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Gentrification and Food Environments: A Rapid Evidence Assessment

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1 **Title:**

2 Gentrification and Food Environments: A Rapid Evidence Assessment

3

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13

14 **Abstract**

15 Gentrification is a complex and controversial process, where the influx of new, wealthier residents to
16 previously run-down neighbourhoods brings change such as economic development, infrastructure
17 investments and lower crime rates, but can be to the detriment of the original lower-income
18 residents, who are either displaced, or stay but cannot take advantage of the new opportunities.
19 Understanding how neighbourhood change affects food environments can shed light on the possible
20 causal pathways between gentrification and urban health inequalities. This rapid evidence
21 assessment reviewed evidence on the impact of gentrification on the healthfulness of food
22 environments globally. Ten studies were identified through a systematic keyword search and
23 assessed. We found limited evidence of an effect, with a small, albeit consistent, body of evidence
24 mostly comprised of low- to medium-quality observational studies, all from high-income countries.
25 Most studies examined effects on availability or affordability of food, finding an association between
26 gentrification and increased availability of unhealthy foods, or reduced affordability for original low-
27 income residents.

28

29 **Key words:**

- 30 1. food affordability
- 31 2. food mirages
- 32 3. food systems
- 33 4. urban health
- 34 5. neighbourhood change
- 35 6. urban renewal

36

37 **Statements and Declarations**

38 We have no competing interests to declare.

39

40

41

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47 causal pathways between gentrification and urban health inequalities. This rapid evidence
48 assessment reviewed evidence on the impact of gentrification on the healthfulness of food
49 environments globally. Ten studies were identified through a systematic keyword search and
50 assessed. We found limited evidence of an effect, with a small, albeit consistent, body of evidence
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63

64

65 1 Introduction

66

67 Gentrification is a complex and controversial process, where the influx of new, wealthier residents to
68 previously run-down neighbourhoods brings change such as economic development, infrastructure
69 investments and lower crime rates, but can be to the detriment of the original lower-income
70 residents, who are either displaced, or stay but cannot take advantage of the new opportunities
71 (Rhodes-Bratton *et al.* 2018).

72 Food environments are defined by Franco *et al.* (2016) as all aspects of the local environment that
73 influence dietary behaviours. Neighbourhood changes that occur with gentrification, such as the
74 replacement of local “mom and pop” stores with upmarket boutiques and retail chains (Krase and
75 DeSena 2020), therefore may also influence characteristics of the food environment. As dietary
76 intake is a key determinant of diet quality, nutrition status and disease (Afshin *et al.* 2019),

77 understanding how food environments are affected by gentrification can shed light on the possible
78 causal pathways between gentrification and health inequalities.

79 This rapid evidence assessment (REA) aims to review the evidence on the impact of gentrification on
80 food environments and was conducted according to guidance from the UK government's
81 Department of Environment Food and Rural Affairs (DEFRA) (Collins *et al.* 2015) and the Guideline
82 for Rapid Evidence Assessments in Management and Organizations by the Centre for Evidence-Based
83 Management (CEBMA) (Barends *et al.* 2017).

84 To our knowledge, this is the first review of the impact of gentrification on food environments.
85 Previous reviews have focused on measures of the food environment (Lytle and Sokol 2017);
86 nutrition interventions in low-income rural and urban retail environments (Fergus *et al.* 2021);
87 community-level interventions to improve access to nutritious food in low and middle income
88 countries (LMICs) (Duraio *et al.* 2020); socioeconomic differences in the association between the
89 food environment and diet (Mackenbach *et al.* 2019); mapping evidence from projects on drivers of
90 food choice to a food environment framework (Constantinides *et al.* 2021); associations between
91 food environment characteristics and diet, nutrition and health outcomes in urban LMIC settings
92 (Westbury *et al.* 2021); and the state of food environment research in LMICs (Turner *et al.* 2020).

93 We start by defining a clear research question, then describe the methodology used to identify and
94 evaluate the literature, provide a judgement on the quality of evidence, and summarize salient
95 themes. We conclude by highlighting gaps in the literature for future research consideration.

96

97 2 Definitions

98

99 While there are competing definitions for *gentrification* (Tulier *et al.* 2019), the term is generally
100 understood as the process in which a poor area experiences an influx of high-income newcomers
101 who drive up property values, often resulting the displacement of original, low-income residents
102 (Merriam-Webster 2020).

103 Related concepts of gentrification include *tourism gentrification*, where neighbourhoods change to
104 suit the needs of wealthy visitors (Loda *et al.* 2020, Sánchez-Ledesma *et al.* 2020); *commercial*
105 *gentrification* where retail change occurs but is disconnected from residential gentrification (Kosta
106 2019); and *ecological gentrification*, the pursuit of an environmental agenda related to public green
107 spaces that leads to the displacement of homeless people (Dooling 2009).

108 Often used interchangeably with gentrification (Tulier *et al.* 2019), *urban renewal* refers to
109 programmes to restore degraded buildings (Merriam-Webster 2020), which frequently displaces
110 original residents and leads to gentrification (Komakech and Jackson 2016).

111 The *food environment* is defined Swinburn *et al.* (2013) as the “collective physical, economic, policy
112 and sociocultural surroundings, opportunities and conditions that influence people’s food and
113 beverage choices and nutritional status.”

114 Other recent work has expanded on past definitions of food environments to encompass the reality
115 in LMICs. Turner *et al.* (2018) describe food environments as the “interface where people interact
116 with the wider food system to acquire and consume foods”. This conceptualization includes both

117 market and non-market food sources and splits food environments into external (e.g. availability,
118 price) and personal (e.g. accessibility, affordability) domains.

119 Downs *et al.* (2020) propose a definition applicable to both LMICs and high-income settings: “The
120 consumer interface with the food system that encompasses the availability, affordability,
121 convenience, promotion and quality, and sustainability of foods and beverages in wild, cultivated,
122 and built spaces that are influenced by the socio-cultural and political environment and ecosystems
123 within which they are embedded.” The incorporation of different food system typologies (natural
124 and built) aims to better reflect the reality of how people interface with food systems in diverse
125 settings.

126 The High Level Panel of Experts on Food Security and Nutrition (HLPE 2017) outlines four domains of
127 the food environment, which have been used as a framework in this REA:

- 128 • Availability and physical access (proximity)
- 129 • Affordability (both absolute prices and relative to purchasing power)
- 130 • Promotion, advertising and information
- 131 • Food quality and safety (This dimension is expanded on and described by Herforth and
132 Ahmed (2015) as ‘desirability’, and Caspi *et al.* (2012) as ‘acceptability’)

133
134 Affordability is measured in food environment studies either as absolute (e.g. food prices) or relative
135 to income and purchasing power (Lee *et al.* 2013, Herforth and Ahmed 2015, Franco *et al.* 2016). By
136 this logic, where household income is the denominator of affordability, foods of the same price can
137 have different affordability for different households in the same neighbourhood. The affordability of
138 food environments is therefore subjective, and factors impacting household income can affect the
139 affordability of food even when prices remain static. This idea is expressed in Turner *et al.* (2018)’s
140 conceptualization of food environments where price is a dimension of the external food
141 environment while affordability is a dimension of the personal food environment.

