Neighborhood Deprivation and Access to Fast-Food Retailing
A National Study
Jamie Pearce, PhD, Tony Blakely, PhD, Karen Witten, PhD, Phil Bartie, MSc

Background: Obesogenic environments may be an important contextual explanation for the growing obesity epidemic, including its unequal social distribution. The objective of this study was to determine whether geographic access to fast-food outlets varied by neighborhood deprivation and school socioeconomic ranking, and whether any such associations differed to those for access to healthier food outlets.

Methods: Data were collected on the location of fast-food outlets, supermarkets, and convenience stores across New Zealand. The data were geocoded and geographic information systems used to calculate travel distances from each census meshblock (i.e., neighborhood), and each school, to the closest fast-food outlet. Median travel distances are reported by a census-based index of socioeconomic deprivation for each neighborhood, and by a Ministry of Education measure of socioeconomic circumstances for each school. Analyses were repeated for outlets selling healthy food to allow comparisons.

Results: At the national level, statistically significant negative associations were found between neighborhood access to the nearest fast-food outlet and neighborhood deprivation \( (p<0.001) \) for both multinational fast-food outlets and locally operated outlets. The travel distances to both types of fast food outlet were at least twice as far in the least socially deprived neighborhoods compared to the most deprived neighborhoods. A similar pattern was found for outlets selling healthy food such as supermarkets and smaller food outlets \( (p<0.001) \). These relationships were broadly linear with travel distances tending to be shorter in more-deprived neighborhoods.

Conclusions: There is a strong association between neighborhood deprivation and geographic access to fast food outlets in New Zealand, which may contribute to the understanding of environmental causes of obesity. However, outlets potentially selling healthy food (e.g., supermarkets) are patterned by deprivation in a similar way. These findings highlight the importance of considering all aspects of the food environment (healthy and unhealthy) when developing environmental strategies to address the obesity epidemic.

Introduction

The increasing prevalence of obesity in many countries has generated considerable concern about health burdens. For example, it has been estimated that 64% of Americans are overweight (34%) or obese (30%),\(^1\) causing somewhere between about 100,000\(^2\) and 300,000\(^3\) deaths per year, rivaling smoking as a public health issue.\(^4\) The emergence of this “obesity epidemic” has been linked to a range of health outcomes including rising rates of heart disease, hypertension, various types of cancer, and non–insulin-dependent diabetes.\(^5\) Further, a strong and growing social gradient in obesity has been noted, with higher rates among lower socioeconomic groups and for those living in areas of social disadvantage.\(^6\)-\(^8\) New Zealand is no exception to these trends, as the prevalence of obesity has doubled over the past 25 years.\(^9\) Rates of obesity are twice as high in the most-deprived quintile of neighborhoods in New Zealand compared to the least-deprived quintile,\(^10\) probably contributing to increasing social and geographic inequalities in health status.\(^11\)-\(^14\) While not an estimate of the independent contribution of overweight and obesity, it has been estimated that two of every five deaths in New Zealand are attributable to nutrition-related factors.\(^15\) As a result, improving nutrition and reducing obesity are two of 13 priority objectives in the New Zealand Health Strategy.\(^16\)
Explanations for increasing rates of obesity in areas of greater socioeconomic disadvantage are likely to be multifaceted and to include characteristics relating to individuals (composition) and those associated with the environment or neighborhood in which people live (context).\textsuperscript{17,18} It has been suggested that contextual drivers may be more prevalent in deprived neighborhoods, resulting in neighborhoods that support unhealthy eating, or so-called “obesogenic environments.”\textsuperscript{18,19} One possible contextual driver is a higher density of fast-food outlets in socially deprived neighborhoods.\textsuperscript{20} For example, a cross-sectional analysis of the mean number of McDonald’s restaurants per 1000 people in England and Wales demonstrated that there was greater outlet density in deprived neighborhoods.\textsuperscript{21} Similarly, people living in the lowest-income communities in Melbourne, Australia, had 2.5 times the exposure to fast-food outlets than people living in the highest-income communities.\textsuperscript{22} Other studies have focused on specific at-risk groups, particularly the young, as there is strong evidence that exposure to key risk factors early in life is a strong predictor of obesity patterns in adulthood.\textsuperscript{23,24} Researchers have noted, for example, that fast-food outlets are often concentrated within short walking distances of primary and secondary schools\textsuperscript{25,26}.

