# <u>Title</u>

The relationship between housing created through Permitted Development Rights and health: a systematic review

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# Author biographies

#### **Rachael Marsh (RM)**

Rachael is a clinician, specialising in Public Health. She has experience working in acute NHS trusts, local governments, Public Health England and academic institutions. She has undertaken a wide range of service work and research projects in the field of healthy, equitable and sustainable environments.

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Michael is a Chartered Town Planner and Honorary Member of the Faculty of Public Health, and has a specialist interest in healthy spatial planning.

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#### Key words

permitted development, spatial planning, change of use, housing, health, wellbeing

# Abstract

### Background

Permitted Development Rights are a regulatory mechanism in the English planning system where the use of a building can be changed bypassing the standard planning process. Other countries have similar arrangements. In England, no assessment of the health impacts has been completed.

#### Methodology

This systematic review provides the first overview of the health and wellbeing impacts of housing created through Permitted Development Rights. 1,999 literature items were identified from a structured search of 14 databases and manual searching for grey literature. Literature published between January 2013 and July 2020, in England, were eligible.

#### Results

Eight academic and 13 grey literature items were included. The review identifies both a greater number of literature and greater number of ways permitted development conversions have negative compared to positive health impacts, and may contribute towards widening health inequalities. There is a lack of research directly with the occupants of housing created through Permitted Development Rights.

#### Conclusions

These findings provide an indication of the impacts of deregulating a planning system without explicitly considering health and wellbeing. They warrant further assessment of how to enable the change of a buildings use to take place whilst also ensuring the homes created are supportive of good health.

#### Introduction Background

There is extensive evidence demonstrating the importance of housing as a wider determinant of health<sup>1, 2</sup>. The design and quality of homes on the health of occupants has been widely reported for numerous outcomes including cardiorespiratory diseases, infectious diseases, injuries, allergies and mental health conditions<sup>1,3</sup>. Understanding the mechanism for this is complex as there are many interdependent elements (eg. type, tenure, size, location, cost, household composition, etc), as well as links with other major systems such as transport, education, and social security<sup>4</sup>. Casual pathways have shown how housing can impact on health. These pathways can be used to infer how risk factors at the building level (such as ventilation and space), the neighbourhood level (such as affordability, proximity to green space, local facilities and public and active transport options) and through direct exposures (such as mould or air pollutants)<sup>1, 5, 6</sup>, can have longer-term health impacts<sup>3</sup>. These casual pathways underpin the methods of this paper.

Despite this, producing housing of good quality (for new and existing ones), which is supportive of health and wellbeing, is a challenge faced by many countries. In Europe, 1 in 6 homes, are of poor quality<sup>7</sup>. Not only does this have significant implications on the occupants lives but for wider health and social care systems too. In the United Kingdom (UK) for instance, the Building Research Establishment estimated that the National Health Service spends about £2.5 billion per annum on housing and health-related conditions<sup>8</sup>. The effects of this have been exacerbated with the COVID-19 pandemic and subsequent lockdowns, forcing people to spend significantly more time in their homes and the immediate surrounding areas.

The factors which determine the quality of housing created are extremely complex, one of which is the level of regulation in the planning system. In England, since 2010, the planning system has been gradually deregulated, of which Permitted Development Rights (PDRs) are one example. PDRs enable the change of a buildings use to take place, and aim to reduce vacant buildings and help increase the supply of housing. Using PDRs, changes to a building can bypass the standard planning process. Traditionally, PDRs have only covered a limited set of circumstances, such as minor extensions to existing homes, which given their minor scale, would not require the level of scrutiny the planning process provides. However, since 2013 the government has expanded the role of PDRs dramatically. Significant aspects of this have been the decisions allowing; commercial buildings to be converted to residential use, and in August 2020 to allow building upwards on existing buildings (up to two storeys for residential), and demolishing vacant commercial, industrial and residential buildings to be replaced with new residential units<sup>9, 10</sup>. (see Figure 1 for timeline).

Governments are under pressure to stimulate the economy following COVID-19. Deregulation such as PDRs is already forming part of this recovery. For example, the UK Government announced significant expansions and reforms to PDRs as part of their COVID-19 economic renewal package<sup>11</sup>.



# Figure 1: Timeline showing key legislative changes affecting Permitted Development Rights Change of Use to residential, in England

#### Permitted Development Rights explained

PDRs are a regulatory mechanism in the English planning system which provides automatic permissions for development subject to meeting prerequisite rules. This mechanism is not unique to England, other systems, such as Australia, New Zealand, USA, Canada and Germany also have such arrangements<sup>12</sup>. Although PDRs are the focus of this paper, the findings may be of interest to researchers or policymakers from any country where deregulation which prevents health forming part of the decision-making process is being implemented or considered.

In England, PDRs legislation at the national level sets out which changes of land/ building use are permitted<sup>9</sup>. Planning applications are not required. But developers do still need to seek a lighter-touch form of planning permission or 'Prior Approval' from a local planning authority if they intend to create housing through this route. Only specific aspects can be considered by the planning authority, and such 'conditions' are set out in legislation governing each individual PDR. For example for PDRs of office to residential conversions, these conditions are: transport and highways impacts, contamination or flooding risks on the site, impacts of noise from commercial premises on the intended occupiers (introduced in 2016) and the provision of adequate natural light in all habitable rooms of the dwellinghouses (only introduced in June 2020)<sup>9</sup>. Building regulations still apply, however these do not necessarily consider the full evidence base linking building features and health impacts and, as minimum standards, often do not consider how building design could promote better health and improved wellbeing<sup>13</sup>. Wider policy requirements normally set out in a local plan, such as dwelling size, green space, play and amenity provision, or levels of air pollution cannot form part of the decision-making process.

