

PEER REVIEW HISTORY

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ARTICLE DETAILS

TITLE (PROVISIONAL)	Type and density of independent takeaway outlets – a geographical mapping study in a low socioeconomic ward, Manchester
AUTHORS	Blow, Jennifer; Gregg, Rebecca; Davies, Ian; Patel, Sumaiya

VERSION 1 - REVIEW

REVIEWER	Barbara Stewart-Knox University of Bradford, UK
REVIEW RETURNED	13-Aug-2018

GENERAL COMMENTS	<p>Review: BMJ – Type and density of takeaway outlets in Manchester</p> <p>Major</p> <p>A major concern is the reporting of the results (which is thin) and that much more could be made of these data. Further data analysis is therefore recommended before publication can be considered.</p> <p>The results for the proximity of fast-food outlets to schools versus colleges/universities, for example, should be separated out. This is because the policy implications for outlets close to schools, which are for children, will be vastly different to those for proximity to colleges /universities, which are for adults. Also type of school (primary or secondary) should be included in the analyses.</p> <p>Also consider combining this spatial study with the qualitative study? This spatial study would 'set the scene' very nicely for the qualitative study and the qualitative results would have policy implications that would enrich the reporting of this spatial research. Bringing the two studies together would also add to the novelty of the research.</p> <p>Specific comments as follows:</p> <p>Abstract</p> <p>Remove repetition from the conclusion and include something on the implications of the results for policy.</p> <p>Introduction</p> <p>Include recent, relevant literature reporting links between fast-food consumption and health generally (not just but also including obesity)? Also include some (apparently abundant) up-to-date literature on the impact of spatial proximity of fast food outlets and food choice?</p> <p>Swop the order of paragraph 2 and 3 (for better flow).</p>
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	<p>The objectives and research questions are clearly stated, but the study aims need clarified, what will the findings deliver to the greater good (policy)?</p> <p>Methods</p> <p>It is strongly recommended that data are re-analysed so that the results for schools versus colleges/universities be separated out. This is because the policy implications for outlets close to schools, which are for children, will be vastly different to those for proximity to colleges /universities, which are for adults. Also type of school (primary or secondary) should be included in the analyses. Possibly also include the type of 'cuisine' close to the school versus the college/university as a further variable in the analyses?</p> <p>Results</p> <p>Adjust results in light of further analysis as suggested above. Some more in depth description of what is depicted on the figures is required.</p> <p>Discussion</p> <p>Study limitations not fully addressed. What do the results imply for health promotion and policy?</p> <p>Minor</p> <p>Typos need corrected throughout the manuscript. Data are plural – correct throughout. Formatting errors in the reference section need corrected.</p>
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REVIEWER	Emma Wilkins Leeds Beckett University
REVIEW RETURNED	05-Nov-2018

