%), under 138% FPL (86%), disabled (38.6%) or unemployed (34.3%), with a high school degree or below (55.6%), covered by Medicaid (53.4%). (Table 1).

Unadjusted Association Between Demographic and Social Risk Factor Variables and Food Security

The bivariate associations of the study variables with the food insecurity hardship indicator were investigated by χ^2

Table 1 The simple associations between demographic and social risk factors and food insecurity: χ^2 analysis result

Variable	Group	Food secure		Food insecure		Total	Total	χ^2	p
		n	%	n	%	n	%		
Housing status	Homeless-sheltered	145	20.4	565	79.6	710	20.5	36.60	0.00
	Homeless-unsheltered	76	13.5	485	86.5	561	16.2		
	Stable housing	553	25.2	1644	74.8	2197	63.4		
Transportation need	Yes	162	22.0	576	78.0	738	21.3	0.07	0.78
	No	612	22.4	2118	77.6	2730	78.7		
Utility bill need	Yes	147	20.4	572	79.6	719	20.7	1.83	0.17
	No	627	22.8	2122	77.2	2749	79.3		
Criminal justice need	Yes	22	25.6	64	74.4	86	2.5	0.54	0.46
	No	752	22.2	2630	77.8	3382	97.5		
Employment need	Yes	45	23.7	145	76.3	190	5.5	0.21	0.64
	No	729	22.2	2549	77.8	3278	94.5		
Medical financial need	Yes	102	35.3	187	64.7	289	8.3	30.60	0.00
	No	672	21.1	2507	78.9	3179	91.7		
Age	Under 29	64	17.5	302	82.5	366	10.6	19.10	0.00
	30–39	95	19.3	397	80.7	492	14.2		
	40–49	127	20.8	485	79.2	612	17.6		
	50–64	318	22.9	1068	77.1	1386	40.0		
	65+	170	27.8	442	72.2	612	17.6		
Gender	Male	288	23.8	923	76.2	1211	34.9	2.29	0.13
	Female	486	21.5	1771	78.5	2257	65.1		
Race	White	328	24.6	1006	75.4	1334	38.5	8.98	0.06
	Black	138	19.0	589	81.0	727	21.0		
	Asian	22	22.4	76	77.6	98	2.8		
	Hispanic	204	22.2	716	77.8	920	26.5		
	AI/AN	82	21.1	307	78.9	389	11.2		
Veteran	Veteran	706	22.1	2487	77.9	3193	92.1	1.00	0.31
	No veteran	68	24.7	207	75.3	275	7.9		
FPL	Under 138%	657	22.0	2326	78.0	2983	86.0	1.50	0.68
	139–200%	86	23.6	278	76.4	364	10.5		
	201–300%	25	26.6	69	73.4	94	2.7		
	301%+	6	22.2	21	77.8	27	0.8		
Employment status	Employed	134	22.0	474	78.0	608	17.5	19.10	0.00
	Disabled	298	22.2	1042	77.8	1340	38.6		
	Retired	104	31.3	228	68.7	332	9.6		
	Unemployed	238	20.0	950	80.0	1188	34.3		
Education	HS or below	401	20.8	1527	79.2	1928	55.6	11.30	0.00
	Some college	217	22.3	756	77.7	973	28.1		
	BS or above	156	27.5	411	72.5	567	16.3		
Health insurance	Private	28	20.4	109	79.6	137	4.0	15.40	0.00
	Medicaid	391	21.1	1460	78.9	1851	53.4		
	Medicare	93	31.1	206	68.9	299	8.6		
	Medi-medi	122	21.6	443	78.4	565	16.3		
	No insurance	81	23.1	269	76.9	350	10.1		
	Other	59	22.2	207	77.8	266	7.7		
Total		774		2694		3468	100.0		

AI/AN American Indians or Alaskan Native

analyses (Table 1). Significantly greater food insecurity was found among Homeless-Unsheltered (86.5%), followed by Homeless-Sheltered (79.6%) than those with stable housing (74.8%).