Regulatory tools allow for local authorities to suspend national PDRs in their local area, in the form of an Article 4 direction. Change of use can still take place but would then have to do so through a standard planning application. However, Article 4 directions can be time consuming relative to the scale of potential PDRs in the area, can involve costly compensation payments and can be modified or overturned by central government<sup>14</sup>. Therefore only few Article 4 directions have been adopted by local authorities since 2013 and those which have are nearly all in London<sup>15</sup>.

#### The scale of the problem

The scale of PDRs is measurable by the number of new homes created. In the UK, data on those which have been created through PDRs have only been collected since 2015-16, since then there have been an estimated 60,399 homes created through these routes<sup>16</sup>. If you assume the UK household size average of 2.3 persons, then PDRs conversions would have housed around 138,779 people<sup>17</sup>. In some areas, over half the housing delivered was through PDRs (51% in Harlow borough in 2018/19)<sup>18</sup>.

Health and wellbeing impacts were not identified, considered and accounted for in the Government's initial regulatory impact assessment of PDRs<sup>19</sup>. Since then, whilst there have been assessments into the extent of policy uptake, there have been few into the impact, especially on health and wellbeing<sup>20</sup>. This paper aims to systematically review what is known on the health and wellbeing impacts of housing created through PDRs. Whilst this mechanism is specific to England, which is used as a case study area, it gives an indication of the potential impacts of deregulating a planning system without explicitly considering health and wellbeing.

#### <u>Method</u>

#### Search strategy

A list of potentially relevant databases and organisations was compiled from existing systematic reviews across similar topics<sup>1</sup> and in consultation with experts in the field (see

Acknowledgements). 14 electronic databases (MEDLINE, PsycINFO, Cochrane, SocINDEX, EconLit, Allied and Complementary Medicine (AMED), Scopus, Web of Science, Bielefeld Academic Search Engine (BASE), Business Source Complete, CORE, Embase, Global Health, Health Management Information Consortium, Social Policy and Practice (SPP) were searched by heading, keyword or free text to identify relevant publications from January 2013 to May 2020.

The search terms were categorised into two-word groups relating to permitted development and health outcomes (Appendix 1). Following an initial draft of search terms, subject area experts were contacted to verify and refine the terms. A pilot search was performed by a knowledge and evidence specialist (JW) in one database (MEDLINE) to test the search strategy and refine the search terms before the full search was undertaken by the same researcher. Additional searches were conducted by RM on Google, Google Scholar and relevant organisation websites to locate additional potentially eligible literature. All authors were involved in identifying relevant grey literature. This was combined with manual searching of referenced articles by RM.

Two reviewers independently screened all titles identified by the searches (RM and JW). Subsequently, two reviewers (RM and MC) independently assessed the quality of selected literature and extracted relevant data. When reviewers' conclusions differed, the literature was reviewed jointly by three reviewers. The reporting of this review conforms to recommendations from the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA)<sup>21</sup>.

# Eligibility

Articles were screened in three phases; title, abstract, and full-text. To be selected for inclusion, literature items were required to meet the following inclusion criteria:

- 1. Be published in English language (literature not in English language were excluded due to limited capacity to translate within the research team)
- Be published between 1<sup>st</sup> January 2013 to 22<sup>nd</sup> July 2020 (the limit on year of publication is in order to reflect the timeframe within which permitted development rights have been expanded).
- 3. Be conducted in England (literature from countries outside England were excluded from this review due to differences in planning systems and regulations which may act as confounders).
- 4. No restriction of study design. The following types of grey literature are eligible: reports, dissertations, policies, conference abstracts, presentations, expert opinion, video and text accessible from nationally recognised stakeholder websites.
- 5. Reports on associations between;
  - a. Population: people of any age or sex, who occupy the building or local area of housing created through PDRs
  - b. Exposure: housing created through PDRs
  - c. Outcome: health and wellbeing (primary) or risk factors with evidence of impact on health at the building level, neighbourhood level and direct exposures (secondary)<sup>1, 5, 6</sup>.

Results were exported to EndNote, and duplicates were removed. The reference lists of included articles were screened to identify additional relevant publications.

As the scoping search identified mainly grey literature, the quality assessment AACODS checklist was used to rate the quality of included literature, in line with previous systematic reviews containing grey literature<sup>22</sup>. This tool was selected for its ability to assess a range of literature, and as it is recommended by the National Institute for Health and Care Excellence<sup>23</sup>. The tool has been recommended for rating the methodological quality of

literature based on construct validity and acceptable content. The tool consists of six quality assessment domains: (i) Authority; (ii) Accuracy; (iii) Coverage; (iv) Objectivity; (v) Date; and (vi) Significance.

### <u>Results</u>

In total, 4,226 literature items were identified from a structured search of 14 databases combined with manual searching for grey literature. 2,068 duplicates were removed prior to screening. A total of 21 literature items met the eligibility criteria and were included in the review (see Figure 2). Of these, eight were academic studies (four mixed methods, three qualitative research, one quantitative research) and the remaining 13 were grey literature (six expert opinion, six reports, one documentary).

The only research that has been conducted with residents of PDRs conversions is a small survey conducted by Clifford *et al.*<sup>14</sup> and two follow-up interviews. The rest of the academic research has been conducted through desk-based reviews, case studies, surveys, or roundtables and interviews with experts.