142
143 *Food mirages* refer to areas where food outlets are plentiful but unaffordable for low-income
144 residents (Breyer and Voss-Andreae 2013).

145
146 The terms *healthy* and *unhealthy* to describe food outlets or environments in this REA follow the
147 authors’ categorization. ‘Unhealthy’ usually defines neighbourhoods with high concentrations of fast
148 food and convenience stores, also known as ‘food swamps’, where areas are overwhelmed with
149 opportunities to access high calorie food and beverages, (Bridle-Fitzpatrick 2015), and/or
150 neighbourhoods lacking access to healthy foods such as fruit and vegetables, also known as ‘food
151 deserts (Widener and Shannon 2014). *Food outlets* is used to describe all food acquisition
152 opportunities (retail and catering).

153

154 3 Methodology

155

156 3.1 Research question

157

158 The aim of this REA is to review what is known about the link between gentrification and food
159 environments, specifically asking *How does gentrification impact the healthfulness of food*
160 *environments?* The lens of food environments as experienced by original or low-income residents
161 was applied to the research question.

162 The method applied by this REA was based on guidance from DEFRA set out by Collins et al (2015),
 163 and supplemented by guidance from CEBMa (Barends *et al.* 2017). Guidance on applying the SPICE
 164 framework was taken from Booth (2006) and Wilson *et al.* (2016). This assessment can be viewed as
 165 a streamlined REA report, rather than a full scoping report.

166 Applying a streamlined approach to identifying and assessing recent peer reviewed evidence while
 167 making recommendations for further systematic reviews allows for a quicker appraisal of a question
 168 and can ascertain the potential structure of a full systematic review. This approach to REAs offers
 169 researchers and policymakers a robust additional method to identifying evidence around a topic
 170 within a timeframe of weeks, and so can help to respond to rapidly emerging issues and help to
 171 define the terms of scoping reports as well as strategic evidence assessments.

172 Application of Booth (2006)'s SPICE framework for defining research questions (Table 1) allowed
 173 elaboration of a clear research question and search terms.

174

SPICE element	Relevant search terms or inclusion/exclusion concept	Justification
Setting	Urban areas All countries	Gentrification literature is geographically biased towards North America and Western Europe, but is a global phenomenon (Krase and DeSena 2020)
Population	Urban residents All socio-economic groups	Original low-income residents who remain after gentrification were of particular interest
Intervention	Gentrification Urban renewal Urban regeneration	These terms are often used interchangeably in the literature (Tulier <i>et al.</i> 2019) Urban renewal can lead to gentrification (Komakech and Jackson 2016)
Comparator	Before gentrification Similar non-gentrified neighbourhoods	Interested in the effect of gentrification compared to absence of gentrification
Evaluation	Healthy food environments Presence of fast-food outlets Presence of supermarkets Ratio of healthy/unhealthy foods available in retail outlets	Health, nutrition and dietary intake outcomes (which may be impacted through other non-food pathways e.g. green spaces for exercise, access to health services) were not of interest and were excluded in order to isolate the effect on food environments

175 **Table 1:** Application of the SPICE framework to review the association between gentrification and
 176 healthy food environments

177

178 3.2 Study selection

179

180 Figure 1 outlines the study selection process. Search terms and concepts identified in the SPICE
181 framework were used to develop a search string combined with Boolean operators 'AND' and 'OR',
182 and to inform inclusion and exclusion criteria. The streamlined approach applied in this case reduced
183 the time limit for publication from 10 to 5 years, focused on the 100 most relevant articles in the
184 search, and selected articles only in English. The justification for a streamlined approach is to allow
185 for a faster identification of a highly selected range of evidence which can then inform
186 recommendations for full systematic reviews. The limitations of these restrictions are discussed.

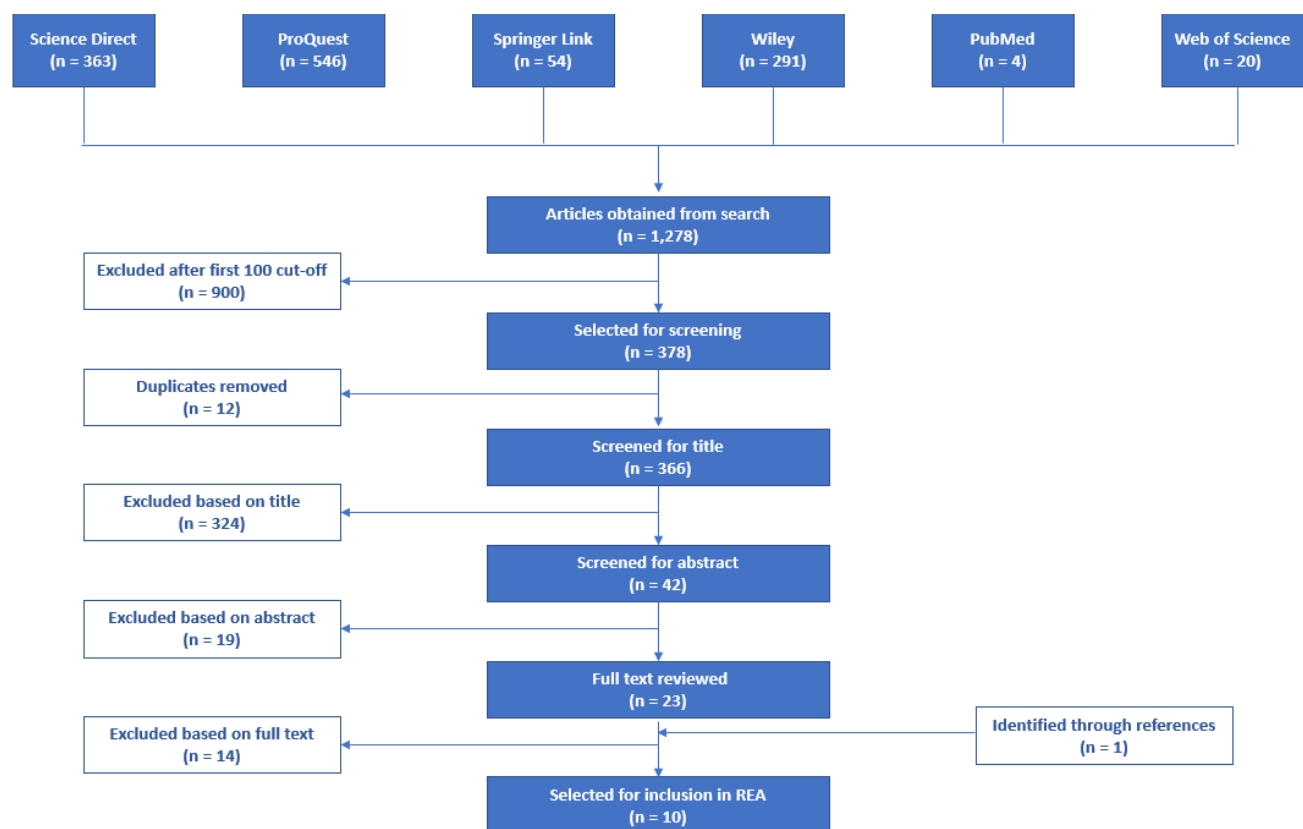
187 The search string entered into databases was:

188 *(gentrification OR "urban renewal" OR "urban regeneration" OR "neighbourhood renewal")*

189 *AND ("food environment" OR retail OR "fast food" OR supermarket) AND food*

190 The search string was applied to six databases (shown in Figure 1) in September 2020, according to
191 the REA method employed, described above. Filters for articles published in the last five years,
192 research articles/journals only, full text, peer reviewed and English language were applied where
193 available, generating a total of 1,278 results.