The need to pay utility bills (79.6% vs. 77.2%) was significantly associated with food insecurity. Also, the more people had need for transportation, the more they also had food insecurity but it was not significant (78% vs. 77.6%). Several social determinant indicators were negatively associated with food security. A smaller proportion of clients with medical finance needs had food insecurity than those without the need (78.9% vs. 64.7%). A smaller proportion of clients experienced food insecurity if they had criminal justice needs (77.8% vs. 74.4%), employment need (77.8% vs. 76.8%), compared to those without the needs but these are not significant.

Socio-demographic characteristics were significantly associated with food insecurity. More clients were found to experience food insecurity if they were in younger age groups (under 29: 82.5%, 30–39: 80.7%), female (78.5%), Black (81%), and veterans (77.9%), compared to their counterparts (Table 1). Also, clients who were unemployed (80%), who had a high school degree or below (79.2%), or who were with private health insurance (79.6%) reported a significantly greater need for food. Those with the lowest FPL (under 138%, 78%) showed food insecurity but it was not significant.

Food Insecurity and Social Determinants Indicators

Table 2 includes the distribution of the social determinants hardships experienced by the people included in this study. Slightly less than half of the clients reported that (45.6%) they experienced multiple hardships at the point of the phone call. The transportation (13.8%) or utility bills (13.9%) most frequently co-occurred with the nutrition hardship. The

proportions of people with other hardships include medical finance (3.1%) or employment (1.7%), in addition to the nutrition hardship, were relatively smaller.

Food insecurity was found among approximately 78% ($n = 2694$) of the total clients ($n = 3468$) in this study (Table 2). Descriptive results indicated that a greater proportion of people experienced food insecurity when they had additional hardships, such as transportation and utility bills. Food insecurity was experienced among 81.1% of clients with both transportation and nutrition hardships; 80.9% of clients with both utility bill and nutrition hardships; and 78.3% of clients with both employment and nutrition hardships, when compared to those with the nutrition hardship only (77.8%). However, a relatively fewer proportion of clients (60.7%) who had a dual hardship in medical finance and nutrition experienced food insecurity. Also, relatively lower proportions of clients were food insecure if they had more than three hardships (75.6% of those with hardships in nutrition, transportation, and utility bills; 63.9% of those with hardships in nutrition, transportation, and medical finance).

The Adjusted Association of Social Determinant and Demographic Factors with Food Insecurity: Multiple Logistic Regression Result

After adjusting for other factors included in the multiple logistic regression, housing status was significantly associated with food insecurity (Table 3). Those who were homeless-sheltered (i.e. who were staying in an emergency shelter, transitional, or supportive housing for homeless) were 1.29 times (95% CI 1.04–1.61, $p = 0.02$) as likely to experience food insecurity, compared to those in stable housing. For those who were homeless-unsheltered, the odds of food insecurity were 2.16 times (95% CI 1.64–2.84, $p = 0.00$), indicating that this group was at a greater risk of food insecurity.

Table 2 Social risk factors among people who are at risk of food insecurity

Social risk factor1	Social risk factor2	Social risk factor3	Food security						Total (n)	Total (%)
			Food secure			Food insecure				
			n	% (Column)	% (Row)	n	% (Column)	% (Row)		
Nutrition only			421	54.4	22.2	1474	54.7	77.8	1895	54.6
Nutrition	Utility		91	11.8	19.1	386	14.3	80.9	477	13.8
Nutrition	Transportation		91	11.8	18.9	390	14.5	81.1	481	13.9
Nutrition	Medical finance		42	5.4	39.3	65	2.4	60.7	107	3.1
Nutrition	Transportation	Utility	20	2.6	24.4	62	2.3	75.6	82	2.4
Nutrition	Employment		13	1.7	21.7	47	1.7	78.3	60	1.7
Nutrition	Transportation	Medical finance	13	1.7	36.1	23	0.9	63.9	36	1.0
Other			83	10.7	25.2	247	9.2	74.8	330	9.5
Total			774	100.0	22.3	2694	100.0	77.7	3468	100

