Public health engagement in alcohol licensing in England and Scotland: the ExILEnS mixed-method, natural experiment evaluation

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Abstract

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Background: International systematic reviews suggest an association between alcohol availability and increased alcohol-related harms. Alcohol availability is regulated through separate locally administered licensing systems in England and Scotland, in which local public health teams have a statutory role. The system in Scotland includes a public health objective for licensing. Public health teams engage to varying degrees in licensing matters but no previous study has sought to objectively characterise and measure their activity, examine their effectiveness, or compare practices between Scotland and England.

Aim: To critically assess the impact and mechanisms of impact of public health team engagement in alcohol premises licensing on alcohol-related harms in England and Scotland.

Methods: We recruited 39 diverse public health teams in England (n = 27) and Scotland (n = 12). Public health teams more active in licensing were recruited first and then matched to lower-activity public health teams. Using structured interviews (n = 66), documentation analysis, and expert consultation, we developed and applied the Public Health Engagement In Alcohol Licensing (PHIAL) measure to quantify six-monthly activity levels from 2012 to 2019. Time series of PHIAL scores, and health and crime outcomes for each area, were analysed using multivariable negative binomial mixed-effects models to assess correlations between outcome and exposure, with 18-month average PHIAL score as the primary exposure metric. In-depth interviews (n = 53) and a workshop (n = 10) explored public health team approaches and potential mechanisms of impact of alcohol availability interventions with public health team members and licensing stakeholders (local authority licensing officers, managers and lawyers/clerks, police staff with a licensing remit, local elected representatives).

Findings: Nineteen public health team activity types were assessed in six categories: (1) staffing; (2) reviewing and (3) responding to licence applications; (4) data usage; (5) influencing licensing stakeholders/policy; and (6) public involvement. Usage and intensity of activities and overall approaches varied within and between areas over time, including between Scotland and England. The latter variation could be explained by legal, structural and philosophical differences, including Scotland's public health objective. This objective was felt to legitimise public health considerations and the use of public health data within licensing. Quantitative analysis showed no clear evidence of association between level of public health team activity and the health or crime outcomes examined, using the primary exposure or other metrics (neither change in, nor cumulative, PHIAL scores). Qualitative data suggested that public health team input was valued by many licensing stakeholders, and that alcohol availability may lead to harms by affecting the accessibility, visibility and norms of alcohol consumption, but that the licensing systems have limited power to act in the interests of public health.

Conclusions: This study provides no evidence that public health team engagement in local licensing matters was associated with measurable downstream reductions in crime or health harms, in the short term, or over a 7-year follow-up period. The extensive qualitative data suggest that public health team engagement is valued and appears to be slowly reorienting the licensing system to better address health (and other) harms, especially in Scotland, but this will take time. A rise in home drinking, alcohol deliveries, and the inherent inability of the licensing system to reduce – or in the case of online sales, to contain – availability, may explain the null findings and will continue to limit the potential of these licensing systems to address alcohol-related harms.

Future work: Further analysis could consider the relative success of different public health team approaches in terms of changing alcohol availability and retailing. A key gap relates to the nature and impact of online availability on alcohol consumption, harms and inequalities, alongside development and study of relevant policy options. A national approach to licensing data and oversight would greatly facilitate future studies and public health input to licensing.

Limitations: Our interview data and therefore PHIAL scores may be limited by recall bias where documentary evidence of public health activity was not available, and by possible variability in grading of such activity, though steps were taken to minimise both. The analyses would have benefited from additional data on licensing policies and environmental changes that might have affected availability or harms in the study areas.

Study registration: The study was registered with the Research Registry (researchregistry6162) on 26 October 2020. The study protocol was published in *BMC Medical Research Methodology* on 6 November 2018.

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Plain language summary

Research finds that when alcohol is more easily available, because more places sell alcohol or have longer opening hours, people tend to drink more and harms tend to increase. In England and Scotland, 'Licensing Committees' in local governments have power over which venues are given a licence to sell alcohol legally. They make decisions based on local policy and on licensing goals set out in law. Licensing laws are slightly different in both nations, and health representatives are often involved in trying to influence local licensing decisions and policies, to reduce alcohol-related harms.