GENERAL COMMENTS	<p>General comments</p> <ul style="list-style-type: none"> - This is an interesting and generally well written paper. However, the findings are highly specific to the study area, and in my view, this paper does not currently have sufficient impact and national/international relevance to be published in the BMJ Open. - It is a shame that the authors did not adopt a broader definition of 'takeaways', to include also e.g. sandwich shops, coffee shops etc., which also retail convenient, ready-to-eat, energy-dense foods. Similarly, it would have been preferable for restaurants offering takeaway services to have been included. Many Indian/Chinese restaurants, for example, effectively offer the same takeaway service and food offering as Indian/Chinese takeaways without a restaurant. Given the relatively small study area, it would not have been too time-consuming to have included these outlet types. This would give the paper wider applicability to other regions of the UK, and even internationally by highlighting the relative importance of these types of food retailing, which are often neglected within the retail food environment literature, and by policymakers. - If the authors were willing to include the above outlet types within analyses, then I think this paper would have sufficient impact to be considered for publication within the BMJ Open. There are also a number of more specific comments, which would need addressing, as detailed below: <p>Abstract</p> <ol style="list-style-type: none"> 1. Abstract suggests use of two food environment data sources ("Local authority and environmental health data"), but the methods only list one (environmental health). <p>Introduction</p> <ol style="list-style-type: none"> 2. "being placed in the top 20%" – top 20% of what?
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	<p>3. A similar study by Gallo et al. (reference below) was published in 2013. This need to be acknowledged in the intro and/or discussion, and the distinctions between the Gallo study and the present study need to be made clearer.</p> <p>4. The most interesting aspect of this study is the detailed classification of fast food outlets by the foods sold (particularly if the study is expanded to include other takeaway types). You need to make more of this in the introduction and discussion, as it doesn't come across strongly enough. Literature that seeks to map the food environment often classifies fast food outlets broadly to include a range of food outlets retailing a variety of foods – some of which are more/less healthy. Other studies adopt quite narrow definitions of fast food (e.g. looking at chain outlets only), and thus may miss important sources of fast food. Policymakers often also focus only on hot food takeaways and neglect other sources of unhealthy ready-to-eat foods. Understanding the relative contribution of these different food outlet types is important for understanding the strengths or limitations of this prior literature and these policy approaches.</p> <p>Methods</p> <p>5. Why did you select Rusholme?</p> <p>6. Please give data re: proportion of residents who are South Asian in Rusholme.</p> <p>7. More information is needed regarding your methodology for mapping food outlets. I suggest you refer to Wilkins et al. (2017a), which includes a reporting checklist for retail food environment research. Specific problems are:</p> <p>a. Your definition of takeaway outlets needs further explanation. I cannot tell for example whether cafes and coffee shops would be included in your definition. Your definition also says you only included independent outlets – does this mean you have excluded chain fast food outlets such as McDonalds? What is the rationale for excluding these? And what is meant by 'commercially pre-prepared'? Does this mean food is pre-prepared by an external caterer? How did you ascertain whether this was the case? Some examples or even images would be very helpful. If possible, to facilitate comparability to other UK literature, I would suggest using the classification scheme of Lake et al. (2010) to clarify your definition.</p> <p>b. Further to the above, it seems you extracted outlets classified as 'hot food takeaways' within the environmental health data. Your definition there seems to run contradictory to what was actually included. This whole section will need revising – particularly if you choose to include a broader range of outlets as suggested above.</p> <p>c. In paragraph beginning line 161 on page 10, please state explicitly that the 'restaurant/café/canteen' category was not included. This is quite unclear at the moment. It would be useful if you could give some examples of outlets falling within this 'restaurant/café/canteen' category, which people might expect to fall within the definition of 'takeaways' – e.g. McDonalds has quite a number of tables, so is this excluded?</p> <p>d. How were education institutions identified and extracted from the Points of Interest data? Which classifications did you use?</p> <p>e. How were food outlets geocoded? To postcode centroids? Please also add details about the geocoding of education institutions – i.e. that the Points of Interest data is pre-geocoded by Ordnance Survey, with the majority of features geocoded to a building centroid – thus being very spatially accurate.</p>
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	<p>8. Where did you obtain road network data from (please cite origin and date)?</p> <p>9. Re: the rationale for using a 400m buffer, I think it is also relevant to add that local authorities typically employ a 400m buffer when restricting development of hot food takeaways around schools.</p> <p>10. Environmental health data has been validated in several studies (e.g. Wilkins et al., 2017b, Lake et al., 2010 and 2012, Cummins et al., 2009) – please include reference to these in the methodology, including data on their validity.</p> <p>Results</p> <p>11. I am assuming the tertiles of deprivation are relative to all LSOAs across England? Please make this clear.</p> <p>12. How were spatial clusters in Figure 1 identified?</p> <p>13. Line 220, page 13 – what percentage was ‘the majority’ of outlets?</p> <p>Figures</p> <p>14. Figure 2: you say this map shows density of food outlets, but the scale seems to show counts – please clarify.</p> <p>15. Figure 4: are the numbers within the polygons the counts of takeaway outlets per school? If so, the numbers don’t seem to tally with the descriptive statistics on page 13. In relation to that, it would be useful to include a more granular summary of outlet counts. 1-10 outlets is quite a broad range.</p> <p>Discussion</p> <p>16. This would need revising to include discussion of prior literature and policy that has neglected different types of takeaway (e.g. restaurants with takeaway services, and sandwich shops/coffee shops), and the implications of this.</p> <p>17. Some statements in the discussion do not appear to be supported by the data e.g. second paragraph of the discussion implies that the findings suggest takeaways are more prevalent in deprived areas. However, given that this study did not contrast areas of differing deprivation, this paragraph will need revising. Sentence beginning line 275, page 16 is also a large extrapolation from this study’s findings, given you did not examine associations between the food environment and any health outcomes.</p> <p>General/grammar</p> <p>18. Please be consistent with presentation of units. For example, in places you write “400m” and in others “400 m”.</p> <p>19. “Particularly of concern is their proximity to schools and thus the physical food environment that children are exposed to; however, current planning laws are aiming to restrict the opening of new takeaway outlets within 400 m of schools”. I don’t think ‘however’ makes sense in this sentence. The second clause is supporting, rather than contradicting the first.</p> <p>20. The references need attention. There are inconsistencies in formatting, and typographic errors throughout.</p> <p>21. “Under the Freedom of Information Act (2000), local councils are subsequently required to provide an up-to-date list of business names, addresses and use all food premises that are located within their jurisdiction.” Latter part of this sentence isn’t grammatically correct.</p> <p>22. The term ‘data’ should be treated as plural throughout. E.g. ‘this data’ should be ‘these data’.</p> <p>23. Line 268, page 15 – this paragraph has a number of grammatical errors that need correcting. I think ‘long’ should be ‘along’, and ‘similar’ should be ‘similarly’.</p> <p>References</p>
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	<p>G. Gallo, R., Barrett, L., & A. Lake, A. (2014). The food environment within the primary school fringe. <i>British Food Journal</i>, 116(8), 1259-1275.</p> <p>Lake, A. A., Burgoine, T., Greenhalgh, F., Stamp, E., & Tyrrell, R. (2010). The foodscape: classification and field validation of secondary data sources. <i>Health & Place</i>, 16(4), 666-673.</p> <p>Wilkins, E. L., Morris, M. A., Radley, D., & Griffiths, C. (2017a). Using Geographic Information Systems to measure retail food environments: discussion of methodological considerations and a proposed reporting checklist (Geo-FERN). <i>Health & place</i>, 44, 110-117.</p> <p>Wilkins, E. L., Radley, D., Morris, M. A. and Griffiths, C. (2017b) Examining the validity and utility of two secondary sources of food environment data against street audits in England. <i>Nutrition Journal</i>, 16(1), p.82.</p> <p>Lake, A. A., Burgoine, T., Stamp, E. and Grieve, R. (2012) The foodscape: Classification and field validation of secondary data sources across urban/rural and socio-economic classifications in England. <i>The International Journal of Behavioral Nutrition and Physical Activity</i>, 9, pp.37-48</p> <p>Cummins, S. and Macintyre, S. (2009) Are secondary data sources on the neighbourhood food environment accurate? Case-study in Glasgow, UK. <i>Preventive Medicine</i>, 49(6), pp.527-528.</p>
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VERSION 1 – AUTHOR RESPONSE