# Figure 2: Literature selection process



The literature included in the synthesis comprised of 11 items of high quality (ACCODS score of 5 or 6), eight items of moderate quality (ACCODS score of 3 or 4) and two items of low quality (ACCODS score of 2 or less). Due to the anticipated nature of built environment exposures including the complex mechanisms which link housing to health, as well as the relatively recent introduction of PDRs, we did not exclude literature on the basis of quality.

Findings consistently show that housing created through PDRs is likely to have a negative impact on health and wellbeing (see Figure 3 and Appendix 2).

# Figure 3: Primary and secondary health outcomes of dwellings created through Permitted Development Rights found in included literature



Number of papers reporting outcome

#### **Primary outcomes**

Very few literature items report on direct health outcomes, with only five items describing who the occupants of dwellings created through PDRs were. This lack of data means it was not possible to break findings down by population subgroups. PDRs conversions were being used as temporary accommodation by local authorities, for people with substance dependence or as student accommodation<sup>18, 24, 25, 26, 10.</sup> A survey with residents of PDR conversions reported a brothel had been established in one of the blocks<sup>14</sup>. These are vulnerable groups of people who are unlikely to have the means to live elsewhere, despite risk factors at building and neighbourhood level for their physical and mental health.

Clifford, *et al.* noted uptake of PDRs seems to be driven by uplift in value from one use to residential use, with significantly greater update in London, the South East and the South West of England where it is more profitable<sup>14</sup>. This reduces affordable housing in areas which are already the least affordable, thus potentially widening spatial inequalities.

Clifford, *et al.* considered a number of socioeconomic factors (including average house prices, office rental prices and vacancy rates, unemployment and index of multiple deprivation) and found that the more deprived a locality, or the lower its average house prices, the smaller the average space standards and the lower the quality of housing created through PDRs. This relationship was not seen for dwellings created under the full planning permission process<sup>25</sup>. People from deprived backgrounds are more likely to have pre-existing health conditions, which may make them more vulnerable to the effects of poor quality housing<sup>2</sup>. Thus PDRs have the potential to exacerbate health inequalities already existing within communities.

#### Secondary outcomes

The majority of literature report on secondary outcomes, at the building and neighbourhood level, rather than on direct exposures. Therefore the following results are broken down in such terms, with the known health impacts refered throughout.

#### **Building level**

#### Internal and amenity space

At the building level the greatest reference was to the small sizes of units created, referenced by 13 included literature items. In an audit by Clifford *et al.*, of 2,140 residential units created through PDRs, just 13.6% would comply with the nationally described space standards<sup>27</sup>. Studio flats of just 15m<sup>2</sup> (just larger than a standard parking space) each were not uncommon. Whilst moderate density can be beneficial in achieving compact neighbourhoods which can be health promoting,<sup>6</sup> such small dwellings are likely to result in households living in crowded conditions, which can interfere with privacy, strained family relationships, reduced storage, lack of space to play, study or work and difficulties sleeping. Evidence shows crowding within households is linked to a range of physical and mental health problems, and in children lowered educational attainment and behavioural difficulties<sup>28</sup>.

These small dwellings were often compounded by a lack of private or communal amenity space, such as a balcony or garden. Severn literature items referred to lack of a garden or amenity space<sup>10, 14, 18, 25, 26, 27, 29</sup>. Just 0.7% of the 2,140 residential units reviewed had access to any private amenity space, and 9 out of the 30 schemes reviewed (30%) had access to communal amenity space<sup>27</sup>. There were reports of children having to resort to playing in carparks<sup>14</sup>. The Developer found that in Leeds, only 1% of new homes created under PDR had access to private or communal amenity space, and in Leicester there were none<sup>18</sup>. Amenity space, particularly private outdoor space, is one of the housing features COVID-19 has caused the most notable leap in demand<sup>30</sup>. Amenity space can contribute to a better quality of life of residents of all ages, particularly in higher density schemes. Outdoor space provides access to daylight, fresh air, a place to dry washing, socialise, play in, enjoy wildlife and to grow plants/vegetables. Compared to no garden access, access to a private garden or balcony was associated with better wellbeing, and being more likely to meet physical activity guidelines<sup>31</sup>.

#### General building design

13 literature items described generally poor design of homes created through PDRs, with none describing good design<sup>24, 32, 33</sup>. Some expanded on specific elements, such as windows<sup>10, 29, 34</sup>, ventilation<sup>35</sup>, or hazards<sup>36</sup>, and some referenced direct exposures that impact on health including privacy, noise and lighting<sup>14, 18, 25, 26, 27</sup>.

Ten papers described problems with windows, either in terms of not providing adequate lighting, being single-aspect, or having a high degree of overlooking and not being able to provide enough privacy<sup>10, 14, 18, 25, 26, 27, 29, 34, 35, 37</sup>. Clifford *et al.* found 85.3% of units reviewed were single aspect only<sup>27</sup>. In the UK, if northerly facing this can cause problems with low lighting levels and cold homes in the winter, or if southerly facing potential overheating in the summer. High quality windows and doors, which fully function and are double glazed are associated with reduced hospital admissions<sup>3</sup>. This was sometimes compounded by unusual layouts in some schemes, for example a dwelling whose only window faces an internal atrium area, dwellings with office style tinted windows still present, or some dwellings with no windows at all<sup>10, 25</sup>. In some cases, office style windows are still present<sup>27</sup>. There is evidence linking increased daylight exposure to improved mental and physical health outcomes<sup>1</sup>.