194



195

196 **Figure 1:** Study selection process

197

198 After sorting for relevance, the first 100 articles from the three databases yielding over 100 results,
199 and all articles from databases yielding fewer than 100, were imported into EndNote X9 (n=378).

200 After removing duplicates (n=12), 366 titles were screened and 42 were retained. Abstracts were
 201 reviewed against inclusion and exclusion criteria (Table 2) and 23 articles were retained, plus an
 202 additional article (from 2013) was identified via reviewing reference lists of all selected articles and
 203 included for relevance. After reading the full studies, ten were selected which met the scope of the
 204 REA.

205 3.3 Study review

206
 207 One author reviewed the ten studies and extracted details on methods, findings and key themes. As
 208 randomized trials are difficult and rare in neighbourhood food environment studies (Lytle 2009), the
 209 UK Government’s ‘How To Note: Assessing the strength of evidence’ (DFID 2014), referred to hereon
 210 as *the How To Note*, was considered an appropriate tool for evidence evaluation. The *How To Note*
 211 provides a robust framework for evaluating evidence generated by all research designs, including
 212 experimental, observational, quantitative and qualitative studies. The process used in a DFID REA
 213 (Cramer *et al.* 2016) was used as a template, described as follows.

214 A checklist was adapted from the *How To Note*’s checklist of quality assessment. Many concessions
 215 must be made in order for an REA to be conducted rapidly (Barends *et al.* 2017). In order to adapt to
 216 the time and personnel constraints of this REA, two principles (reliability and cultural sensitivity,
 217 referring to research designs that fail to consider local, cultural factors that might affect behaviours
 218 and trends) were removed from assessment.

219 Following the DFID example REA, a grading system was devised to ensure a structured approach.
 220 Using checklist questions as a guide, two reviewers independently assessed the ten articles, giving a
 221 grade of 1 to 3 for each principle (1 being major concerns to 3 being no concerns). Each study was
 222 then assigned an average score assuming equal weighting for each principle, and categorized as low
 223 (<2.0), medium (2.0-2.5), or high (>2.5) quality, with cut-offs decided by the reviewer. A narrative
 224 approach was used to synthesize the findings.
 225

Variable	Inclusion	Exclusion
Type of article	<ul style="list-style-type: none"> ✓ Full text ✓ Peer reviewed ✓ Published in scholarly journals 	<ul style="list-style-type: none"> x Systematic reviews or meta-analyses x Opinion pieces x Book chapters x University theses or dissertations x Grey literature x Unpublished studies
Language	<ul style="list-style-type: none"> ✓ English 	<ul style="list-style-type: none"> x Languages other than English
Setting	<ul style="list-style-type: none"> ✓ Urban settings ✓ Neighbourhoods ✓ Retail food environments 	<ul style="list-style-type: none"> x Rural settings x Organizational settings (schools, workplaces)
Intervention	<ul style="list-style-type: none"> ✓ Gentrification ✓ Tourism gentrification ✓ Ecological gentrification ✓ Commercial gentrification 	

Evaluation	✓	Food retail environment changes	x	General (non-food) retail environment changes
	✓	Food availability	x	Studies investigating impact of gentrification on general health, nutrition status or dietary intake outcomes
	✓	Food affordability	x	Studies investigating impact of food environment on health/nutrition outcomes

226 **Table 2:** Study inclusion and exclusion criteria

227

228 4 Results

229

230 4.1 Summary of studies

231

232 Selected studies are detailed in Table 3. Of the ten studies, seven (Breyer and Voss-Andreae 2013,
233 Anguelovski 2015, Whittle *et al.* 2015, Komakech and Jackson 2016, Rhodes-Bratton *et al.* 2018,
234 Berger *et al.* 2019, Kosta 2019) were conducted in North America and three (Bilal *et al.* 2018, Loda *et al.*
235 *et al.* 2020, Sánchez-Ledesma *et al.* 2020) in Western Europe.

236 All studies used observational research designs, four (Anguelovski 2015, Whittle *et al.* 2015,
237 Komakech and Jackson 2016, Sánchez-Ledesma *et al.* 2020) used qualitative data in their analysis,
238 four (Breyer and Voss-Andreae 2013, Bilal *et al.* 2018, Rhodes-Bratton *et al.* 2018, Berger *et al.* 2019)
239 used quantitative, and two (Kosta 2019, Loda *et al.* 2020) used mixed methods.

240 Six studies (Breyer and Voss-Andreae 2013, Anguelovski 2015, Bilal *et al.* 2018, Rhodes-Bratton *et al.*
241 2018, Berger *et al.* 2019, Kosta 2019) used a neighbourhood, census tract or other geographical
242 boundary as the unit of analysis, three qualitative studies (Whittle *et al.* 2015, Komakech and
243 Jackson 2016, Sánchez-Ledesma *et al.* 2020) used residents as subjects, and one study (Loda *et al.*
244 2020) used both.

245 Nine studies (Breyer and Voss-Andreae 2013, Anguelovski 2015, Komakech and Jackson 2016, Bilal *et al.*
246 *et al.* 2018, Rhodes-Bratton *et al.* 2018, Berger *et al.* 2019, Kosta 2019, Loda *et al.* 2020, Sánchez-
247 Ledesma *et al.* 2020) explored the effect of gentrification (or socioeconomic status (SES) as a proxy),
248 on one or more domains of the food environment. The most common outcome measured, in five
249 studies, (Rhodes *et al.* 2009, Bilal *et al.* 2018, Berger *et al.* 2019, Kosta 2019, Loda *et al.* 2020) was
250 change in types of food outlets using repeated cross-sectional measures or longitudinal data. The
251 tenth study (Whittle *et al.* 2015) began with the outcome, investigating food insecurity and
252 identifying gentrification as a driver of reduced affordability of foods.

253 All studies concluded that gentrification had a negative effect on at least one domain of the food
254 environment when considering the subjective experience of original or low-income residents.