Response to reviewers' comments

Reviewer(s)' Comments to Author:

Reviewer: 1

Reviewer Name: Barbara Stewart-Knox

Institution and Country: University of Bradford, UK

Please state any competing interests or state 'None declared': None

Please leave your comments for the authors below

Review: BMJ – Type and density of takeaway outlets in Manchester Major A major concern is the reporting of the results (which is thin) and that much more could be made of these data. Further data analysis is therefore recommended before publication can be considered.

The results for the proximity of fast-food outlets to schools versus colleges/universities, for example, should be separated out. This is because the policy implications for outlets close to schools, which are for children, will be vastly different to those for proximity to colleges /universities, which are for adults. Also type of school (primary or secondary) should be included in the analyses.

Also consider combining this spatial study with the qualitative study? This spatial study would 'set the scene' very nicely for the qualitative study and the qualitative results would have policy implications that would enrich the reporting of this spatial research. Bringing the two studies together would also add to the novelty of the research.

Response: We thank the reviewer for their supportive comments on the paper. Firstly, we wish to be clear that within this study we have focused on takeaway food outlets (independent outlets that hot convenience foods) opposed to fast food outlets (chains, bakeries). We feel that this distinction is vital for a number of reasons. These include the classification of retail food outlets when mapping the foodscape (1), previous research showing clear definitions are required to build an evidence base that can inform public health policy(2), along with issues related to nutritional labelling.

With regards to the comment related to the separation of education establishments, we have now highlighted this as a limitation of the study. A further response to this comment is provided to point under methods.

With regards to the combining of these results with our qualitative paper, which the reviewer has kindly reviewed, we thank the reviewer for this comment. Due to journal word count restrictions, this was not an option. We had originally submitted both papers to the journal together and asked them to be considered in that manner however, this has not occurred. Hence, we have had to remove any reference to the results from the partner paper from each manuscript.

Specific comments as follows:

Abstract

Remove repetition from the conclusion and include something on the implications of the results for policy.

Response: We thank the reviewer for this suggestion and have reworded the section to remove repetition and have included a section on implication on policy. This is related to how the current planning laws that are aiming to limit the proliferation of takeaway food outlets will not have an impact on the density of takeaways near educational establishments.

“Within this low-socioeconomic area, there was a high concentration of takeaway food outlets, p along major roads and in easy walking distance of educational establishments with the majority offering similar foods. In addition, a high proportion of these outlets were in easy walking distance of educational establishments. Public health policy needs to consider the implications of current takeaway food outlets and not just the proliferation of these outlets with current planning laws.”

Introduction

Include recent, relevant literature reporting links between fast-food consumption and health generally (not just but also including obesity)? Also include some (apparently abundant) up-to-date literature on the impact of spatial proximity of fast food outlets and food choice?

Swop the order of paragraph 2 and 3 (for better flow).

The objectives and research questions are clearly stated, but the study aims need clarified, what will the findings deliver to the greater good (policy)?

Response: Literature reporting links between obesity and nutrition-related chronic conditions has been inserted (line 107-109) along with details on proximity, access and health risk (line 109-111). The paragraphs have been swapped and we agree this improved the flow of this section. Finally, a statement on outcomes has been inserted in line 133-136.

Methods

It is strongly recommended that data are re-analysed so that the results for schools versus colleges/universities be separated out. This is because the policy implications for outlets close to schools, which are for children, will be vastly different to those for proximity to colleges /universities, which are for adults. Also type of school (primary or secondary) should be included in the analyses.