Although the relationship between area deprivation and the geographic access to fast-food outlets has received some attention, previous studies have often relied on definitions of neighborhoods predefined as administrative areas (often the census unit) for which data are easily available, and analyses have usually been focused on the presence or absence of an outlet in these arbitrary units.\textsuperscript{27} Further, due to the difficulties of data collection, studies have usually been limited in scope and confined to small geographic areas such as cities rather than, for example, considering accessibility at a national level.\textsuperscript{27} In this study, these previous limitations were addressed by adopting a geographic information systems (GIS) approach to provide a measure of location accessibility to fast food outlets in small areas throughout New Zealand. Access was calculated for both residential neighborhoods and for schools across the country. For comparison, and to examine the overall neighborhood “foodscape,” access to other types of food outlets that potentially sell “healthier food” (including supermarkets and locally operated food shops) was also calculated. This is the first study in New Zealand and one of the first national studies anywhere to use GIS methods to examine accessibility to fast-food retailing by neighborhood socioeconomic status (SES).

**Methods**

Data on fast-food outlets were obtained from all 74 local Territorial Authorities (TAs) across New Zealand during the latter part of 2005. TAs have regulatory responsibility for safety inspections of all premises in respective regions used in the manufacture, preparation, and/or storage of food for sale. For each outlet, information was requested on the street address as well as its name. The data were verified using the online telephone directory (i.e., Yellow Pages)\textsuperscript{28}; in cases of missing data or incomplete records, the data were supplemented with additional address information. The data were coded into two groups: multinational fast-food outlets (McDonald’s, Burger King, Kentucky Fried Chicken, Pizza Hut, Subway, Domino’s Pizzas, and Dunkin’ Donuts), and the remaining locally operated outlets. A total of 2930 fast-food outlets in New Zealand were registered, of which 474 were multinational outlets. In addition, data on all outlets potentially selling healthier food were collected from the TAs. Healthier-food outlets included all supermarkets as well as locally operated convenience stores and service stations selling fresh food. All outlets were geocoded to provide a precise geographic coordinate of its location. Neighborhood access to outlets was linked to neighborhood and school-based measures of socioeconomic deprivation through the meshblock (i.e., neighborhood) geographic unit. Meshblocks compose the smallest unit of dissemination of census data in the New Zealand census; there are 38,350 meshblocks across the country, each representing approximately 100 people.

In the first stage of the analysis, GIS was used to calculate the distance (in meters) from each meshblock centroid to the closest fast-food facility. Each meshblock was represented by its population-weighted centroid (the center of population in the area rather than the geometric centroid), and the travel time taken to each community resource along the road network was calculated using GIS network functionality. In order to more accurately represent accessibility, it is important to use the distance between each meshblock and the location of each community resource through the road network to calculate total travel time rather than the Euclidean (straight-line) distance.\textsuperscript{29} GIS has the advantage of not restricting the neighborhood measure of access to outlets in the immediate vicinity.\textsuperscript{21,30} A full explanation of the adopted GIS methods is reported elsewhere.\textsuperscript{31} The analysis was repeated independently for both multinational outlets and local vendors. The distance measure was used to calculate the median travel distances in neighborhoods stratified by neighborhood deprivation. Depivation was measured by the 2001 New Zealand Deprivation Index (NZDep) calculated from census data on nine socioeconomic characteristics (car access, tenure, benefit receipt, unemployment, low income, telephone access, single-parent families, education, and living space).\textsuperscript{32} All meshblocks in New Zealand were then assigned to a decile rank by this deprivation measure. In the second stage of the analysis, accessibility to fast-food restaurants was measured around each of the 2652 schools across the country. The distance from each school to the closest fast-food outlet as well as distances to multinational and local outlets were calculated. The median travel distance for schools grouped by the Ministry of Education’s school socioeconomic decile rating is reported. (School decile ratings run in the reverse direction to NZDep ratings, that is, a decile-one school is located in an area of high deprivation, whereas a decile-one NZDep rating signifies a low-deprivation meshblock. For clarity in the interpretation of findings in this study, the school decile rating was reversed when reported in
A school’s decile rating reflects the socioeconomic characteristics of the neighborhoods from which its pupils are drawn. The rating is based on census data pertaining to those neighborhoods on household income, occupation, household overcrowding, education, and income support in households with children. Lunches are not provided in New Zealand schools. Pupils bring lunch from home, purchase food from food outlets in the vicinity of the school, or in some circumstances, from a food shop in the school.