Reference	Summary of study	Study design, Data collection and analysis, Quality	Sample/ Subject	Outcome/s studied*	Key findings	Is gentrification good for food environments? (domain impacted)
Anguelovski (2015) Boston (USA)	Empirical research documenting impact of gentrification on affordability and access to culturally appropriate options for low-income ethnic minorities	Observational Qualitative (case study) Low	1 neighbourhood	Availability of culturally appropriate food options. Affordability of food for low-income residents	Gentrification, including the arrival of a Whole Foods outlet, was associated with reduced availability and variety of Latino products, and reduced affordability for low-income residents	No (availability, affordability)
Berger <i>et al.</i> (2019) New York (USA)	Tracks relationship between trajectories of neighbourhood socio-demographic characteristics and BMI-unhealthy retail environments over 20 years	Observational Quantitative (cross sectional repeated measures) Low	2,047 census tracts	Changes in number of BMI-unhealthy food outlets (characterized as selling calorie-dense foods such as pizza and pastries)	Neighbourhoods that experienced increased purchasing power also experienced increased exposure to BMI-unhealthy retail environment	No (availability)
Bilal <i>et al.</i> (2018) Madrid (Spain)	Explores association between gentrification over 4 years and subsequent changes in retail environment in the following 5 years	Observational Quantitative (cross sectional repeated measures) High	2,272 census sections (700-3500 people) classified into 4 groups, representing the entire city.	Changes in number and proportion of: total food stores, (unhealthy) supermarkets, and (healthy) small specialized stores including fruit and vegetable stores, fishmongers, butchers, bakers	Gentrifying areas experienced increased number and proportion of supermarkets and decreased in specialized stores All neighbourhood types experienced gradual shift from specialized store to supermarkets, which was steepest in gentrifying areas	No (availability)

Breyer and Voss-Andreae (2013)	Used regression analysis to examine relationship between gentrification and food availability and affordability for low-income households	Observational Quantitative (cross sectional)	140 census tracts (neighbourhoods)	Distance to grocery stores, distance to low-cost grocery stores	(Healthy) grocery stores are more abundant, physically accessible (shorter distance to stores), and costly in gentrifying areas, creating 'food mirages' for low-income residents	Yes (availability) No (affordability)
Portland (USA)		Medium				
Komakech and Jackson (2016)	Qualitative study using exploratory research methods to examine impact of urban renewal on small grocery stores	Observational Qualitative (exploratory research design, interviews)	10 small ethnic store owners + 16 ethnic residents recruited via purposive sampling.	Subjective reported impact on business of small ethnic grocery stores (which play a role in food security)	Urban renewal (leading to gentrification) had a negative impact on ethnic grocery stores' business. These stores play a role in food security for low income/ethnic minority residents via credit schemes and provision of culturally acceptable foods	No (availability, affordability)
Toronto (Canada)		Low				
Kosta (2019)	Comparative case study investigating impact of commercial gentrification on the proportion of 3 types of food outlets	Observational Mixed methods (comparative case study)	2 neighbourhoods	Change in proportion of restaurants, cafes, and food stores including speciality ethnic food stores	Restaurants and cafes targeted at non-residents increased, while specialty food stores that would necessitate home cooking decreased over 39 years (1971-2010)	No (availability)
New York (USA)		Low				
Loda <i>et al.</i> (2020)	Empirical surveys documenting impact of tourism gentrification on food retail environment	Observational Mixed methods (case study)	1 area of historic centre (150 ha) + 237 business owners sampled randomly	Change in number and orientation (tourist-targeted vs non-tourist targeted) of food retail (catering) outlets	Catering/restaurants targeted at tourists increased at the expense of services useful for residents: Catering services doubled in 15 years; 19% of catering businesses replaced non-tourist targeted commercial/artisan activities	No (availability)
Florence (Italy)		Low-medium				

Rhodes-Bratton <i>et al.</i> (2018) New York (USA)	Secondary longitudinal data analyses examining relationship between gentrification and changes in healthy and unhealthy food outlets over 21 years (1990-2010)	Observational Quantitative (longitudinal) Medium	21 sub-borough areas	Changes in healthy and unhealthy food outlets	Gentrifying neighbourhoods experienced the highest increase in (predominantly unhealthy) food outlets between 1990-2010 compared to reference (did not gentrify, not eligible to gentrify) neighbourhoods	No (availability)
Sánchez-Ledesma <i>et al.</i> (2020) Barcelona (Spain)	Participatory action research approach to identify residents' perceived pathways between tourism gentrification and impact on health	Observational Qualitative (Participatory action research approach – photostory) Low-medium	13 self-selected residents	Subjective effect on residents: Reported perceived pathways between tourism gentrification and health	Residents identified changes in store types (loss of fresh food stores and traditional markets, replacement with tourist-oriented stores) and increased food prices as tourism gentrification-induced factors that forced them to adopt unhealthier eating habits	No (availability, affordability)
Whittle <i>et al.</i> (2015) San Francisco (USA)	Interviews with people living with HIV in gentrified neighbourhoods to explore experiences of food insecurity	Observational Qualitative (interviews) Low	34 people living with HIV	Subjective experience of food insecurity	Respondents reported that food insecurity often arose from the need to pay high rents exacerbated by gentrification, thereby reducing relative affordability of food	No (affordability)

256 *Only food environment outcomes were considered, although several studies measured multiple outcomes (e.g. health)

257 **Table 3:** Summary of studies

258 5 Evaluation of Evidence

259

260 5.1 Evaluation of individual studies

261

262 Table 4 displays the results of the quality checklist.

263 On average, the sample was judged to be low quality for conceptual framing, with only two studies
264 (Bilal *et al.* 2018, Rhodes-Bratton *et al.* 2018) considered to fully meet all three criteria of
265 acknowledging existing research, constructing a conceptual framework and posing a research
266 question or outline a hypothesis.

267 The sample was judged to be medium quality for transparency, with six studies (Breyer and Voss-
268 Andreae 2013, Bilal *et al.* 2018, Rhodes-Bratton *et al.* 2018, Berger *et al.* 2019, Loda *et al.* 2020,
269 Sánchez-Ledesma *et al.* 2020) judged to fully meet all three criteria of presenting or linking to the
270 raw data, clearly defining the geography or context of the study and declaring sources of funding.

271 The body of evidence was evaluated as medium quality for appropriateness, with four studies
272 (Anguelovski 2015, Whittle *et al.* 2015, Komakech and Jackson 2016, Kosta 2019) judged to meet all
273 criteria of identifying a research design and method and demonstrating why the chosen design and
274 method was well suited to the research question.

275 Studies were considered to perform poorly for validity, with only two studies (Bilal *et al.* 2018, Kosta
276 2019) considered to demonstrate all considered forms of validity (measurement, internal, external
277 and ecological).

278 The sample was evaluated to be medium quality for cogency, with three studies (Breyer and Voss-
279 Andreae 2013, Bilal *et al.* 2018, Sánchez-Ledesma *et al.* 2020) graded highly for signposting the
280 reader, considering the study's limitations or alternative interpretations of the analysis, and basing
281 conclusions clearly on the study's results.