A survey by Clifford *et al.* found only around half of residents were happy with their housing, with some giving very negative accounts. They mentioned problems such as a large number of children living in blocks with lack of play space, and a lack of noise insulation and a brothel in the block<sup>14</sup>.

#### Neighbourhood level

#### Loss of developer contributions and affordability

At the neighbourhood level the problem most frequently described was to the loss of developer contributions, with 18 literature items expressing concerns about it. Developer contributions is a mechanism to require developers to provide monetary or non-monetary mitigation measures to negative impacts such as the provision of green spaces, play areas or funding towards local facilities like schools and health facilities. In 2018-19, in one year, around £7 billion was secured through this mechanism<sup>38</sup>. Bibby et al. found the law relating to developer contributions complex and there were conflicting interpretations that have resulted in some local authorities exempting PDRs from developer contributions<sup>20</sup>. They estimated that the direct financial impact of the extension of PDR is a net loss of around £50m (between 2010 and 2017), mainly through lost planning fees and affordable housing contributions<sup>20</sup>. The Developer expressed this as equivalent to over 13,500 affordable homes lost over 4 years<sup>18</sup>. Affordable housing has been linked to better health through engagement with health services, more income being available to support health and wellbeing and improved quality of life<sup>1</sup>. With small units in PDRs conversions contributing to rising population sizes, additional pressure may be placed on health, social care and other local services.

#### Location and green space

Clifford *et al* found little difference in access to services, transport connections and green space between homes created through PDRs and full planning permission<sup>37</sup>. Clifford *et al*. described some PDRs conversions in potentially desirable locations, close to public transport and services<sup>27</sup>, however the same paper and 11 others referenced conversions in problematic locations, for example, close to factories, a waste transfer station, or on industrial estates. These papers also described difficulties accessing local facilities such as schools, healthcare, public transport, and supermarkets, which evidence shows is linked to reduced physical activity, and in older people reduce social participation and mobility<sup>1</sup>. Four papers describe conversions in areas of very high traffic, such as between two busy dual carriageways<sup>38</sup>.

There were limited references to access to green space, but three literature items did express concerns about poor links the natural environment<sup>18, 27, 37</sup>. In the audit by Clifford *et al.*, 15 of the 30 schemes reviewed were within 250m of some public green or open space, and 25 were within 500m<sup>39</sup>. However, with small units and little amenity space common in PDR conversions, additional pressure is likely to be put on such green infrastructure. There is evidence that access to green space and engagement with the natural environment is

beneficial for health particularly in terms of physical activity, social cohesion and mental health<sup>40</sup>.

#### Impact on local area

Seven literature items found PDRs conversions to residential use had a negative impact on the local area, mainly via reducing local employment opportunities. One paper suggested the policy enables regeneration of empty, unproductive office space,<sup>24</sup> whilst others highlighted nowhere in the regulation was there any provision to distinguish between redundant and economically viable office space, and that 25% of early applications were being made for buildings already in use<sup>41</sup>. Small to medium enterprises were noted as most likely to be displaced<sup>14</sup>.

Five literature items considered the impact on neighbours and community cohesion, describing concerns about PDR conversions causing neighbourhood tensions and conflict <sup>18, 27, 29, 32, 42</sup>. Consultation is one of the many features of the planning system bypassed with PDR so neighbours have no control over changes in the local area which take place via this route. Community cohesion and environments which are supportive of this can promote residents wellbeing<sup>1</sup>.

#### Housing provision and need

Three literature items found a positive aspect of PDRs conversions was that they contribute towards meeting housing need<sup>18, 24, 25</sup>. However, it is unclear whether these homes would have been created anyway, but via the standard planning process had PDRs not been an option. Six literature items found the type and mix of housing was poor, often dominated by studio and one-bedroom flats<sup>25, 27, 34, 20, 41, 42</sup>. Clifford *et al.* found 91.7% of units reviewed were studios or one beds, which can lead to overcrowding, particularly in the case of families with children in need of accommodation, exacerbated by the small spaces often seen<sup>27</sup>. Evidence suggests mixed housing can increase social cohesion and perceptions of safety among more deprived areas<sup>1</sup>.

#### **Discussion**

To our knowledge, this literature review provides the first overview of the evidence for associations between dwellings created through PDR and health.

We find that the building and neighbourhood features prominent in housing created through PDRs are linked to a range of negative health impacts, including risk of cardiorespiratory diseases, type 2 diabetes, obesity, excess winter deaths, musculoskeletal conditions, cancer, mental health problems, low wellbeing and premature death<sup>1, 3, 8</sup>. The review identifies both a greater number of papers and a greater number of ways that PDRs conversions have negative compared to positive impacts on health. Categories for 29 ways dwellings created through PDRs negatively impact on health are found (five primary health outcomes, six direct exposures, 11 building level features and 14 neighbourhood level features), compared to just eight ways positive impacts are realised. It is difficult to draw conclusions about the impact on inequalities due to the small number of papers which consider it, but the findings suggest homes created through PDRs may contribute to widening health inequalities. Poorer quality housing, such as very small internal spaces, is being created in more deprived areas, and less affordable housing is being created in the areas which already have high housing costs.

Although the majority of evidence included in this review is grey literature, it highlights some concerning findings on the range of negative impacts on health, wellbeing and quality of life that housing created through PDRs might have, which warrants further assessment by researchers and policy makers as set out below.