For both sets of measures (neighborhood deprivation and school decile rating), results were also disaggregated by urban/rural status using Statistic New Zealand’s New Zealand Urban–Rural Profile classification. The index groups all meshblocks across the country into one of seven urban/rural categories ranging from major urban centre to highly rural areas, using the workplace address relative to the home address, which allows for economic and social ties between urban and rural areas to be incorporated into the classification. In this analysis, a dichotomous categorization was used that divided all neighborhoods into urban (highly urban, satellite urban, or independent urban) or rural (highly rural and rural areas with varying degrees of urban influence). To examine whether the results were explained by systematic differences in population density between deprived and non-deprived neighborhoods across the country, the analysis of the urban meshblocks was further stratified into areas of high, medium, and low population density. The relationship between access to fast-food outlets and neighborhood deprivation was examined separately for each population density group. In the final stage, a comparative analysis was undertaken for shops potentially selling healthy food (e.g., supermarkets and convenience stores). Again the distances from each meshblock centroid and school to the nearest facility were calculated using a GIS. For each of these analyses, results were reported for deprivation/school deciles with the national median value and the one-way analysis of variance result presented.

Results

Median travel distance to the nearest fast-food outlet varied by neighborhood deprivation \((p<0.001)\), with travel distance being at least twice as far (i.e., worse access) in the least-deprived compared to the most-deprived areas (Figure 1). The median distance to all types of fast-food outlets peaks in deprivation Decile 2 (1870 m), and then gradually decreases to its lowest value in Decile 9 (714 m), followed by a slight rise in Decile 10 (742 m). A similar trend can be noted for multinational and locally operated outlets with a statistically significant \((p<0.001)\) negative association with decile of deprivation (better access in more-deprived neighborhoods), although in each decile the absolute travel distance to the less numerous multinational outlets is more than twice that of the locally operated outlets. When the analysis is disaggregated by urban/rural status, a similar statistically significant \((p<0.001)\) pattern is noted in urban areas that numerically dominate the combined analysis (Table 1). How-

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**Figure 1.** Median travel distance to closest fast-food outlet for New Zealand deprivation deciles. Median travel distances: all, 99 m; multinational, 2827 m; locally operated, 1025 m (analysis of variance, \(p=0.000\)).
ever, in rural areas (23% of all meshblocks) there is a
statistically significant ($p < 0.001$) positive pattern of
access with greater distances to fast-food outlets in
more-deprived areas, that is, the converse of the pattern
found in urban areas. The results are not explained by
systematic variations in population density between
deprived and nondeprived neighborhoods. When the
urban meshblocks are stratified by population density,
the association between access to fast food outlets and
neighborhood deprivation persists for low, medium,
and high urban areas, although the strength of the
relationship is stronger in low-density neighborhoods
(Figure 2).

When distance is calculated to fast-food outlets from
each school across the country, access similarly tends to
be better around more-deprived schools (Deciles 7 to
10), for both multinational and local fast-food outlets
(Figure 3). However, access to multinational fast-food

### Table 1. Median travel distance (meters) to closest fast-food outlet by neighborhood deprivation, stratified by urban/rural status

<table>
<thead>
<tr>
<th>Decile</th>
<th>All fast food (n=37,760 neighborhoods)</th>
<th>Fast food, urban areas (n=28,992 neighborhoods)</th>
<th>Fast food, rural areas (n=8832 neighborhoods)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>All Multinational Local</td>
<td>All Multinational Local</td>
<td>All Multinational Local</td>
</tr>
<tr>
<td>1 (low)</td>
<td>1545 3498 1576</td>
<td>1217 2726 1240</td>
<td>10,778 21,578 10,844</td>
</tr>
<tr>
<td>2</td>
<td>1870 4422 1950</td>
<td>1029 2564 1052</td>
<td>11,933 26,126 11,958</td>
</tr>
<tr>
<td>3</td>
<td>1629 4459 1661</td>
<td>982 2483 1006</td>
<td>11,314 27,175 11,314</td>
</tr>
<tr>
<td>4</td>
<td>1274 3978 1301</td>
<td>803 2112 821</td>
<td>12,300 32,958 12,321</td>
</tr>
<tr>
<td>5</td>
<td>1046 3076 1083</td>
<td>794 1965 813</td>
<td>13,028 32,225 13,033</td>
</tr>
<tr>
<td>6</td>
<td>892 2617 919</td>
<td>701 1797 717</td>
<td>12,576 33,647 12,606</td>
</tr>
<tr>
<td>7</td>
<td>806 2161 823</td>
<td>687 1739 707</td>
<td>14,775 38,775 14,775</td>
</tr>
<tr>
<td>8</td>
<td>735 1926 762</td>
<td>644 1590 670</td>
<td>10,995 36,184 11,024</td>
</tr>
<tr>
<td>9</td>
<td>714 1894 734</td>
<td>640 1622 664</td>
<td>16,462 35,168 16,462</td>
</tr>
<tr>
<td>10 (high)</td>
<td>742 2259 753</td>
<td>653 1870 665</td>
<td>21,650 43,987 21,630</td>
</tr>
<tr>
<td>Median</td>
<td>999 2827 1025</td>
<td>776 2004 795</td>
<td>12,594 31,310 12,617</td>
</tr>
</tbody>
</table>