282

Principles of quality	Associated questions	Anguelovski 2014	Berger et al 2019	Bilal et al 2018	Breyer and Voss-Andreae 2013	Komakech and Jackson 2016	Kosta 2019	Loda et al 2020	Rhodes-Bratton et al 2018	Sanchez-Ledesma et al 2020	Whittle et al 2015	Overall
		Conceptual framing	Does the study acknowledge existing research?	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
	Does the study construct a conceptual framework?	No	No	Yes	Yes	Yes	No	Yes	Yes	No	No	
	Does the study pose a research question or outline a hypothesis?	Yes	No	Yes	No	No	No	No	Yes	No	No	
	Score	1	1	3	2	2	1	2	3	1	1	1.7
Transparency	Does the study present or link to the raw data it analyses?	No	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	
	Is the geography/context of the study clearly defined?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
	Does the study declare sources of support/funding?	No	Yes	Yes	Yes	No	No	Yes	Yes	Yes	No	
	Score	1	3	3	3	1	2	3	3	3	2	
Appropriateness	Does the study identify a research design?	Yes	No	No	No	Yes	Yes	Yes	No	No	Yes	
	Does the study identify a research method?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
	Does the study demonstrate why the chosen design and method are well suited to the research question?	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	
	Score	3	2	2	2	3	3	2	2	2	3	
Validity	To what extent does the study demonstrate measurement validity?	Med	Low	Low	Low	Med	Med	Med	Low	Med	Med	
	To what extent is the study internally valid?	Low	Low	Med	Low	Low	Low	Low	Low	Med	Low	
	To what extent is the study externally valid?	Low	Low	High	Low	Low	Low	Low	Low	Low	Low	
	To what extent is the study ecologically valid?	Low	High	High	High	Low	High	Low	High	Low	Low	
	Score	1	1	2	1	1	2	1	1	1	1	

Cogency	Does the author 'signpost' the reader throughout?	Yes	No	Yes	Yes	No	No	Yes	Yes	Yes	No	
	To what extent does the author consider the study's limitations and/or alternative interpretations of the analysis?	Low	High	High	High	Med	No	Low	High	High	High	
	Are the conclusions clearly based on the study's results?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	
	Score	2.0	2.0	3.0	3.0	2.0	1.0	2.0	2.0	3.0	2.0	2.2
Overall quality of evidence rating (scores average)		1.6	1.8	2.6	2.2	1.8	1.8	2.0	2.2	2.0	1.8	2.0
Corresponding quality rating		Low	Low	High	Med	Low	Low	Low/ Med	Med	Low/ Med	Low	Low/ Med

285

286 **Table 4:** Quality of evidence checklist for studies, adapted from DFID (2014)

287

288 **Scores:**

289 3 = no concerns

290 2 = some concerns

291 1 = major concerns

292

293 **Quality cut-offs for averages:**

294 <2.0 = low

295 2.0-2.5 = medium

296 >2.5 = high

297

298 5.2 Evaluation of the body of evidence

299

300 Using the DFID *How To Note*, the overall body of evidence was judged on quality, size, context and
301 consistency.

302 The quality assessment described above judged five studies (Anguelovski 2015, Whittle *et al.* 2015,
303 Komakech and Jackson 2016, Berger *et al.* 2019, Kosta 2019) to be low quality, two (Loda *et al.* 2020,
304 Sánchez-Ledesma *et al.* 2020) to be low-medium, two (Breyer and Voss-Andreae 2013, Rhodes-
305 Bratton *et al.* 2018) to be medium, and one (Bilal *et al.* 2018) to be high quality. The overall quality
306 of the sample was therefore judged to be low-medium. However the range of different designs used,
307 which triangulates findings, is a strength (DFID 2014).

308 Although REAs do not involve a comprehensive review of the literature, summarizing the
309 characteristics of the body of evidence include some subjective judgement of the size of the body of
310 evidence (DFID 2014). The size of the evidence base was considered be small, with only ten studies
311 identified. Although there are no specific numbers that constitute size DFID (2014), a crude test on
312 ScienceDirect comparing results elicited from the search terms *gentrification “food environment”*
313 ($n=34$) and *gentrification “mental health”* ($n=382$) provides a basic indication of the relative size of
314 the evidence body compared to other gentrification-related topics.

315 The body of evidence is context-specific (as opposed to global), heavily skewed towards North
316 America then Western Europe, and totalling just four countries (USA, Canada, Spain and Italy). A
317 convincing body of evidence would ideally exist globally as well as in the context of interest. Without
318 a comparison group in different settings, context-related factors may confound findings (DFID 2014).
319 The absence of studies from LMICs, despite the global focus of the search, was surprising given the
320 nutrition transition, urbanization and gentrification occurring in these regions, and that food
321 environment research is gaining traction in LMICs (Turner *et al.* 2020). This may have been due to
322 the limitations of the search imposed by the REA methodology.

323 The body of evidence, however, was consistent, with all studies concluding that gentrification had a
324 negative effect on food environments, particularly availability and affordability, when considered
325 through the lens of low-income groups. However, this could suggest publication bias, where studies
326 reporting a significant relationship are more likely to be published than those with null results (Caspi
327 *et al.* 2012).

328

329 *Measurement validity*

330 Five studies (Breyer and Voss-Andreae 2013, Bilal *et al.* 2018, Rhodes-Bratton *et al.* 2018, Berger *et*
331 *al.* 2019, Kosta 2019) relied exclusively on secondary data (e.g. business directories or geographic
332 information system-based methods) to characterise the food environment, which Liese *et al.* (2013)
333 found results in significant error. Both Liese *et al.* (2013) and Kosta (2019) recommend combining
334 these data with field census or other methods such as qualitative interviews, however this was only
335 done in one study (Loda *et al.* 2020).

336 The classification of outlets as ‘healthy’ or ‘unhealthy’ was measured at the level of store type. More
337 precise retail-level data (such as measures of relative shelf space, availability and affordability of
338 specific foods, etc.) are likely required.

339 Gentrification, which is complex, non-linear and phased, is also inherently problematic to study
340 (Tulier *et al.* 2019), and was measured inconsistently across studies, with some, e.g. Rhodes-Bratton

341 *et al.* (2018), relying on secondary gentrification rankings others, e.g. Berger *et al.* (2019), using
342 sociodemographic data such as change in Black and Hispanic populations.

343

344 *Internal validity*

345 Three studies (Breyer and Voss-Andreae 2013, Bilal *et al.* 2018, Berger *et al.* 2019) analysed cross-
346 sectional data (two with repeated measures) which has limited capacity to demonstrate cause and
347 effect (Lytle 2009). Gentrification may impact food environments, but the reverse may also be true,
348 such as when the opening of new supermarkets makes a neighbourhood more attractive to wealthy
349 newcomers (Cohen 2018).

350 Only one study (Bilal *et al.* 2018) aimed to control for causal direction by analysing neighbourhood
351 change and subsequent retail change in two separate time periods. Confounding remained an issue,
352 however, as study periods overlapped with recession and recovery (Bilal *et al.* 2018).

353 Use of longitudinal data or repeated measures of cross-sectional data do not resolve the issue of
354 confounding as neighbourhoods themselves also change over time (Lytle 2009). The four studies
355 using residents (Whittle *et al.* 2015, Komakech and Jackson 2016, Loda *et al.* 2020, Sánchez-Ledesma
356 *et al.* 2020) were also prone to confounding, as people are not 'randomly assigned' to
357 neighbourhoods, but may live there due to income, proximity to work, or other factors (Lytle 2009).

358 Although conceptualization of causal mechanisms is essential to inform policy (Tulier *et al.* 2019),
359 only three studies identified potential causal pathways: increased property value driving out small
360 retailers (Bilal *et al.* 2018); exodus of ethnic families reducing demand for ethnic retailers (Komakech
361 and Jackson 2016); and high rents reducing purchasing power, the denominator of food
362 affordability, of vulnerable people (Whittle *et al.* 2015).