Table 3 Adjusted associations of social risk factors and food insecurity: multiple logistic regression results

Independent variable	Group	Reference	Adjusted OR (AOR)	95% CI		p
				Lower	Upper	
Housing status	Homeless-sheltered	Stable housing	1.29	1.04	1.61	0.02
	Homeless-unsheltered	Stable housing	2.16	1.64	2.84	0.00
Transportation need	Yes	No	1.00	0.81	1.23	0.96
Utility need	Yes	No	1.29	1.04	1.59	0.01
Criminal justice need	Yes	No	0.94	0.57	1.57	0.83
Employment need	Yes	No	1.02	0.71	1.45	0.91
Medical financial need	Yes	No	0.51	0.39	0.66	0.00
Gender	Female	Male	1.22	1.02	1.46	0.02
Age	30–39	Under 29	0.92	0.64	1.32	0.67
	40–49	Under 29	0.81	0.57	1.14	0.23
	50–64	Under 29	0.73	0.53	1.00	0.05
	65+	Under 29	0.68	0.45	1.01	0.05
Race/ethnicity	Black	White	1.30	1.03	1.64	0.02
	Asian	White	1.25	0.75	2.06	0.38
	Hispanic	White	1.07	0.87	1.32	0.50
	AI&AN	White	1.14	0.86	1.51	0.34
Veteran	Veteran	No veteran	0.93	0.66	1.30	0.67
Education	HS or below	BS or above	1.40	1.11	1.75	0.00
	Some college	BS or above	1.22	0.96	1.56	0.10
Health insurance	Medicaid	Private	0.86	0.55	1.35	0.52
	Medicare	Private	0.70	0.42	1.18	0.18
	Medi-medi	Private	1.05	0.64	1.71	0.84
	No insurance	Private	0.79	0.48	1.31	0.37
	Other	Private	0.97	0.57	1.67	0.93
FPL	Under 138%	301%+	0.94	0.36	2.40	0.90
	139–200%	301%+	1.06	0.40	2.77	0.90
	201–300%	301%+	0.81	0.28	2.29	0.69
Employment status	Disabled	Employed	1.02	0.78	1.32	0.87
	Retired	Employed	0.77	0.53	1.11	0.16
	Unemployed	Employed	1.02	0.79	1.32	0.84

AI/AN American Indians or Alaskan Native

Additionally, the utility bill hardship was significantly associated with food insecurity. Those with the utility bill hardship were 1.29 times as likely to experience food insecurity (95% CI 1.04–1.59, $p=0.01$), compared to those without utility hardships. However, the likelihood of food insecurity was approximately 49% lower (AOR 0.51; 95% CI 0.39–0.66, $p=0.00$) among people with the hardship in paying for their medical costs. Other hardships including transportation, criminal justice, and employment were not significantly associated with food insecurity.

Several socio-demographic variables were significantly associated with food insecurity. Females were 1.2 times more likely to experience food insecurity (95% CI 1.02–1.46, $p=0.01$). A greater likelihood of food insecurity was also found among Black people (AOR 1.3; 95% CI 1.03–1.64, $p=0.02$) when compared to White people, and those with a high school degree or below education (AOR 1.4; 95% CI

1.11–1.75, $p=0.00$) compared to those with college degree or higher. No other significant associations were found.

Discussion

The purpose of this study was to examine the intersection of food insecurity and housing instability, along with measuring needs for several SDoH hardships that similar studies do not take into account when analyzing nutrition or housing. We found that food insecurity is significant among unsheltered homeless clients, along with utility bill payment issues. Other populations of clients that experience significantly high rates of food insecurity are Black, female, and those with a high school or below level of education. Contradictory to our expectation, those with a hardship in paying for medical expenses were less likely to experience food

insecurity. This finding calls for further examination as to why medical expenses are not associated with someone who would have a higher risk of food insecurity. In general, our results align with similar findings of other studies in terms of social risk factors having an effect on nutrition, housing, and overall SDoH [5, 14, 17].