Possibly also include the type of 'cuisine' close to the school versus the college/university as a further variable in the analyses?

Response: We thank the reviewer for their comments regarding the analysis of data in the study. In this study, we used the ONS Points of Interest data to ensure that the educational institutes were already pre-geocoded to a building centroid and thus are very accurate.

Within these Points of Interest, there are 9 level 1 Groups available of which Education and Health is one. Within this, there are a number of Categories (Level 2) which is primary, secondary and tertiary education. We use these data, pre-geocoded to building centroids to map the educational institutes within our study area. However, we agree with the reviewer that being able to map to Classes (Level 3) within the ONS dataset however as this includes 8 classes which does not necessary clearly identify primary and secondary schools in two easily separate classes, the Level 2 data were used. This ensured all educational establishments within the study area were included and limited the complexity of map-building from pre-geocoded data.

As stated in the introduction, this study has three objectives that included mapping the takeaway outlets in the study area, establishing the type of takeaway outlets by cuisine type and establishing their proximity to educational establishments. In terms of data complexity, mapping and data collection it was a large piece of work and thus additional analyses had to be limited to inevitable time and financial constraints.

Furthermore, there are only a very small number of Further Education and Higher Education establishments within the study area and the majority of the education institutes either being primary and secondary schools.

Nevertheless, we agree with the reviewer that this is a limitation of the study and one, which we are unable to currently address. Thus, we have included a paragraph acknowledging this limitation in the discussion section as stated below:

"A major limitations of this current study is that that educational institutions have not been further divided into primary or secondary schools, and further and higher education institutes. It could be suggested that this limits the utility of the results however; the majority of education establishments identified will be primary and secondary schools with only a small umber being further and higher education establishments. Notably, this work did not simply aim to only map the takeaway outlet landscape within the study area but has also focused on cuisine types along with their location and clustering. This aspect of the work is unique as it highlights how the majority of takeaway outlets provide similar food types."

Results

Adjust results in light of further analysis as suggested above.

Some more in depth description of what is depicted on the figures is required.

Response: As stated in the above answer that the results cannot be separated out for types of educational establishments and this remains a limitation of the study. However, this does not detract

from the value of the study as it does provide significant information to the number of takeaway outlets in the study area, along with the type and proximity of educational institutes presenting a very comprehensive picture of the takeaway outlet environment in this low-socioeconomic area.

In terms of more in depth description of the figures we have now amended this in the results sections and provided a greater description of each figure (line 274-279, 281, 296-297 and 302-305).

Discussion

Study limitations not fully addressed.

What do the results imply for health promotion and policy?

Response: As mentioned in the above response we have now included a paragraph on the limitation of using the combined education establishments. We have now included a paragraph regarding the implications for public health policy of this research as follow:

“Planning laws that restrict the proliferation of outlets near to schools will not affect those that are already open near to 69.8% of the schools, colleges and universities found in this study. It is evident that public health policy needs to consider how to curb the impact of established takeaway outlets in order to have a positive impact of health of children and the wider population. Moreover, our research suggests that the majority of these takeaway outlets provide a similar menu type, and it could be that the provision of food terms could be targeted either by supporting reformulation of food items or by improving the provision of healthy choices(6). Indeed this would require the support of business owners but also the community and stakeholders.”

Minor

Typos need corrected throughout the manuscript.

Data are plural – correct throughout.

Formatting errors in the reference section need corrected.

Response: We thank the reviewer for highlighting these errors that we have endeavoured to correct throughout the manuscript.

Reviewer: 2

Reviewer Name: Emma Wilkins

Institution and Country: Leeds Beckett University

Please state any competing interests or state 'None declared': None declared

Please leave your comments for the authors below Please see attached file

General comments

- This is an interesting and generally well written paper. However, the findings are highly specific to the study area, and in my view, this paper does not currently have

sufficient impact and national/international relevance to be published in the BMJ

Open.

- It is a shame that the authors did not adopt a broader definition of 'takeaways', to include also e.g. sandwich shops, coffee shops etc., which also retail convenient, ready-to-eat, energy-dense foods. Similarly, it would have been preferable for restaurants offering takeaway services to have been included. Many Indian/Chinese restaurants, for example, effectively offer the same takeaway service and food offering as Indian/Chinese takeaways without a restaurant. Given the relatively small study area, it would not have been too time-consuming to have included these outlet types. This would give the paper wider applicability to other regions of the UK, and even internationally by highlighting the relative importance of these types of food retailing, which are often neglected within the retail food environment literature, and by policymakers.

- If the authors were willing to include the above outlet types within analyses, then I think this paper would have sufficient impact to be considered for publication within the BMJ Open.