*p* value (ANOVA) $0.000* 0.000* 0.000* 0.000* 0.000* 0.000* 0.000* 0.000* 0.000* 0.000*

*5*p* = 0.000 (bolded).

ANOVA, analysis of variance.

Figure 2. Median travel distance to closest fast-food outlet for New Zealand Deprivation Index (2001) deciles grouped by population density.
outlets is also high in Decile 1 (lowest deprivation), but distance to the nearest outlet increases markedly in Deciles 2 and 3 followed by a gradual decrease in distances through to Decile 10 (high deprivation). The pattern for all outlets and locally operated outlets, while significant \((p<0.001)\), is less pronounced with more equal median distances in Deciles 5 to 10. An examination of the pattern of access in urban and rural areas (Table 2) shows that in urban areas, travel distances tend to be slightly shorter in the more-deprived areas \((p<0.001)\) for all types of outlets but that in Decile 10 (most deprived) median travel distances to multinational fast-food outlets is considerably higher \((2208\;m)\) than in Deciles 5 to 9 \((all <2000\;m)\). In rural areas, however, median travel distances were the lowest for the schools in less-deprived neighborhoods, with distance tending to increase from Deciles 1 to 10 for all types of fast-food outlets.

The pattern of geographic access to food outlets potentially selling healthier food (supermarkets and other locally operated outlets) by neighborhood deprivation and school decile rating showed similar trends to

![Figure 3. Median travel distance to closest fast-food outlet for school deciles. Median travel distances: all, 976 m; multinational, 3850 m; locally operated, 1002 m (analysis of variance, \(p=0.000\)).](image)

<table>
<thead>
<tr>
<th>Decile</th>
<th>All</th>
<th>Multinational</th>
<th>Local</th>
<th>All</th>
<th>Multinational</th>
<th>Local</th>
<th>All</th>
<th>Multinational</th>
<th>Local</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 (low)</td>
<td>923</td>
<td>2744</td>
<td>925</td>
<td>747</td>
<td>1923</td>
<td>766</td>
<td>11,650</td>
<td>17,833</td>
<td>11,736</td>
</tr>
<tr>
<td>2</td>
<td>3688</td>
<td>7417</td>
<td>3688</td>
<td>766</td>
<td>2228</td>
<td>889</td>
<td>13,466</td>
<td>23,789</td>
<td>13,489</td>
</tr>
<tr>
<td>3</td>
<td>2061</td>
<td>9911</td>
<td>2061</td>
<td>593</td>
<td>2128</td>
<td>622</td>
<td>14,041</td>
<td>28,135</td>
<td>14,041</td>
</tr>
<tr>
<td>4</td>
<td>1302</td>
<td>9200</td>
<td>1308</td>
<td>637</td>
<td>2055</td>
<td>692</td>
<td>13,740</td>
<td>31,744</td>
<td>13,740</td>
</tr>
<tr>
<td>5</td>
<td>970</td>
<td>6523</td>
<td>981</td>
<td>663</td>
<td>1931</td>
<td>667</td>
<td>9,386</td>
<td>25,360</td>
<td>9,386</td>
</tr>
<tr>
<td>6</td>
<td>788</td>
<td>6378</td>
<td>804</td>
<td>559</td>
<td>1662</td>
<td>570</td>
<td>14,610</td>
<td>34,488</td>
<td>14,610</td>
</tr>
<tr>
<td>7</td>
<td>871</td>
<td>3245</td>
<td>890</td>
<td>677</td>
<td>1906</td>
<td>726</td>
<td>13,782</td>
<td>27,246</td>
<td>14,144</td>
</tr>
<tr>
<td>8</td>
<td>719</td>
<td>2724</td>
<td>720</td>
<td>603</td>
<td>1796</td>
<td>614</td>
<td>13,340</td>
<td>25,659</td>
<td>13,340</td>
</tr>
<tr>
<td>9</td>
<td>822</td>
<td>3633</td>
<td>872</td>
<td>567</td>
<td>1608</td>
<td>620</td>
<td>21,912</td>
<td>44,048</td>
<td>21,912</td>
</tr>
<tr>
<td>10 (high)</td>
<td>694</td>
<td>2960</td>
<td>713</td>
<td>597</td>
<td>2208</td>
<td>599</td>
<td>24,100</td>
<td>39,155</td>
<td>24,100</td>
</tr>
<tr>
<td>Median</td>
<td>976</td>
<td>3850</td>
<td>1002</td>
<td>637</td>
<td>1918</td>
<td>661</td>
<td>14,178</td>
<td>29,115</td>
<td>14,178</td>
</tr>
</tbody>
</table>