363 In summary, this REA has found that the evidence body linking gentrification with unhealthier food
364 environments is small, albeit consistent, and of low to medium quality. This corresponds most
365 closely to DFID's description of 'limited evidence', characterized by mostly medium to low quality
366 observational studies.

367

368

369 6 Summary of key themes

370

371 Four themes emerged from the studies reviewed: availability, affordability (food mirages), cultural
372 relevance, and catering to a transient population. Breaking down findings into food environment
373 domains helps distinguish which associations are the most robust (Caspi *et al.* 2012).

374

375 6.1 Availability of healthy and unhealthy food

376

377 Nine studies explored the concept of availability, of which the majority (Bilal *et al.* 2018, Rhodes-
378 Bratton *et al.* 2018, Berger *et al.* 2019, Kosta 2019, Loda *et al.* 2020) measured changes in the

379 number and/or proportion of healthy versus unhealthy food outlets, and one (Breyer and Voss-
380 Andreae 2013) measured distance to (healthy) grocery stores.

381 Seven of these nine studies (Anguelovski 2015, Komakech and Jackson 2016, Bilal *et al.* 2018, Berger
382 *et al.* 2019, Kosta 2019, Loda *et al.* 2020, Sánchez-Ledesma *et al.* 2020) found gentrification to be
383 associated with increased availability of unhealthy foods and/or decreased availability of healthy or
384 culturally appropriate foods. One (Rhodes-Bratton *et al.* 2018) found increased availability of both
385 healthy and unhealthy, and one (Breyer and Voss-Andreae 2013) found increased availability of
386 healthy (albeit unaffordable) food.

387 The categorization of food outlet types as healthy or unhealthy differed by study. Supermarkets
388 were considered unhealthy in Madrid, as they were more likely to offer low-cost processed foods
389 (Bilal *et al.* 2018), but were labelled healthy in the American studies, where they are assumed to
390 carry more healthy options compared to convenience stores (Franco *et al.* 2016).

391 This differing classification of store type in each context hinders comparability and thus meta-
392 analysis of effect estimates. Categorization of 'healthy' and 'unhealthy' at the store level could lead
393 to measurement error and inconsistent findings, as stores may offer both healthy and unhealthy
394 options. Caspi *et al.* (2012) argue that since supermarkets offer both fresh and ultra-processed
395 foods, applying this dichotomous classification may be overly simplistic. Consumer-level retail
396 measures such as shelf space and product placement would provide more granular understanding.

397 After their systematic review found consistent evidence of an association between availability and
398 dietary behavior in LMICs, which contrasted with previous findings from high-income countries
399 (HICs), Westbury *et al.* (2021) hypothesized that availability may be more important in LMICS than
400 HICs. The authors suggested that this could be due in part to access to transport which makes it
401 easier for people to buy food outside their neighbourhoods. Applying the same consideration to
402 gentrifying neighbourhoods, if poorer residents are less likely to have access to private transport,
403 food availability may be an important predictor of dietary behaviors.

404

405 6.2 Food mirages: unaffordable abundance

406

407 Three low quality studies (Anguelovski 2015, Whittle *et al.* 2015, Komakech and Jackson 2016), one
408 low-medium quality study (Sánchez-Ledesma *et al.* 2020) and one medium quality study (Breyer and
409 Voss-Andreae 2013) explored the issue of affordability for original residents. Three of these five
410 (Breyer and Voss-Andreae 2013, Anguelovski 2015, Komakech and Jackson 2016) considered prices
411 relative to the purchasing power of certain groups. One paper (Whittle *et al.* 2015) explored a
412 mechanism on the demand side, whereby high rents due to gentrification in San Francisco reduced
413 the food budgets of people living with HIV. All studies concluded that food affordability worsened
414 with gentrification for the populations considered.

415 Unaffordability often coincided with abundant availability, exemplifying the concept of 'food
416 mirages', where food outlets are plentiful but unaffordable for low-income residents (Breyer and
417 Voss-Andreae 2013). Breyer and Voss-Andreae (2013) found shorter distances to grocery stores and
418 more abundant but costly food in gentrified areas, pointing out that these areas would not appear
419 problematic from a standard food desert perspective.

420 Constantinides *et al.* (2021), who found that gender dynamics was an important factor in LMIC food
421 environment studies, argued for applying an equity lens to assessment of the personal food

422 environment. The above findings support this argument and suggest that considering equity may
423 help understand how the personal circumstances of poorer residents, such as income or time
424 available for food preparation, mediate how external food environments in gentrified areas are
425 experienced.

426 None of the studies reviewed differentiated between the relative affordability of healthy versus
427 unhealthy food, with the partial exception of Sánchez-Ledesma *et al.* (2020) who found that
428 increased food prices led to self-reported 'worse nutrition habits' among residents. Since healthy
429 diets have been found to cost more than unhealthy ones (Rao *et al.* 2013), it could therefore be
430 assumed that any issue with affordability of food in general would be exacerbated if only healthy
431 foods were considered. If studies investigating affordability fail to make this distinction, findings may
432 have limited value in explaining obesogenic food environments.

433

434 6.3 Cultural acceptability of available food

435

436 Two low quality studies (Anguelovski 2015, Komakech and Jackson 2016) looked at the theme of
437 cultural acceptability, with both concluding that gentrification led to decreased access to affordable
438 and culturally preferred items for ethnic minorities, such as halal foods, via the closure of stores.

439 The concept of cultural preferences is largely absent from food environment definitions, aside from
440 Herforth and Ahmed (2015)'s dimension of 'desirability' which includes cultural norms. Caspi *et al.*
441 (2012) argue that food environment constructs should be expanded to include cultural relevance,
442 which may be significant in areas with large immigrant populations.

443 Other aspects of acceptability did not appear in the studies. This aligns with a systematic review of
444 food environment research in LMICs by (Turner *et al.* 2020) which found aspects of the personal
445 food environment such as desirability and convenience to feature less prominently than the external
446 food environment. Caspi *et al.* (2012) also concluded that food acceptability in general is
447 understudied in food environment literature.

448

449

450 6.4 Catering for transient populations

451

452 Three low-medium and low quality studies looked at specific types of gentrification: tourism
453 gentrification in Florence and Barcelona, where neighbourhoods change to suit the needs of wealthy
454 visitors (Loda *et al.* 2020, Sánchez-Ledesma *et al.* 2020), and commercial gentrification in New York's
455 Little Italy neighbourhoods, where retail change occurs but is disconnected from residential
456 gentrification (Kosta 2019).

457 All studies described changes in the orientation of food businesses, finding that the retail food
458 environment transformed to meet the needs of tourists or commuting workers at the expense of
459 stores serving the everyday needs of residents.

460 None of the three studies looked at other aspects of the food environment, however since food
461 outlets may adapt to tourist palates at the expense of locally preferred options, the issue of cultural
462 preferences may be relevant.