Response: Thank you for your above comments. Lake et al (1) who developed a unique classification system have highlighted the importance of clear definitions when describing the food environment or foodscape. This classification includes 21 categories, of which fast food outlets (number 12) are separate to takeaway (number 5) and also cafes and bakeries, thus highlighting a clear difference. In addition, the previous inconsistent evidence related to socioeconomic position and takeaway consumption was suggested to be due to varying definitions of takeaway foods i.e. takeaways including fast foods or independent takeaways or including other out-of-home hot food consumption.

In addition, we gave a narrow definition of takeaway food is due to the lack of nutritional labelling specifically within the independent (small business) outlets. Under the now discontinued Responsibility Deal, most fast food chains and other out of home foods provided energy and nutrition information.

We have previously shown takeaway meals to be energy-dense, nutritionally inadequate, and excessive in portion size (3-5). While sandwich shops, coffee shops etc. do provide energy dense food we feel the extent of excessive energy, salt, fat, sugar etc. is of a much higher magnitude with our definition of takeaway food— especially when considering the portion size.

Frequent consumption of takeaway food is a major public health concern, and evidence has consistently shown that large portion size promotes excessive and passive energy intake, and is a risk factor for obesity(6). Furthermore, the exponential growth of takeaway and fast food (chain) outlets in the UK parallels the obesity epidemic, with the majority of the outlets coming from the independent (small business) sector (7).

The Department of Health and Social Care are now proposing various options with respect to providing energy (kcal) labelling; one of the options is to exclude small independent business and the other is to include all out of home business.

https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/751532/impact-assessment-for-consultation-on-calorie-labelling-outside-of-the-home.pdf

While we understand the difficulties of implementing this for small businesses and government, due to high levels of variation in meal preparation and the cost of implication, but giving an indication of the energy, salt, fat, sugar etc. content of the meals would benefit the consumer, as shown in some parts of the US (8). We feel the health benefits of reducing energy intake etc. due to labelling are crucial considering the epidemic of obesity. In addition, impacting on NHS health, social and economic costs saving in excess of £4 billion.

Therefore, the impact of this work and our previous literature would potentially encourage policy changes to provide the option where nutritional labelling is provided for all out of home food provision, including the small business, independent outlets.

There are also a number of more specific comments, which would need addressing, as detailed below:

Abstract

1. Abstract suggests use of two food environment data sources (“Local authority and environmental health data”), but the methods only list one (environmental health).

Response: We thank the reviewer for bringing this to our attention. The environmental health data are provided by the local authority and this is not two separate data sources. Therefore, we have clarified this by amending the methods in abstract to the following

“Local authority Environmental Health data were used to map the takeaway outlets, using QGIS v2.18.0 (OPENGIS.ch LLC, Einsiedeln, Switzerland).”

Introduction

2. “being placed in the top 20%” – top 20% of what?

Response: We agree with the reviewer that this sentence could be ambiguous to readers. In it, we are referring to Manchester City Council being the placed in the 20% of the most deprived authorities in England. We have amended to the sentence to improve readability as follows:

“The current study is based in Manchester, which is placed in the top 20% of the most deprived unitary authorities in England.”

3. A similar study by Gallo et al. (reference below) was published in 2013. This need to be acknowledged in the intro and/or discussion, and the distinctions between the

Gallo study and the present study need to be made clearer.

Response: We thank the reviewer for highlighting this valuable paper, We have added it into the introduction when highlighting concern of proximity of takeaways to schools (line 112) and also in our discussion to highlight the results of study in-line with our findings but also the prevalence of childhood obesity (line 383-387) as follows:

“A study of food outlets within a 400m zone of primary schools in Newcastle, showed that the total number of food outlets (predominantly convenience shops or takeaways) were higher for schools in more deprived areas and with above average child obesity rates”

4. The most interesting aspect of this study is the detailed classification of fast food outlets by the foods sold (particularly if the study is expanded to include other takeaway types). You need to make more of this in the introduction and discussion, as it doesn't come across strongly enough. Literature that seeks to map the food environment often classifies fast food outlets broadly to include a range of food outlets retailing a variety of foods – some of which are more/less healthy. Other studies adopt quite narrow definitions of fast food (e.g. looking at chain outlets only), and thus may miss important sources of fast food. Policymakers often also focus only on hot food takeaways and neglect other sources of unhealthy ready-to-eat foods.

Understanding the relative contribution of these different food outlet types is important for understanding the strengths or limitations of this prior literature and these policy approaches.

Response: We are pleased that the reviewer has identified the unique value of the study in terms of the outlet definition. We agree with the reviewer that definitions in relation to food outlets are crucial and we have used the paper by Lake et al (2010) as highlighted by the reviewer in point 7a below.

Indeed, the paper by Lake et al (2010) highlights the importance of classifying food outlets in a systematic way and suggests 21 categories, of which fast food outlets (number 12) are separate to takeaway (number 5). The reviewer in the comment above refers to them as 'fast food outlets' and we would like to clarify that we have specifically only looked at takeaway outlets which are distinct from fast food outlets. As suggested by the reviewer this is a crucial distinction and one which we should highlight in both in the introduction and discussion. We have now included the following sentence in the introduction (line 129-130) to highlight this clear distinction:

“This study aimed to map takeaway food outlets, defined as small, independent outlets offering convenience hot meals, as opposed to fast food outlet chains.”