\(p\) value (ANOVA) \(\textbf{0.000*} \; \textbf{0.000*} \; \textbf{0.000*} \; \textbf{0.000*} \; \textbf{0.000*} \; \textbf{0.000*} \; \textbf{0.000*} \; \textbf{0.000*} \; \textbf{0.000*} \)

*\(p<0.000\) (bolded).

ANOVA, analysis of variance.
Table 3. Median travel distance (meters) to closest “healthier food” outlets for New Zealand Deprivation (2001) deciles and school deciles

<table>
<thead>
<tr>
<th>Decile</th>
<th>NZDep 2001 decile</th>
<th>School decile</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Supermarkets</td>
<td>Other</td>
</tr>
<tr>
<td>1 (low)</td>
<td>2313</td>
<td>1343</td>
</tr>
<tr>
<td>2</td>
<td>2772</td>
<td>1442</td>
</tr>
<tr>
<td>3</td>
<td>2410</td>
<td>1315</td>
</tr>
<tr>
<td>4</td>
<td>2129</td>
<td>1088</td>
</tr>
<tr>
<td>5</td>
<td>1743</td>
<td>877</td>
</tr>
<tr>
<td>6</td>
<td>1524</td>
<td>766</td>
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<td>7</td>
<td>1367</td>
<td>666</td>
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<td>8</td>
<td>1290</td>
<td>621</td>
</tr>
<tr>
<td>9</td>
<td>1275</td>
<td>587</td>
</tr>
<tr>
<td>10 (high)</td>
<td>1368</td>
<td>624</td>
</tr>
<tr>
<td>Median</td>
<td>1696</td>
<td>834</td>
</tr>
</tbody>
</table>

*p value = 0.000 (bolded).
ANOVA, analysis of variance; NZDep, New Zealand Deprivation Index.

Discussion

Earlier studies have proposed environmental (contextual) explanations, including access to fast food outlets, for the rising rates and social gradient of obesity. The key finding of this study is that access to fast-food outlets in New Zealand is patterned by deprivation. At the national level, access to both multinational and locally operated fast-food outlets is decreasing from 2313 m and 1343 m, respectively, in Decile 1, to 1368 m and 624 m, respectively, in Decile 10, with the lowest value in Decile 2 (2772 m and 1442 m) and lowest in Decile 9 (1275 m and 587 m). Similar to the results for fast-food outlets, the results stratified by school decile rating show that there is a significant negative relationship with school decile (p < 0.001); access to potentially healthier foods was better around the most-deprived schools with the exception of Decile 1 where the median distance was substantially lower than for Decile 2.

Evaluating environmental explanations for increasing obesity rates and before advocating environmental interventions.

These results are consistent with international evidence highlighting that fast-food restaurants tend to be more prevalent in more-deprived neighborhoods. Studies in the United States, United Kingdom, and Australia have consistently found access to fast-food restaurants to be better in more-deprived neighborhoods. The findings also support studies from a range of countries that have investigated the presence (or absence) of so-called “food deserts.” With the exception of a few local studies, there is little evidence outside of North America to suggest that more-deprived neighborhoods have less geographic access to shops selling healthy food. In fact, in New Zealand, the results at the national level suggest that access to supermarkets and other shops potentially selling healthy food is better in more-deprived neighborhoods.