Unsheltered homeless clients had a high probability of experiencing food insecurity. Community resource centers can connect clients to a range of housing services for families, long term transitional housing, and housing services for seniors. Although these programs exist, the 2020 Regional Homelessness Count found that there are 7619 homeless people in San Diego County [19]. The survey also showed that 52 families are unsheltered and 660 individuals are chronically homeless.

Since Black, female, and people with a lower level of education experience higher rates of food insecurity among clients, it is vital to analyze the resources and conditions of these populations. Neighborhood conditions affect physical access to food because people living in some urban areas, rural areas, and low-income neighborhoods may have limited access to full-service supermarkets or grocery stores. Predominantly Black and Hispanic neighborhoods have fewer full-service supermarkets than predominantly White and non-Hispanic neighborhoods [9]. Food assistance programs, such as the National School Lunch Program (NSLP), the Women, Infants, and Children (WIC) program, and the Supplemental Nutrition Assistance Program (SNAP) have the capacity to address these barriers to accessing healthy food [20], but more than one resource addressing the SDoH may be necessary to better health outcomes.

Greater collaboration of community resources could be a possible step in ensuring all around wellness of San Diego residents and beyond [21]. To give rise to this novel approach, *2-1-1 San Diego* designed the Community Information Exchange (CIE). The CIE enables partner organizations to share information about clients' needs and services used in order to facilitate better care coordination and ensure that clients' overlapping needs are met. It also provides the community with valuable data about the resources they needed, but couldn't get, whether due to ineligibility or lack of the resource altogether.

Policies directly shape our environments- creating positive or negative effects on the SDoH. From national to local levels of government, addressing the issues in our communities with evidence-based policies can greatly increase the well-being of people living in these areas. Now with the COVID-19 pandemic, these issues have made the SDoH even more pertinent to study. The loss of jobs perpetuated a series of spiraling events that are all connected to the SDoH. From loss of income, growing food insecurity levels, homelessness increasing, and a general lack of resources, we must act quickly to better the health of our communities [22]. By

further researching the association of housing instability and food insecurity, we can better inform public health strategies that address health disparities present in communities.

Limitations

A limitation of this study is that food insecurity was measured through an adapted version of the USDA HFSSM, which does not fully utilize all questions found in this national scale, however, the adapted version captures the three pillars of food security—availability, access, and utilization. This study is only representative of San Diego County from one community organization. Clients call into *2-1-1 San Diego* because they need assistance and are inclined to get help. Therefore, this study analyzed the needs of people who are already at risk of associated hardships.

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Data Availability Data transparency complies with field standards.

Code Availability Code is available (software application or custom code).

Declarations

Conflict of interest There are no conflicts of interest.

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References

1. Social Determinants of Health. Centers for Disease Control and Prevention. Retrieved July 10, 2020, from <https://www.cdc.gov/socialdeterminants/index.htm>. Published January 29, 2018.
2. Social Determinants of Health. Social Determinants of Health | Healthy People 2020. Retrieved July 10, 2020, from <https://www.healthypeople.gov/2020/topics-objectives/topic/social-determinants-of-health>.
3. Alderwick, H., & Gottlieb, L. M. (2019). Meanings and misunderstandings: A social determinants of health lexicon for health care systems. *The Milbank Quarterly*, 97(2), 407–419. <https://doi.org/10.1111/1468-0009.12390>
4. Bottino, C., Fleegler, E., Cox, J., & Rhodes, E. (2019). The relationship between housing instability and poor diet quality among urban families. *Academic Pediatrics*, 19(8), 891–898. <https://doi.org/10.1016/j.acap.2019.04.004>
5. Crowley, S. (2003). The affordable housing crisis: Residential mobility of poor families and school mobility of poor children. *Journal of Negro Education*, 72(1), 22–38. <https://doi.org/10.2307/3211288>