463

464

465 7 Limitations

466

467 This REA has several limitations. *Food environment* is a relatively new term (Campeau *et al.* 2019),
468 therefore relevant publications exploring concepts such as affordability or convenience, but not
469 using *food environment* or other selected search terms, may have been missed.

470 While the concept of affordability was interpreted subjectively, with the inclusion of one study
471 (Whittle *et al.* 2015) showing how increased cost of living impacted affordability of food through
472 purchasing power, the search terms used did not explicitly seek articles investigating the link
473 between gentrification and cost of living. Therefore, studies highlighting this pathway will likely have
474 been missed.

475 Only articles in English were included, however Morrison *et al.* (2009) found that limiting searches to
476 English publications risks producing biased results. Since Western Europe was the second most
477 represented geographic area, other relevant studies published in European languages could have
478 been missed. The exclusion of articles in Spanish will likely have missed relevant studies from South
479 American countries where urbanization and gentrification in the context of nutrition transitions are
480 a concern.

481 Finally, concessions and adaptations made to the DFID *How To Note*, such as removing ‘reliability’
482 from the checklist, could have introduced bias, and the absence of alternative spelling of search
483 terms was also a limitation of the search strategy. This assessment will also be prone to the usual
484 selection bias of REAs due to the compromises required for them to be carried out rapidly (Barends
485 *et al.* 2017).

486

487 8 Conclusion

488

489 This REA explored the question: *How does gentrification impact the healthfulness of food*
490 *environments?* Through assessment of ten peer-reviewed studies, it found limited evidence that
491 gentrification is associated with healthier food environments. The evidence body is small,
492 comprised mostly of low to medium quality observational studies, albeit with consistent findings.

493 The exclusive use of observational study designs was considered appropriate for the research
494 questions, but several limitations were identified nonetheless, including issues with measuring both
495 gentrification and food environments, the classification of outlets broadly as ‘healthy’ or ‘unhealthy’,
496 the use of cross-sectional data to answer a cause-and-effect research question, and inadequate
497 control of confounding.

498 Of the four domains of food environments – availability, affordability, promotion, and food
499 safety/quality/desirability – the first two were the most represented.

500 Past research such as James *et al.* (2017) has highlighted that whilst cross-sectionally, high-income
501 neighbourhoods tend to have healthier food environments than low-income neighbourhoods, high-
502 income neighbourhoods have become more unhealthy over time, whereas low-income

503 neighbourhoods have plateaued. The results of this review add to this literature, finding that
504 originally low-income neighbourhoods may mirror longitudinal trends of high-income
505 neighbourhoods, developing more unhealthy food environments over time as they gentrify.

506 Downs *et al.* (2020)'s conceptual framework proposes that food environments transition with
507 development, and that those in high-income developed urban societies may undergo further
508 transition as consumers begin to demand healthy and sustainable foods. Viewing the current
509 findings through this framework could imply that while gentrifying neighbourhoods may be
510 undergoing this transition objectively, low income residents may simultaneously be experiencing a
511 shift to healthier personal food environments.

512 The literature on affordability adds an important element to the food desert discourse, with food
513 mirages behaving as food deserts in practical terms. However, affordability studies did not
514 differentiate between healthy and unhealthy foods.

515 The theme of cultural acceptability (desirability) emerged, highlighting a gap in both the research
516 and current conceptualization of food environments (Caspi *et al.* 2012). The impact of transient
517 populations on food environments also arose, but further study into the impact on the cultural
518 acceptability of foods would be relevant. The dimension of promotion did not feature at all in the
519 research, nor did other food environment concepts such as quality, safety and convenience.

520 The geographical bias towards North America and Western Europe is representative of gentrification
521 literature in general (Krase and DeSena 2020). However, given the increasing globalization of
522 gentrification (Tulier *et al.* 2019), research in different regions could help isolate the causal effect of
523 gentrification and control for locally contextual confounding factors.

524 Given the limitations presented in the REA, there remains significant room for improvement in
525 research on gentrification and food environments. However, limited evidence should not be an
526 excuse for inaction: urban policies that ensure the availability of healthy, affordable and culturally
527 appropriate food should be pursued regardless, and are in line with every country's commitment to
528 Sustainable Development Goals 2 (zero hunger) and 11 (sustainable cities and communities).
529 Simultaneously, improvement in the evidence base can help policymakers better understand drivers
530 of urban health inequalities and inform effective targeting of actions to achieve these goals.

531

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533 References

534

535 Afshin, A., et al. (2019). "Health effects of dietary risks in 195 countries, 1990–2017: a
536 systematic analysis for the Global Burden of Disease Study 2017." The Lancet **393**(10184): 1958-
537 1972.

538

539 Anguelovski, I. (2015). "Alternative food provision conflicts in cities: Contesting food privilege,
540 injustice, and whiteness in Jamaica Plain, Boston." Geoforum **58**: 184-194.

541

542 Barends, E., et al. (2017). CEBMa Guideline for Rapid Evidence Assessments in Management and
543 Organizations. Amsterdam, Center for Evidence Based Management.

544

545 Berger, N., et al. (2019). "Disparities in trajectories of changes in the unhealthy food environment in
546 New York City: A latent class growth analysis, 1990–2010." Social Science & Medicine **234**: 112362.

547

548 Bilal, U., et al. (2018). "Neighborhood social and economic change and retail food environment
549 change in Madrid (Spain): The heart healthy hoods study." Health & Place **51**: 107-117.

550

551 Booth, A. (2006). "Clear and present questions: formulating questions for evidence based practice."
552 Library Hi Tech **24**(3): 355-368.

553

554 Breyer, B. and A. Voss-Andreae (2013). "Food mirages: geographic and economic barriers to
555 healthful food access in Portland, Oregon." Health & Place **24**: 131-139.

556

557 Bridle-Fitzpatrick, S. (2015). "Food deserts or food swamps?: A mixed-methods study of local food
558 environments in a Mexican city." Soc Sci Med **142**: 202-213.

559

560 Campeau, C., et al. (2019). Food environments: Where people meet the food system. UNSCN
561 Nutrition. U. N. S. S. C. o. Nutrition. Rome.

562

563 Caspi, C. E., et al. (2012). "The local food environment and diet: A systematic review." Health & Place
564 **18**(5): 1172-1187.

565

566 Cohen, N. (2018). Feeding or Starving Gentrification: The Role of Food Policy. C. U. F. P. Institute.
567 New York, CUNY Graduate School of Public Health and Health Policy.

568

569 Collins, A., et al. (2015). The Production of Quick Scoping Reviews and Rapid Evidence Assessments:
570 A How to Guide. J. W. E. Group. London.

571

572 Constantinides, S. V., et al. (2021). "Using a global food environment framework to understand
573 relationships with food choice in diverse low- and middle-income countries." Global Food Security-
574 Agriculture Policy Economics and Environment **29**.

575

576 Cramer, C., et al. (2016). Evidence Synthesis: What interventions have been effective in preventing
577 or mitigating armed violence in developing and middle-income countries? London, Department for
578 International Development.

579

580 DFID (2014). How to Note: Assessing the Strength of Evidence. London, Department for International
581 Development.

582

583 Dooling, S. (2009). "Ecological Gentrification: A Research Agenda Exploring Justice in the City."
584 International Journal of Urban and Regional Research **33**(3): 621-639.