In addition highlighted this in the discussion (line 323-331):

“In this study we have concentrated on a narrow definition of takeaway food outlets, to small independent outlets providing hot convenience foods and distance to fast food outlets (chains), cafes and restaurants as classified by Lake et al. (1). There has been a paucity of research concentrating on this type of outlet with many concentrating on fast food outlets and lacking the ability to distinguish

the two types when classifying the foodscape. In addition, this study concentrated on takeaway outlets due to the lack of nutritional labelling specifically within the independent (small business) outlets. Under the now discontinued Responsibility Deal, most fast food chains and other out of home foods provided energy and nutrition information. "However, we acknowledge that further work in this specific geographic area could include all food outlets and thus provide a clear description of the foodscape. However, in this paper we have concentrated on takeaway outlets due to the specific poly implications as highlighted by reviewer comments above.

Methods

5. Why did you select Rusholme?

Response: We thank the reviewer for highlighting the need to justify the study area. To do so we have now included a clear reference to the area in question in the introduction (line 101-103), including reference to the deprivation and obesity prevalence in the area. A greater description of the study area is provided in the methods section (line 155-168).

6. Please give data re: proportion of residents who are South Asian in Rusholme.

Response: We have now included this is the description of the ward in the methods section (line 165-166). The proportion of South Asians in Rusholme is 39.9% compared to the (the Manchester wide proportion of 17.1% (data from 2011 census).

7. More information is needed regarding your methodology for mapping food outlets. I suggest you refer to Wilkins et al. (2017a), which includes a reporting checklist for

retail food environment research.

Response: We thank the reviewer for highlighting this checklist, which they have devised and agree it is valuable in ensuring adequate reporting of such studies. We have attempted to ensure we have followed procedure with the recommendations made in it. Although this is not a checklist that is required by the journal, we have completed it (see line 264-265) and have included it in the submission. As with all checklists, it requires consensus across the field and as is stated by the authors who lead the development of the STROBE checklist for the reporting of observational studies, checklists should not make the reporting of such studies rigid.

Specific problems are:

a. Your definition of takeaway outlets needs further explanation. I cannot tell for example whether cafes and coffee shops would be included in your definition.

Your definition also says you only included independent outlets – does this mean you have excluded chain fast food outlets such as McDonalds? What is the rationale for excluding these? And what is meant by 'commercially prepared'?

Does this mean food is pre-prepared by an external caterer? How

did you ascertain whether this was the case? Some examples or even images would be very helpful. If possible, to facilitate comparability to other UK literature, I would suggest using the classification scheme of Lake et al. (2010) to clarify your definition.

Response: This is an issue, which has been raised by the reviewer in earlier comments. We have clarified the definition of takeaway food outlet in our paper (line 180-184) in line with the paper by Lake et al (2010). As in this paper, our paper also excludes fast food outlets from the definition of takeaway outlets, also with café and coffee shops.

In our paper, we have excluded fast food outlets, which we considered more as the chain-based outlets such as McDonalds, Burger King and KFC and concentrated on independent outlets. In particular, response to concerns of the proliferation of such takeaway outlets over the fast food outlets in the UK, particularly in areas of higher socioeconomic deprivation as highlighted in recent Public Health England reports. Furthermore, as our introduction suggests, there are proposals within local authorities to restrict planning permission to such takeaway outlets and thus this study focused only on this singular outlet type.

b. Further to the above, it seems you extracted outlets classified as 'hot food takeaways' within the environmental health data. Your definition there seems to run contradictory to what was actually included. This whole section will need revising – particularly if you choose to include a broader range of outlets as suggested above.

Response: We appreciate that this may not be currently clear and to elaborate the planning department uses the "A5 Hot food takeaway" which are also considered as takeaways by the Environmental Health Department from which the data was obtained. However, outlets which may have more than a small number of tables are called "restaurants/cafes/canteens" and thus were not included in our study as these may have included restaurants and cafes.

We have changed this paragraph as follows (line 212-219):

"The Environmental Health Department categorise traditional takeaway food businesses such as kebab shops, chip shops and pizza outlets as 'takeaways' for the purpose of the public register; however, food businesses that have more than a small number of tables (this was not quantified) and also provide a takeaway service are placed into the 'restaurant/café/canteen' category and subsequently included in our study."

Regarding the alteration of the definition of takeaway food outlets to include all outlets that provide takeaway services such as restaurants and cafes, we feel that this would not relate to the aim of our study. Moreover, this is not included in the classification of takeaway food outlets that has been suggested by Lake et al (2010).

c. In paragraph beginning line 161 on page 10, please state explicitly that the 'restaurant/café/canteen' category was not included. This is quite unclear at

the moment. It would be useful if you could give some examples of outlets falling within this 'restaurant/café/canteen' category, which people might expect to fall within the definition of 'takeaways' – e.g. McDonalds has quite a number of tables, so is this excluded?