# **Strengths and limitations**

A key strength of this study is the robustness and rigour of the review methods applied. Our systematic approach of collating and assessing the quality of existing evidence against building and neighbourhood features as well as primary health outcomes has enabled the identification of knowledge and research gaps on the complex link between PDRs and health.

Public health evidence for impacts from built environment exposures, such as housing, is often weak because study designs tend to be opportunistic, non-randomised, use subjective outcome measures, and do not incorporate follow-up of study participants. In this review the majority of included literature were grey, and of the academic papers most reliant on findings from case studies or interviews. These research methods cannot prove causality, nevertheless our findings highlight a range of ways that housing created through PDRs has a mainly negative impact on health and the importance of policies and actions to mitigate this. Grey literature and non-experimental studies are also are at greater risk of bias. Many of the grey literature items did not have a clearly stated aim or parameters which define their content coverage, so may report only on the most extreme findings. Publication bias may be present if literature about PDRs that did show positive results are less likely to have been submitted or accepted for publication. This traditional hierarchy of evidence only speaks to a limited selection of relevant policy concerns. Some of the research methods used by the included studies, such as interviews and surveys do hold weight in housing and planning policy areas<sup>43</sup>. However, caution is advised on using the review findings to draw conclusions about the impact of PDRs conversions on health and wellbeing.

The majority of the identified literature did not report on a specific type of change of use (15 items). This means it is not known if the buildings converted to housing were previously used as offices, or for agricultural, storage, industrial or other purposes, which may have implications on the findings and suitability for conversion to homes. The rest of literature items were focused on office to residential (3), agricultural to residential (1) or office and agricultural to residential (1). This is consistent with national data which shows that office to residential change of use accounts for the vast majority of PDRs uptake, with 54,162 units produced from 2015/16 to 2018/19<sup>16</sup>. Although in recent years there has been an increase in the change of use from agricultural to residential<sup>16</sup>.

#### Implications for researchers

This review reveals many research gaps, where outcomes from PDRs conversions are not known, including:

- Direct exposures, such as damp and mould, air pollutants, pests, and temperature.
- Health outcomes, particularly respiratory disease, cardiovascular disease, diabetes, allergies, injuries, excess winter deaths, infectious diseases, and mental health conditions.
- Additional building and neighbourhood features; materials and toxicity, adaptability and use by groups with specific needs (e.g. elderly, or disabled), opportunities for physical activity (e.g. bike facilities and cycle infrastructure) and further climate adaption and mitigation measures.

The reasons for limited literature, particularly of academic studies may be because PDRs are a relatively new mechanism in the English planning system, a cross disciplinary approach is needed to explore the research question, and because of the challenges researching complex exposure as described in the introduction<sup>4</sup>. Tracking objective impacts resulting from specific PDRs regulatory changes on population health and wellbeing is needed. Although it is unlikely to be possible or appropriate to undertake an experimental approach, such as a randomised controlled trial, natural experiments or longitudinal studies would be plausible. Future academic research linking directly to exposure and health

outcomes rather than just building and neighbourhood level features would strengthen the evidence base.

In particular, we report a significant gap in research with the occupants of housing created through PDRs. A descriptive or qualitative study would help evaluate the impact of PDR on users' health, wellbeing and contribute to understanding on the impact on inequalities.

#### Implications for policymakers

The findings from our review would be relevant to policymakers from any country where there is an ideological and practical focus on harnessing the opportunities of planning deregulation and promotion of brownfield redevelopment. Such an approach may be more attractive post-COVID-19 particularly for those counties struggling to recover from slowing economies and housebuilding activity, making this paper particularly timely.

PDRs have the potential to be beneficial in a number of ways. First, by making the planning system less onerous for developers and more efficient, thereby making administrative savings. Second, reusing buildings and wider brownfield redevelopment is likely to have a lower carbon footprint and in more sustainable and accessible locations in urban centres or close to transit hubs, which is beneficial given the climate emergency and increasing understanding of burdens of disease linked to the environment. However, in practice this form of deregulation, without the necessary checks and balances, seems to be delivering variable and often poor-quality housing with detrimental health and wellbeing implications.

There are potential solutions which would continue to enable the change of use of buildings to take place with a more efficient planning process, whilst also ensuring the homes created are supportive of good health. As stated earlier it is not known whether without PDRs, these developments would not have taken place or whether they would have been developed through full planning process anyway with the normal protections and contributions. Ideas include<sup>29</sup>;

- (1) Moving specific requirements into building regulations, such as dwelling size or amenity space - This would help mitigate the negative health impacts from small spaces and pressure on local facilities and amenities, but not the numerous others negative impacts found in this review. Additionally, size does not always relate to quality and this may be an over simplistic mechanism to reduce risks from housing created through PDRs on the occupant's heath.
- (2) Applying voluntary design guidance or a certification processes to Prior Approval applications Similar voluntary schemes already exist, such as Fitwel<sup>44</sup> and the international WELL building standard<sup>45</sup>, which provide a global certification process and overview of best practices in design and construction to support health and wellbeing through buildings. This option could help act as an incentive to developers to produce higher quality housing through PDRs than the minimum required, as well as improve monitoring by providing data on the quality of developments. However, as a voluntary process it its likely many PDRs conversions would continue to have features detrimental to health. For example, WELL was launched in 2014 but as of June 2020 only 4,290 projects across 62 countries have used it<sup>45</sup>. Also, voluntary schemes can have shorter longevity, such as the Code for Sustainable Homes. A voluntary standard for the sustainable design and construction of new homes in the UK. Introduced in 2006, and often cited as a mandatory requirement by planners and commissioners of social housing, was dropped in 2014<sup>46</sup>.
- (3) Requiring application of local standards as part of the PDRs process This would enable both the theoretical benefits of re-using buildings, with the accountability, scrutiny and safeguard the planning process provides. It would also help mitigate a much wider range of ways that PDRs conversion negatively impact on health. However, the more prescribed PDRs become the more we can question the value of the approach compared to a full planning application. For example in other parts of

the UK nations such as Wales and Scotland, devolved planning responsibilities allow the respective governments to set out planning rules for PDRs.