Three mechanisms might explain why access to fast-food (and healthier food) outlets is socially patterned in New Zealand. First, it can be argued that consumer demand is greater in more-deprived areas, so retailers preferentially locate in these communities. However, in many urban areas higher- and lower-SES suburbs are located in reasonable proximity to each other, so locating outlets in lower-decile suburbs will not greatly preclude access by the highly mobile and affluent residents of adjacent suburbs. (An opposing element of consumer demand is likely civic resistance to the aesthetic and other impacts of fast-food outlets in more affluent suburbs, directly influencing the location of food outlets.) A second possible explanation is that population density and other impacts of fast-food outlets in more affluent suburbs, directly influencing the location of food outlets. A third possibility is that population density is associated with neighborhood deprivation, which in part may explain why there is a greater density of all types of food outlets (healthy and unhealthy) in deprived neighborhoods—there are simply more customers to be served. However, it was found that the association of neighborhood deprivation with fast-food access persisted in strata of population density (Figure 2).

Third, land-use costs, neighborhood histories, and planning and control measures need to be examined. For example, lower land prices and building rental costs in lower-SES neighborhoods would also influence the location choices made by international and local proprietors. That is, there might be no deliberate or preferential targeting of unhealthy foods to lower socioeconomic neighborhoods, but rather other considerations that influence the location of both healthy and unhealthy food outlets.

Regardless of the historical mechanisms by which food-outlet locations have come to be socioeconomically patterned, in New Zealand as elsewhere there is potential for public health advocacy around land use planning to help tackle the “obesity epidemic.”
et al.\text{,}^{44}\text{ identify a number of examples of zoning restrictions on fast-food outlets and drive-through services in the U.S., although they observe that generally the rationale for the adoption of restrictions has been unrelated to obesity. Preserving and enhancing the aesthetic quality of communities, reducing congestion, and protecting the small business sector are among the justifications identified. Land-use strategies that have related to obesity-based rationales include requiring fast food outlets to locate a minimum distance from youth-oriented facilities such as schools, limiting the per capita number of fast-food restaurants in neighborhoods, especially in socially deprived neighborhoods, and limiting the proximity of fast-food restaurants to each other.\text{45}\text{ In the New Zealand context, zoning restrictions on fast-food outlets would need to be incorporated into the district plans of the TAs. If such changes occurred, a proposal to locate an outlet in a restricted zone would then require notified resource consent, which would provide an avenue for public health advocacy.}

Location access is not the only way that fast-food outlets may contribute to an obesogenic environment. Many fast-food outlets display strong visual branding and associated food advertising. Both the increased availability and point-of-sales fast-food product marketing are potential contributors to obesogenic environment in more-deprived New Zealand neighborhoods. The 1990 Smoke Free Environments Act in New Zealand that regulated the marketing, advertising, and promotion of tobacco products may provide a lead with regard to public health action in this visual component of obesogenic neighborhood environments.

This study is limited in that it lacks data on dietary consumption or rates of obesity in deprived and non-deprived neighborhoods. The relationship between type of food outlet and products offered, and hence consumption pattern, is not fixed.\text{36,46–48}\text{ Further research could usefully examine the relationship between neighborhood access to fast-food outlets, fast-food consumption, and obesity in schoolchildren and general population samples. Future studies should also simultaneously examine all aspects of the food environment (healthy and unhealthy) in order to disentangle the various contextual drivers of dietary intake. Nonetheless, this study is unique in that it adopts a GIS approach that is not limited to the simple presence or absence of an outlet within each neighborhood but rather uses the distance to the closest facility either within or outside each area.}

Research into dietary intake, and individual health-related behaviors more generally, has tended to emphasize individual choices and ignore the effects on personal diets from the “complex social and physical contexts in which individual behavioral decisions are made.”\text{17}\text{ This research adds to the growing body of recent research on “environmental” or “contextual” exposures that affect dietary intake.\text{49,50}\text{ Results show that geographic access to outlets selling fast food is better in more-deprived neighborhoods across New Zealand. The parallel finding that food outlets selling potentially healthier food warns against knee-jerk blaming of the fast-food industry for socioeconomic targeting. Nevertheless, and importantly, the findings still suggest potential for, and add weight to, environmental interventions to reduce nutrition-related mortality and morbidity as well as to reduce health inequalities. For example, policies in New Zealand such as the Ministry of Health’s “Healthy Eating–Healthy Action” strategy should focus on environmental modification as well as individual behavioral change.\text{51}\text{ We are grateful to Matthew Faulk for his assistance with collecting and geocoding the fast food data set. No financial conflict of interest was reported by the authors of this paper.}}

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