Response: We have now clarified this point (see response to 4c). Regarding examples of such excluded outlets, McDonalds may qualify, along with restaurants who may in addition provide a takeaway food service and cafes (which would have a different type of food provision compared to takeaway food outlets). At this point we should highlight the aim of the study was to map independent takeaway food outlets, which have been suggested to have proliferated in the UK particularly in areas of higher socioeconomic deprivation.

d. How were education institutions identified and extracted from the Points of Interest data? Which classifications did you use?

Response: From the Points of Interest data available in the Ordnance Survey, Category 31 "Primary, secondary and tertiary education" within the Group 5 "Education and Health" were used. The data file used for this information was the OS Points of Interest [Shapefile geospatial data], which covered Manchester District, Updated March 2016, Ordnance Survey, GB. Using: EDINA Digimap Ordnance Survey Service, <<http://edina.ac.uk/digimap>>, Downloaded: April 2016.

This information has now been added to the manuscript (line 222-227 and line 236-237).

e. How were food outlets geocoded? To postcode centroids? Please also add details about the geocoding of education institutions – i.e. that the Points of Interest data is pre-geocoded by Ordnance Survey, with the majority of features geocoded to a building centroid – thus being very spatially accurate.

Response: As data on takeaway outlets was taken from a local government data source, this was then geocoded to postcode centroids. Whilst data on educational institutions was from Points of Interest data, it was pre-geocoded. We have now added this to (line 222-227 and line 236-237) in the manuscript.

8. Where did you obtain road network data from (please cite origin and date)?

Response: The road network data was from the OS map of the study area in April 2016. Please see response to point 4 above.

9. Re: the rationale for using a 400m buffer, I think it is also relevant to add that local authorities typically employ a 400m buffer when restricting development of hot food takeaways around schools.

Response: We thank the reviewer for their suggestion and have now included this in the paper (line 257-262) as follows:

“This distance was selected to represent a conceivable walking distance for students to travel during breaks (if the institution is not gated) or whilst travelling to or from the institution and thus reflected in the hot food takeaway planning policy of Manchester City Council”

10. Environmental health data has been validated in several studies (e.g. Wilkins et al., 2017b, Lake et al., 2010 and 2012, Cummins et al., 2009) – please include reference to these in the methodology, including data on their validity.

Response: We agree with the reviewer that we should highlight how we developed our methodology and have referred to the Lake et al papers in the methods section (line 195-196) as these are the papers that we used to consider the validity and utility secondary sources (as mentioned in other aspects of the manuscript).

Results

11. I am assuming the tertiles of deprivation are relative to all LSOAs across England?

Please make this clear.

Response: We have now clarified this to reflect that this is relative to all LSOAs across England line 272).

12. How were spatial clusters in Figure 1 identified?

Response: Although the individual takeaway food outlets could be geocoded, we identified that it was very difficult to view all these data points simultaneously. Therefore, Figure 1b represents a map of the study area with the takeaway food outlets presented as ‘cluster points’. The number and size of each point on the map represents the amount of takeaway outlets that cluster within a small area.

13. Line 220, page 13 – what percentage was ‘the majority’ of outlets?

Response: We have now expressed this as a percentage as requested by the reviewer. Please also see response to point 15 below.

Figures

14. Figure 2: you say this map shows density of food outlets, but the scale seems to show counts – please clarify.

Response: We have now changed the description of the figure to say counts of takeaway food outlets.

15. Figure 4: are the numbers within the polygons the counts of takeaway outlets per school? If so, the numbers don’t seem to tally with the descriptive statistics on page

13. In relation to that, it would be useful to include a more granular summary of outlet counts. 1-10 outlets is quite a broad range.

Response: We have checked the numbers in figure 4 and the number of school total 53. If the reviewer is alluding to the number of takeaways differing from the total number identified in the study area, this could possibly be due to the fact that a takeaway could be located within 400m from 2 different education institutions.

In order to reflect the reviewers' comment regarding the categorisation of number of takeaways we have now changed this as shown below (line 300-302).

"Of the 53 schools, colleges and universities within the study area, 28 (52.8%) had 1-5 takeaway food outlets within 400m, 9 (17.0%) had 6-10 outlets; 4 (7.5%) more than 11 outlets with 12 (22.6% having zero outlets."

Discussion

16. This would need revising to include discussion of prior literature and policy that has neglected different types of takeaway (e.g. restaurants with takeaway services, and sandwich shops/coffee shops), and the implications of this.

Response: We have now added a number of paragraphs to the discussion to include the importance of considering takeaway outlets not with other outlets as put forward by Lake et al (2010) when describing the foodscape (line 323-331) but also the impact of the study on public health policy (line 393-399). As noted in our above responses we have concentrated on takeaway food outlets opposed to other food outlets.