We aimed to find out what public health teams have done to influence alcohol licensing and whether their actions have affected alcohol-related harms. We recruited 39 public health teams (Scotland: 12; England: 27) and measured how active they were on licensing matters. We gathered detailed information (from interviews and papers) about their actions from 2012 to 2019, and asked them and others involved in licensing (including police, and local authority licensing teams and lawyers) about how their efforts might make a difference to harms. We gathered local data on alcohol-related health harms and crimes during 2009–19. We analysed whether any changes in these harms were related to the level of public health team activity, and explored differences between Scotland and England.

Public health teams across Scotland and England took varied approaches to engaging in alcohol licensing, and their work was often welcomed by others working in the licensing system. However, we found no clear relationship between the level of licensing-related activity that public health teams engaged in and the levels of alcohol-related health harms or crime. This may be because their actions make only a modest difference to licensing decisions, or because it may take longer than the study period for them to have a sizeable impact. Reducing alcohol-related harms through licensing may require strengthening national licensing laws and the powers of public health teams, including by addressing online sales and home deliveries.

1 Introduction

This study focused on the involvement of public health practitioners in local alcohol licensing systems in England and Scotland. We firstly describe prior evidence on the relationship between alcohol availability and alcohol-related harms. We then summarise how current licensing systems regulate availability in both nations, including relevant recent studies. We describe current evidence on public health involvement in the UK licensing system, and the gaps in evidence that this study was intended to address.

Details of methods and findings are reported fully in our other outputs and planned outputs (see *Table 1*) and are summarised in Section 2.

TABLE 1 List of outputs from the ExILEnS study

1. Niamh Fitzgerald, Matt Egan, Frank de Vocht, Colin Angus, James Nicholls, Niamh Shortt, Tim Nichols, Nason Maani Hessari, Cheryl McQuire, Richard Purves, Nathan Critchlow, Andrea Mohan, Laura Mahon, Colin Sumpter & Linda Bauld. Exploring the impact of public health teams on alcohol premises licensing in England and Scotland (ExILEnS): protocol for a mixed methods natural experiment evaluation. *BMC Med Res Methodol* 2018;**18**:123. https://doi.org/10.1186/s12874-018-0573-z[1]
2. Richard Purves, Andrea Mohan, Rachel O'Donnell, Matt Egan, Nason Maani & Niamh Fitzgerald, on behalf of the ExILEnS Consortium. Demonstrating diverse public health team activity to influence alcohol premises licensing: Qualitative findings from the ExILEnS study. Under review. *Public Health Research*.
3. Niamh Fitzgerald, Andrea Mohan, Richard Purves, Rachel O'Donnell, Matt Egan, James Nicholls, Nason Maani, Maria Smolar, Andrew Fraser, Tim Briton & Laura Mahon, on behalf of the ExILEnS Consortium. Factors influencing public health engagement in alcohol licensing in England and Scotland including legal and structural differences: comparative interview analysis. In Press, *Public Health Research*.
4. Niamh Fitzgerald, Andrea Mohan, Nason Maani, Richard Purves, Frank de Vocht, Colin Angus, Madeleine Henney, James Nicholls, Tim Nichols, Gemma Crompton, Laura Mahon, Cheryl McQuire, Niamh Shortt, Linda Bauld & Matt Egan. Measuring how PH stakeholders seek to influence alcohol premises licensing in England and Scotland: the Public Health engagement In Alcohol Licensing (PHIAL) measure. *Journal of Studies on Alcohol and Drugs* (published online 3 October 2022). https://doi.org/10.15288/jsad.22-00020[2]
5. James Nicholls, Rachel O'Donnell, Laura Mahon & Niamh Fitzgerald, on behalf of the ExILEnS Consortium. 'Give us the real tools to do our jobs': views of UK stakeholders on the role of a public health objective for alcohol licensing *Public Health* 211 2022. https://doi.org/10.1016/j.puhe.2022.07.006[3]
6. Rachel O'Donnell, Andrea Mohan, Richard Purves, Nason Maani, Colin Angus, Matt Egan & Niamh Fitzgerald, on behalf of the ExILEnS Consortium. Mechanisms of impact of alcohol availability interventions from the perspective of 63 diverse alcohol licensing stakeholders: a qualitative interview study. *Drugs: Education, Prevention and Policy* 2023. https://doi.org/10.1080/09687637.2023.2205991
7. Frank de Vocht, Cheryl McQuire, Claire Ferraro, Philippa Williams, Madeleine Henney, Colin Angus, Matt Egan, Andrea Mohan, Richard Purves, Nason Maani, Niamh Shortt, Laura Mahon, Gemma Crompton, Rachel O'Donnell, James Nicholls, Linda Bauld & Niamh Fitzgerald. Impact of public health team engagement in alcohol licensing on health and crime outcomes in England and Scotland: A comparative timeseries study between 2012 and 2019. *The Lancet Regional Health – Europe* 2022;**20**:100450 (published online 30 June 2022). https://doi.org/10.1016/j.lanepe.2022.100450[4]
8. Rachel O'Donnell, Andrea Mohan, Richard Purves, Nason Maani, Matt Egan & Niamh Fitzgerald, on behalf of the ExILEnS Consortium. How public health teams navigate their different roles in alcohol premises licensing: ExILEnS multi-stakeholder interview findings (published online August 24 2022). *Public Health Res* 2022. https://doi.org/10.3310/XCUW1239[5]
9. Niamh Fitzgerald, Matt Egan, Rachel O'Donnell, James Nicholls, Laura Mahon, Frank de Vocht, Cheryl McQuire, Colin Angus, Richard Purves, Madeleine Henney, Andrea Mohan, Nason Maani, Niamh Shortt & Linda Bauld. Public health engagement in alcohol licensing in England and Scotland: the ExILEnS mixed-method, natural experiment evaluation (this report)