With people spending significantly more time in their homes and the surrounding areas due to the COVID-19 pandemic, the differential effects from good and poor quality homes, such as those produced through PDRs are likely to be exacerbated. However, the recovery period from COVID-19 also provides opportunities. For example in the UK, alongside legislative changes further expanding PDRs,<sup>10</sup> further changes require PDRs to have access to natural daylight, and the Planning for the Future White Paper for England proposes a greater focus on design and placemaking which can help ensure decision-makers consider wellbeing through good design<sup>38</sup>.

#### **Conclusion**

This literature synthesis provides the first overview of the evidence for associations between housing created through PDRs and health. The review identifies both a greater number of papers and a greater number of ways that PDRs conversions have negative compared to positive health impacts. This includes producing housing which is small, has little amenity space, is of poor design and is not mixed or necessarily aligned with housing need. PDR conversions can be in inappropriate locations with poor connections to facilitates and the natural environment, loose developer contributions which would usually be used to improve the local area and risk causing\_neighbourhood tensions and conflict. Evidence links these building and neighbourhood features to a range of negative health impacts, including risk of cardiovascular disease, type 2 diabetes, obesity, respiratory disease, excess winter deaths, musculoskeletal conditions, cancer, mental health problems, lower wellbeing and premature death.

The paper also sets out several ways that PDRs conversions may contribute to widening health inequalities, through poorer quality PDR conversions taking place in deprived area, greater uptake amongst vulnerable groups and reducing affordable housing in areas which already have high housing costs. The implications for planning practice to consider these health impacts could be promoting the greater use of tools such as health impact assessments, if undertaking such an assessment does not detract from the purpose of PDR which is to streamline and expedite decision-making on certain developments.

The review reveals a significant research gap, with very little research with the occupants of housing created through PDRs and therefore limited evidence on primary health outcomes. The findings provide an indication of the impacts of deregulating a planning system without explicitly considering health and wellbeing, and warrant further assessment by researchers and policy makers of how to enable the change of a buildings use to residential to take place. whilst ensuring that the homes created are supportive of good health.

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# **Appendices**

#### Appendix A: Example search protocol for Medline

Database(s): **Ovid MEDLINE(R) and Epub Ahead of Print, In-Process & Other Non-Indexed Citations, Daily and Versions(R)** 1946 to May 14, 2020 Search Strategy:

#	Searches	Results
1	exp "Quality of Life"/	191942
2	quality of life.tw.	272256
3	QoL.tw.	37469
4	health impact*.tw.	12519
5	health effect*.tw.	28336
6	well being.tw.	74051
7	wellbeing.tw.	15265
8	health equi*.tw.	2839
9	exp Health Impact Assessment/	664
10	health impact assessment*.tw.	822
11	exp Accidents, Home/ or exp Accidents/	188187
12	accident*.tw.	111269
13	exp Hypersensitivity/	342039
14	hypersensitiv*.tw.	73076
15	allerg*.tw.	184308
16	exp Asthma/	127017
17	asthma.tw.	144155
18	exp Blood Pressure/	288736
19	blood pressure.tw.	290613
20	exp Hypertension/	252568
21	hypertension.tw.	374964
22	exp Body Mass Index/	125225
23	body mass index.tw.	179777
24	BMI.tw.	140717
25	exp Neoplasms/	3317282
26	neoplasm*.tw.	134105
27	cancer*.tw.	1744717
28	exp Cardiovascular Diseases/	2364063
29	cardiovascular disease*.tw.	166079

30	CVD.tw.	34920
31	exp Lung Diseases/	877276
32	exp Pulmonary Disease, Chronic Obstructive/	55061
33	lung disease*.tw.	51105
34	chronic obstructive pulmonary disease*.tw.	47337
35	COPD.tw.	44676
36	exp Death/	147550
37	death*.tw.	802669
38	dying.tw.	34156
39	exp Dehydration/	13221
40	dehydration.tw.	30214
41	dehydrat*.tw.	42397
42	exp Depression/	117214
43	depressi*.tw.	379659
44	exp Diabetes Mellitus/	421262
45	diabet*.tw.	620004
46	exp Diet/	277469
47	diet*.tw.	554788
48	exp Disabled Persons/	64717
49	disabilit*.tw.	182847
50	exp Disease/	182972
51	diseas*.tw.	3685066
52	disorder*.tw.	1103934
53	emot* health*.tw.	2220
54	exp Accidental Falls/	23894
55	fall*.tw.	205924
56	exp Fires/	9773
57	fire*.tw.	45592
58	illness*.tw.	257788
59	exp Accident Prevention/	85885
60	accident prevent*.tw.	976
61	injury prevent*.tw.	7220
62	exp Social Isolation/	17264
63	social isolat*.tw.	6828
64	exp Mental Health/	37509