17. Some statements in the discussion do not appear to be supported by the data e.g. second paragraph of the discussion implies that the findings suggest takeaways are more prevalent in deprived areas. However, given that this study did not contrast

areas of differing deprivation, this paragraph will need revising. Sentence beginning

line 275, page 16 is also a large extrapolation from this study's findings, given you

did not examine associations between the food environment and any health

outcomes.

Response: We have now qualified the statements made in second paragraph of the discussion to ensure it is clear we only looked at one ward and did not compare different socioeconomic areas. However, on rereading the paragraph about health outcomes and ethnic minority health disparity, we have not alluded to our research and thus have been careful to postulate a hypothesis of possible intervention to improve health outcomes.

General/grammar

18. Please be consistent with presentation of units. For example, in places you write

"400m" and in others "400 m".

Response: We have now amended this to be consistent throughout the manuscript.

19. "Particularly of concern is their proximity to schools and thus the physical food environment that children are exposed to; however, current planning laws are aiming to restrict the opening of new takeaway outlets within 400 m of schools". I don't think 'however' makes sense in this sentence. The second clause is supporting, rather than contradicting the first.

Response: We have now removed 'however' from the sentence and replaced with a supporting clause.

20. The references need attention. There are inconsistencies in formatting, and typographic errors throughout.

Response: We thank the reviewer for bringing this to our attention. We have now checked and corrected the reference list.

21. "Under the Freedom of Information Act (2000), local councils are subsequently required to provide an up-to-date list of business names, addresses and use all food premises that are located within their jurisdiction." Latter part of this sentence isn't grammatically correct.

Response: We agree with the reviewer and have identified that there some missing words which we have now added and hope that the sentence will now read well.

22. The term 'data' should be treated as plural throughout. E.g. 'this data' should be 'these data'.

Response: We thank the reviewer for highlighting this grammatical error. We have now consistently amended this throughout the manuscript.

23. Line 268, page 15 – this paragraph has a number of grammatical errors that need correcting. I think 'long' should be 'along', and 'similar' should be 'similarly'.

Response: We have now revised the paragraph and amended the grammatical errors expressed above.

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VERSION 2 – REVIEW

REVIEWER	Barbara Stewart-Knox University of Bradford, UK
REVIEW RETURNED	15-Feb-2019

GENERAL COMMENTS	<p>This manuscript has been much improved, and a majority of comments appear to have been addressed. Although now addressed as a study limitation (line 378-386), it remains unclear why there has been no differentiation between colleges and schools in proximity to take-away outlets. As pointed out previously the implications of (adults) or a school (children). Please explain?</p> <p>Some further minor edits are required.</p> <p>The reporting should be consistent in using the past tense: line 89 replace 'is' with 'was'; line 125 replace 'aims' with 'aimed'; Line 128 replace 'aims' with 'aimed';</p> <p>Line 221 data are plural - replace 'was' with 'were'.</p> <p>Line 381 insert commas before and after 'however'</p> <p>Line 382 correct typo</p>
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VERSION 2 – AUTHOR RESPONSE

Reviewer(s)' Comments to Author:

Reviewer: 1

Reviewer Name: Barbara Stewart-Knox

Institution and Country: University of Bradford,

UK

Please state any competing interests or state 'None declared': None

Please leave your comments for the authors below

This manuscript has been much improved, and a majority of comments appear to have been addressed. Although now addressed as a study limitation (line 378-386), it remains unclear why there has been no differentiation between colleges and schools in proximity to take-away outlets. As pointed out previously the implications of (adults) or a school (children). Please explain?

Response: As mentioned in our previous response to reviewer's comments we agree that the work could have benefited from separation of schools from other education establishments. As indicated in Sources of funding/support this work was funded from a small research grant that funded a Masters by Research student who carried out the mixed-method study (both the current geographical mapping study and accepted qualitative study). Thus, due to the data complexity, specialist skills required and additional costs we were unable to undertake this further work and consequently have included it a major limitation of the study. Moreover, as there are only a small number of further and higher education establishments within the study area, it is likely that the majority of the identified education establishments to be primary or secondary schools. We hope the reviewer will appreciate the complex nature of the research methodology involved in the geographical mapping of foodscapes and the efforts undertaken to answer the aims of this study. We strongly consider that the results of this study could help to inform public health policy, locally and nationally and believe that the timely dissemination of this important work is needed for this.

Some further minor edits are required.

The reporting should be consistent in using the past tense: line 89 replace 'is' with 'was'; line 125 replace 'aims' with 'aimed'; Line 128 replace 'aims' with 'aimed';

Response: We have now corrected these errors.

Line 221 data are plural - replace 'was' with 'were'.

Response: We have now correct this error.

Line 381 insert commas before and after 'however'

Response: We have now included a comma.

Line 382 correct typo

Response: We have now corrected this typo.