1.1 Research and policy context including rationale for the study

Alcohol consumption is a major contributor to the preventable burden of disease in the UK and internationally.[6–9] Alcohol contributes to approximately 3 million deaths each year globally, as well as to the disabilities and poor health of millions more, along with adverse social outcomes like crime and violence.[10–13] The UK Office for National Statistics reported 7565 alcohol-specific deaths in the UK in 2019: at that time, the second highest tally since their data time series began in 2001.[14] The COVID-19 crisis appears to have worsened the problem still further. Between January and September 2020 there was a 16.4% increase in registered alcohol-specific deaths compared with the same 9-month period in 2019.[15] Alcohol harms are socially patterned, making alcohol a key driver, and reflection, of health inequalities[16–23] as well as being associated with wider discrimination and social stigmatisation in often diverse and complex ways.[24]

1.1.1 Alcohol availability and harm

Systematic reviews, and reviews of reviews, have concluded that controlling the ease with which alcohol can be obtained can be effective in reducing alcohol-related harms.[25–27] As few territories in the world have a total prohibition on alcohol, most of the evidence on alcohol control relates to interventions that regulate and modify alcohol availability. These 'alcohol availability' interventions take a variety of approaches: for example, the number and proximity of alcohol outlets (physical availability), their hours and days of sale (temporal availability), restricting specific population subgroups from purchasing alcohol (e.g. age restrictions).[28] While governments commonly control alcohol availability around the world, the system, type, degree, and location of control (i.e. local, regional, national, supranational) varies by jurisdiction. There is consistent evidence of an association between increased physical[29,30] and temporal availability[31–33] of alcohol and higher rates of consumption and associated alcohol-related harms, including several UK studies.[34–37] Alcohol outlet density has been shown to be higher in deprived areas in both Scotland and England.[36,38] However, the extent to which increased availability causes alcohol harms in different contexts, and the mechanisms by which effects are exerted, remains unclear, since much of the research is cross-sectional and the validity of measures of the availability of alcohol premises is variable.[37,39–43] A review of 160 studies found that a causal relationship between public health activities, specific local licensing controls, indicators and types of availability and alcohol-related harms is not clear or consistently demonstrated in the literature.[39] The same review noted the difficulty of translating research findings into practice, due both to these limitations and to the lack of clear theories of change. Research into local licensing practitioners' use of evidence suggests a preference for locally relevant evidence over evidence relating to different (international) contexts and interventions.[44] This presents challenges for alcohol availability decisions in the UK, as most of the applicable evidence is from the USA and Australia.[39,45]