65	mental health*.tw.	140153
66	exp Musculoskeletal Diseases/ or exp Musculoskeletal Pain/	1076289
67	musculoskeletal*.tw.	49093
68	MSK.tw.	1133
69	exp Obesity/	210124
70	obes*.tw.	294109
71	exp Exercise/	192578
72	exercise*.tw.	286140
73	physical activit*.tw.	109172
74	exp Respiratory Tract Infections/	356453
75	exp Respiratory Tract Diseases/	1331660
76	respiratory.tw.	423072
77	exp Safety/	79195
78	safety.tw.	494364
79	exp Sedentary Behavior/	9095
80	sedentar*.tw.	31162
81	exp Sleep Wake Disorders/	88447
82	sleep wake disorder*.tw.	290
83	sleep disturb*.tw.	15042
84	exp Drug Misuse/	13258
85	drug misus*.tw.	1593
86	drug abus*.tw.	19922
87	substance misus*.tw.	2451
88	substance abus*.tw.	25390
89	exp Suicide/	62306
90	exp Self-Injurious Behavior/	70042
91	suicid*.tw.	76257
92	self injur*.tw.	4580
93	self harm*.tw.	5588
94	exp Violence/ or exp Domestic Violence/ or exp Intimate Partner Violence/	94006
95	violen*.tw.	58252
96	or/1-95	13566388
97	exp United Kingdom/	362763
98	exp England/	105873
99	united kingdom.tw.	36906

100	great britain.tw.	7607
101	england.tw.	49310
102	or/97-101	403649
103	"change of use".tw.	931
104	exp Housing/	32549
105	housing.tw.	28210
106	planning permi*.tw.	21
107	building conver*.tw.	11
108	high rise.tw.	539
109	hous* qualit*.tw.	405
110	permitted develop*.tw.	88
111	PDR.tw.	4351
112	or/103-111	57740
113	96 and 102 and 112	1261
114	limit 113 to (english language and humans and yr="2013 - 2021")	276

# Appendix B: Summary of included literature and their findings

Literature item	Grey or academic literature	Type of literature	Details	Country	Type of change of use	C	Qual	lity A	Арр	orais	al (A	٩AC	ODS)	Primary outcome			
						Α	A	C	: (	0	D	S	Total	Health or wellbeing	Building	Neighbourhood	Exposure
Butter, 2013 <sup>32</sup>	Grey	Expert opinion	RTPI	England	Not specific	Y	N	N	1	Y	Y	Y	4		Poor quality	Neighbourhood conflict	
Shaw & Blackie, 2013 <sup>47</sup>	Grey	Expert opinion	Mixed experts	England	Not specific	Y	N	N	1 1	N	Y	N	2			Isolated developments, economic costs where employment sites are converted, social costs if shops, etc are converted, cannot control if there is appropriate public transport and social infrastructure, detrimental to high streets	
Ferm & Jones, 2016 <sup>48</sup>	Grey	Expert opinion	Academic	England	Not specific	Y	N	N	1	N	Y	N	2			Loss of affordable homes	
Muldoon- Smith & Greenhalgh, 2016 <sup>33</sup>	Academic	Qualitative - Interviews, literature review	Semi structured interviews, literature review	England	Office to residential	Y	Y	N	1	Y	Y	Y	5		Poor quality	Unable to get contributions, compounds inflated rents, lack of appropriate infrastructure	
Holman, Mossa & Pani, 2017 <sup>41</sup>	Academic	Qualitative - Document analysis, interviews, field observations, expert opinion	Expert roundtables, document analysis, interviews field observations	England	Office to residential	Y	Y	Y		Y	Y	Y	6			Loss of employment land, loss of developer contributions, no support for local public transport or schools, less affordable housing	
Baker & Parker, 2018 <sup>42</sup>	Grey	Expert opinion	ТСРА	England	Agricultural to residential	Y	N	Y		N	Y	Y	4			Loss of fees/ developer contributions, affordability	

Bibby, et al. 2018 <sup>20</sup>	Academic	Qualitative - Cost benefit analysis	Cost benefit analysis	England	Not specific	Y	Y	Y	)	Y Y	Y		6			Loss of CIL, S106, planning application fees depending on type of PDRs. Less mixed uses (decline of business property stock). Some include renewable energy schemes and installation of charging points for electric vehicles	
Remoy & Street, 2018 <sup>35</sup>	Grey	Report	Policy comparison	England, Netherlan ds	Office to residential	Y	Y	Y	١	YY	Y	1	6		Poor quality, low light, space and ventilation	Unaffordability, far from facilities like schools, healthcare, transport, supermarkets, mix of residential and commercial is difficult	
Clifford, et al. 2018a <sup>34</sup>	Academic	Mixed methods - Case studies, interviews, cost benefit analysis	Combines Bibby et al. 2018 and Clifford et al. 2018, with an overarching synthesis	England (comparis on to Scotland and Netherlan ds)	Not specific	Y	Y	Y		YY	Y	1	6	Quality of life	Overall quality, no amenity space, no space standards	Loss of financial contributions, no supporting infrastructure, poor mix of accommodation, mainly goes to students, rural residential developments not sustainable and add to road traffic	
Clifford, et al. 2018b <sup>14</sup>	Academic	Quantitative - Case studies, interviews	Qualitative, 5 case study areas, 2 comparison areas, 568 site visits, 30 stakeholder interviews including 2 residents)	England (Scotland and Netherlan ds comparis on)	Not specific	Y	Y	Y		ÝÝ	Y	1	6		Quality, crowded, unsafe, noisy, poor sound insulation, few windows, not affordable, no garden, had to cover shop windows with boxes	No outdoor space, children playing in carpark, loss of developer contributions, loss of local employment risks high street, many SMEs and arts businesses get displaced, brothel in building	Noise, poorly maintained, no privacy
APSE and TCPA, 2019 <sup>26</sup>	Academic	Mixed methods - Policy review, case studies, survey, expert opinion	Desk based policy review, five case studies, online survey, expert roundtable	UK	Not specific	Y	Y	N		YY	Y	1	5	Reduced general health and wellbeing, quality of life, vulnerable people are likely to be disproportionatel y negatively affected	Poor design and quality of development, lack of space or garden, poor storage, poor energy performance so higher running costs, poor lighting and ventilation, not many fire safety features, difficult to adapt	Poor location of housing, low street connectivity, not compact, uninviting to walk, traffic, poor public transport connections, lack of climate resilience measures, quote about outdoor space, low rents and access to amenities and less affordable housing, negative impact on local economy	Poor light, noisy, risk of homelessnes s, need flood resilience, low safety
RIBA, 2019 <sup>49</sup>	Grey	Expert opinion	President RIBA	England	Not specific	Y	N	N	)	Y Y	Y	(	4		Little space		
Smith, 2019 <sup>37</sup>	Grey	Expert opinion	TCPA policy manager	England	Not specific	Y	N	N	٩	N Y	Y	1	3	General health	Poor quality, small, no windows	Low affordable homes, impacts economy, less developer contributions, isolated industrial estates no access to services, open space, green space, public transport	