585

586 Downs, S. M., et al. (2020). "Food Environment Typology: Advancing an Expanded Definition,
587 Framework, and Methodological Approach for Improved Characterization of Wild, Cultivated, and
588 Built Food Environments toward Sustainable Diets." Foods **9**(4).

589

590 Durao, S., et al. (2020). "Community-level interventions for improving access to food in low- and
591 middle-income countries." Cochrane library **2020**(7): CD011504-CD011504.

592

593 Fergus, L., et al. (2021). "Nutrition Interventions in Low-Income Rural and Urban Retail
594 Environments: A Systematic Review." Journal of the Academy of Nutrition and Dietetics.

595

596 Franco, M., et al. (2016). Food Environment. Encyclopedia of Food and Health. B. Caballero, P. M.
597 Finglas and F. Toldrá. Oxford, Academic Press: 22-26.

598

599 Herforth, A. and S. Ahmed (2015). "The food environment, its effects on dietary consumption, and
600 potential for measurement within agriculture-nutrition interventions." Food Security **7**(3): 505-520.

601

602 HLPE (2017). Nutrition and food systems. A report by the High Level Panel of Experts on Food
603 Security and Nutrition of the Committee on World Food Security. HLPE Reports. Rome.

604

605 James, P., et al. (2017). "Changes in the food environment over time: examining 40 years of data in
606 the Framingham Heart Study." The international journal of behavioral nutrition and physical activity
607 **14**(1): 84-84.

608

609 Komakech, M. D. and S. F. Jackson (2016). "A Study of the Role of Small Ethnic Retail Grocery Stores
610 in Urban Renewal in a Social Housing Project, Toronto, Canada." J Urban Health **93**(3): 414-424.

611

612 Kosta, E. B. (2019). "Commercial Gentrification Indexes: Using Business Directories to Map Urban
613 Change at the Street Level." City & Community **18**(4): 1101-1122.

614

615 Kruse, J. and J. N. DeSena (2020). Introduction. Gentrification around the World, Volume I:
616 Gentrifiers and the Displaced. J. Kruse and J. N. DeSena. Cham, Springer International Publishing: 1-
617 10.

618

- 619 Lee, A., et al. (2013). "Monitoring the price and affordability of foods and diets globally: Monitoring
620 food prices." Obesity reviews **14**: 82-95.
- 621
- 622 Liese, A. D., et al. (2013). "Characterizing the Food Retail Environment: Impact of Count, Type and
623 Geospatial Error in Two Secondary Data Sources." Journal of nutrition education and behavior **45**(5):
624 435-442.
- 625
- 626 Loda, M., et al. (2020). "History to eat. The foodification of the historic centre of Florence." Cities
627 **103**: 102746.
- 628
- 629 Lytle, L. A. (2009). "Measuring the food environment: state of the science." American journal of
630 preventive medicine **36**(4 Suppl): S134-S144.
- 631
- 632 Lytle, L. A. and R. L. Sokol (2017). "Measures of the food environment: A systematic review of the
633 field, 2007–2015." Health & Place **44**: 18-34.
- 634
- 635 Mackenbach, J. D., et al. (2019). "A Systematic Review on Socioeconomic Differences in the
636 Association between the Food Environment and Dietary Behaviors." Nutrients **11**(9): 2215.
- 637
- 638 Merriam-Webster (2020). "Gentrification." Dictionary. Retrieved September, 2020, from
639 <https://www.merriam-webster.com/dictionary/gentrification>.
- 640
- 641 Merriam-Webster (2020). "Urban renewal." Dictionary. Retrieved September, 2020, from
642 <https://www.merriam-webster.com/dictionary/urban%20renewal>.
- 643
- 644 Mohammed, S. H., et al. (2019). "Neighbourhood socioeconomic status and overweight/obesity: a
645 systematic review and meta-analysis of epidemiological studies." BMJ open **9**(11): e028238-
646 e028238.
- 647
- 648 Morrison, A., et al. (2009). English-Language Restriction When Conducting Systematic Review-based
649 Meta-analyses: Systematic Review of Published Studies, Canadian Agency for Drugs and
650 Technologies in Health.
- 651
- 652 Rao, M., et al. (2013). "Do healthier foods and diet patterns cost more than less healthy options? A
653 systematic review and meta-analysis." BMJ open **3**(12): e004277-e004277.
- 654
- 655 Rhodes-Bratton, B., et al. (2018). "The relationship between childhood obesity and neighborhood
656 food ecology explored through the context of gentrification in New York City." Int Public Health J
657 **10**(4): 481-496.
- 658
- 659 Rhodes, P., et al. (2009). "Adult-onset obesity reveals prenatal programming of glucose-insulin
660 sensitivity in male sheep nutrient restricted during late gestation." PLoS ONE **4**(10): e7393.
- 661

- 662 Richardson, A. S., et al. (2014). "Neighborhood socioeconomic status and food environment: A 20-
663 year longitudinal latent class analysis among CARDIA participants." Health & Place **30**: 145-153.
- 664
665 Sánchez-Ledesma, E., et al. (2020). "Perceived pathways between tourism gentrification and health:
666 A participatory Photovoice study in the Gòtic neighborhood in Barcelona." Social Science & Medicine
667 **258**: 113095.
- 668
669 Smoyer-Tomic, K. E., et al. (2008). "The association between neighborhood socioeconomic status
670 and exposure to supermarkets and fast food outlets." Health & Place **14**(4): 740-754.
- 671
672 Swinburn, B., et al. (2013). "Monitoring and benchmarking government policies and actions to
673 improve the healthiness of food environments: a proposed Government Healthy Food Environment
674 Policy Index." Obesity reviews **14**(1): 24-37.
- 675
676 Tulier, M. E., et al. (2019). "'Clear action requires clear thinking': A systematic review of
677 gentrification and health research in the United States." Health & Place **59**: 102173-102173.
- 678
679 Turner, C., et al. (2018). "Concepts and critical perspectives for food environment research: A global
680 framework with implications for action in low- and middle-income countries." Global Food Security
681 **18**: 93-101.
- 682
683 Turner, C., et al. (2020). "Food Environment Research in Low- and Middle-Income Countries: A
684 Systematic Scoping Review." Adv Nutr **11**(2): 387-397.
- 685
686 Westbury, S., et al. (2021). "The influence of the urban food environment on diet, nutrition and
687 health outcomes in low-income and middle-income countries: a systematic review." Bmj Global
688 Health **6**(10): e006358.
- 689
690 Whittle, H. J., et al. (2015). "Food insecurity, chronic illness, and gentrification in the San Francisco
691 Bay Area: An example of structural violence in United States public policy." Soc Sci Med **143**: 154-
692 161.
- 693
694 Widener, M. J. and J. Shannon (2014). "When are food deserts? Integrating time into research on
695 food accessibility." Health & Place **30**: 1-3.
- 696
697 Wilson, A. L., et al. (2016). "Nudging healthier food and beverage choices through salience and
698 priming. Evidence from a systematic review." Food quality and preference **51**: 47-64.
- 699
700