6. McKinney, S. (1987). Homeless Assistance Act of 1987, Pub. L. No. 100–77, 101 Stat. 482.
7. Harvard Joint Center for Housing Studies Releases State of the Nation's Housing 2016. *National Low Income Housing Coalition*. Retrieved May 10, 2020, from <https://nlihc.org/resource/harvard-joint-center-housing-studies-releases-state-nations-housing-2016>. Published June 27, 2016.
8. Nord, M., & Golla, A. M. (2009). Does SNAP decrease food insecurity? Untangling the self-selection effect. *AgEconomy Search*. <https://doi.org/10.22004/ag.econ.55955>
9. USDA Economic Research Service. (2009). *Access to affordable and nutritious food: Measuring and understanding food deserts and their consequences*. Washington: USDA Economic Research Service. Retrieved November 27, 2017.
10. Webb, P., Coates, J., Frongillo, E. A., Rogers, B. L., Swindale, A., & Bilinsky, P. (2006). Measuring household food insecurity: Why it's so important and yet so difficult to do. *Journal of Nutrition*, *136*(5), 1404S–1408S. <https://doi.org/10.1093/jn/136.5.1404S>
11. Coleman-Jensen, A., Rabbitt, M. P., Gregory, C., & Singh, A. (2015). *Household Food Security in the United States in 2014*. United States Department of Agriculture.
12. Gundersen, C., & Oliveira, V. (2001). The food stamp program and food insufficiency. *American Journal of Agricultural Economics*, *83*, 875–887. <https://doi.org/10.1111/0002-9092.00216>
13. Bailey, K. T., Cook, J. T., de Cuba Ettinger, S., Casey, P. H., Chilton, M., Coleman, S. M., et al. (2015). Development of an index of subsidized housing availability and its relationship to housing insecurity. *House Policy Debate*, *26*(1), 172–187. <https://doi.org/10.1080/10511482.2015.1015042>
14. Ma, C. T., Gee, L., & Kushel, M. B. (2008). Associations between housing instability and food insecurity with health care access in low-income children. *Ambulatory Pediatrics*, *8*(1), 50–57. <https://doi.org/10.1016/j.ambp.2007.08.004>
15. Parpouchi, M., Moniruzzaman, A., Russolillo, A., & Somers, J. M. (2016). Food Insecurity among Homeless Adults with Mental Illness. *PLoS ONE*, *11*(7), e0159334. <https://doi.org/10.1371/journal.pone.0159334>
16. Tarasuk, V., Fafard St-Germain, A. A., & Mitchell, A. (2019). Geographic and socio-demographic predictors of household food insecurity in Canada, 2011–12. *BMC Public Health*, *19*(1), 12. <https://doi.org/10.1186/s12889-018-6344-2>
17. Kushel, M. B., Gupta, R., Gee, L., & Haas, J. S. (2006). Housing instability and food insecurity as barriers to health care among low-income Americans. *Journal of General Internal Medicine*, *21*(1), 71–77. <https://doi.org/10.1111/j.1525-1497.2005.00278.x>
18. Keys to Cross-Sector Collaboration. Health Leads USA. Retrieved February 1, 2021, from <http://healthleadsusa.org/wp-content/uploads/2020/08/Learning-from-the-Implementation-of-CSCA.pdf>.
19. San Diego Regional Task Force on the Homeless. We All Count. Retrieved November 2, 2020, from <https://www.rtfhsd.org/wp-content/uploads/WeAllCount.pdf>. Published 2020.
20. Bhattarai, G. R., Duffy, P. A., & Raymond, J. (2005). Use of food pantries and food stamps in low-income households in the United States. *The Journal of Consumer Affairs*, *39*(2), 276–298
21. What is CIE? Community Information Exchange San Diego. Retrieved February 1, 2021, from <https://ciesandiego.org/what-is-cie/>.
22. Singu, S., Acharya, A., Challagundla, K., & Byrareddy, S. N. (2020). Impact of social determinants of health on the emerging COVID-19 pandemic in the United States. *Frontiers in Public Health*, *8*, 406. <https://doi.org/10.3389/fpubh.2020.00406>

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