Shelter, 2019 <sup>50</sup>	Grey	Report	Briefing	England	Not specific	Y	N	N	N	Y	Y	Y	5	Health and safety problems	Small, low quality, not many fire safety features, hazards, high running costs	No social or affordable homes, lack of diversity in tenancy, doesn't provide for specific groups, poor street connectivity, inappropriate locations, risks neighbourhood conflict	Homelessnes s, in areas of flooding risk, low safety
Clifford, et al. 2019 <sup>39</sup>	Academic	Mixed methods - Case studies	30 case studies (desktop, and site visits)	England	Office to residential and 1 light industrial to residential	Y	Y	Y	Y	Y	Y	Y	6	Mental health, wellbeing	Compliance with national space standards, provision of amenity space, access to daylight, often no garden private or shared, high degree of overlooking, poor security features	Mixture of unit types, location in relation to green or open space (often not within 250m), near waste or industrial units, no residential areas within 10 min walk, poor street connectivity, some near busy highways, minimal surrounding greenery. Some well-located to access the shops, services and public transport available in the area, risks neighbourhood conflict	Little light or privacy
Grimwood & Barton, 2019 <sup>24</sup>	Grey	Report	Briefing - house of commons	England	Not specific	Y	N	Y	Y	Y	Y	Y	5	Used for most vulnerable families	Poor quality of schemes, possibly cramped	Loss of office space, lack of developer contributions for affordable housing or local amenities. Helps regenerate area by using empty spaces	
East Sussex County Council, 2020 <sup>36</sup>	Grey	Report	JSNA, East Sussex	England	Not specific	N	Y	N	N	Y	Y	N	4			Loss of CIL, S106	
TCPA, 2020 <sup>10</sup>	Grey	Report	Briefing	England	Not specific	Y	Y	P	N	N	Y	Y	4	Housing most vulnerable in substandard conditions, damages health and life chances, oppressive to health and wellbeing	Poor design, recreation and play space cannot be considered, windowless, unsafe, tiny	Unsuitable locations, excludes possibility of developer contributions	
MHCLG, 2020 <sup>29</sup>	Grey	Report	Planning review - Building Better, Building Beautiful commission	England	Not specific	Y	N	N	N	Y	Y	N	3		No space standards, low quality slums, lack of private of communal space, no windows	Loss of affordable housing and developer contributions, not near public transport, possible impacts on neighbours	
The Developer, 2020 <sup>18</sup>	Grey	Documentary	Interviews including with a resident, statistics, case studies	England	Not specific	Y	N	N	N	Y	Y	Y	4	Houses vulnerable families, some residents have addiction problems, many fights	No space, 13m <sup>2,</sup> flats, whole flats without a window, sub- standard housing, very few have outdoor space, often sited in car parks, do not have adequate	Interrupts walking and cycling routes, good facilities close by, access to country side, no developer contributions eg. to schools, bus services, or GPs, moves vulnerable people so can increase pressure on	Residents feel unsafe, can account for flooding risk through prior approval, no privacy, noisy

														light or ventilation, no play facilities, drug gangs operating from conversions, noise complaints, many single aspect so problems with overheating, communal areas not clean, old buildings so often low energy efficiency and more expensive to run, have used double glazing	local authorities, dislocates communities and stops democratic process, no consultation or engagement with community, can help to provide social housing	
Clifford et al, 2020 <sup>25</sup>	Academic	Mixed methods - Case studies, interviews	639 building visits over 11 local planning authorities, 11 interviews with development professionals	England	Not specific	Y	Y	Y	Y	Y	Ý	6	PDRs conversions create worse quality residential environments than planning permission conversions in relation to a number of factors widely linked to health, wellbeing and quality of life of future occupiers. Often used as temporary accommodation, may house vulnerable people	concerning quality, small space standards, can lead to overcrowding, poor layouts, lots with single aspect windows, poor access to daylight, lack of amenity space, concerns over insulation and energy performance, does not correspond to housing need, e.g. lots of studio flats	loss of employment space, problematic locations such as industrial estates, examples of development in positioned in an island formed by A roads and feeling very cut off, poor amenity access, do not create mixed communities, frequent concerns about loss of S106	Poor light