1.1.2 Regulation of availability in the context of England and Scotland

In the UK, age restrictions, physical availability and temporal availability controls are largely administered through licensing systems at the local government (LG) level, although mandatory and discretionary powers of LGs are specified by national legislation.[46,47] Although the context of alcohol consumption is broadly similar across the UK, three different legislative and administrative systems exist for controlling alcohol availability in the UK's constituent nations: one in England/Wales, one in Scotland, and one in Northern Ireland.[48,49] In all three, as in many other jurisdictions worldwide, the sale of alcohol requires a premises licence (a permit). In Northern Ireland, such licences are issued by local courts, whereas both in England/Wales and in Scotland, they are issued by LG bodies known as Licensing Committees or Licensing Boards, respectively.[50,51]

Major changes to the licensing systems were introduced in legislation in England and Wales in 2003,[50] and in Scotland in 2005.[51] The powers and processes defined through these Licensing Acts continue to be developed through guidance and legislation – for examples, see Fitzgerald *et al.*,[49] Home Office,[52] Scottish Parliament[53] and UK Parliament.[54] In this new era of alcohol licensing, decisions to grant, amend or refuse licence applications are guided by statutory 'licensing objectives': preventing crime

and disorder, promoting public safety, preventing public nuisance, protecting children (and young people) from harm and, in Scotland only, protecting and improving public health. Licensing Committees/Boards, made up of elected councillors, are responsible for licensing decisions in their local area. The form and powers of these committees differ somewhat between England and Scotland.[49] However, it is worth noting that, once granted, licences cannot be rescinded solely to reduce availability and are rarely revoked (normally only in the case of premises that are found to be in serious breach of the law or licensing objectives). Applications for alcohol licences must indicate whether they are seeking a licence for an outlet to sell alcohol for consumption on site (on-trade premises or 'on-licences') or away from the premises (off-trade premises or 'off-licences'), and must also provide other information on their proposed hours of operation, type of business and so on. In normal circumstances, the default assumption is that a licence application will be accepted unless a convincing case is made that it undermines one or more of the licensing objectives. Much licensing activity focuses on establishing, and ensuring adherence to, specific conditions placed on individual licences.

Under the current legislation, specified local bodies must receive notice of alcohol premise licence applications so that they can choose to review the application in the context of the above objectives. They may then seek to have applications amended (through a representation) or declined (through an objection). These 'responsible authorities' (England/Wales) or 'statutory consultees' (SCs; Scotland) include police, health and other public sector bodies. English health authorities became classed as responsible authorities in April 2012.[55,56] In 2013, many public health functions in England were transferred from the NHS to LGs.[57] As a result, LG-based public health practitioners became involved in alcohol licensing with a statutory role as responsible authorities. In Scotland, local NHS Boards (responsible for administering the NHS in the area) became SCs in October 2011.[58] In practice, health input to licensing in Scotland involves a diverse group of health practitioners including staff within NHS Board public health teams/departments, NHS health improvement departments, Health and Social Care Partnerships (which are joint NHS–LG bodies), or Alcohol and Drug Partnerships (which can be NHS or LG-based). For ease of writing, we use the term 'public health team' (PHT) to describe any combination of these groups in Scotland, as well as public health teams in English LG.[1]

Besides considering individual applications, local licensing authorities must also produce a 'Statement of Licensing Policy' (SLP) every 5 years and are required to consult publicly on their proposed policy.[59] The SLP should outline the authority's strategic approach to promoting the licensing objectives. In Scotland, SLPs must include a statement on 'overprovision'; that is, whether there are areas where the number or density of outlets, or of a particular type of outlet, is deemed excessive for any reason.[51,53] A licence application may be refused in Scotland on grounds of overprovision alone. This overprovision legislation does not apply to England. However, English licensing authorities possess a discretionary power to create 'Cumulative Impact Zones'[54] (CIZs) [originally introduced in guidance as 'cumulative impact policies' (CIPs)/'cumulative impact areas']. In both CIZs and overprovision areas, the burden of proof regarding the licensing objectives is reversed: instead of assuming applicants will be granted a licence unless it is successfully argued that to do so would contravene one or more of the licensing objectives, licence applications are expected to be refused unless the *applicant* can demonstrate that granting the licence would not undermine the objectives. Hence, overprovision areas and CIZs provide some means of containing alcohol area-level outlet density, at least with regard to new licence applications.

Licensing authorities also have some control over temporal availability. The hours of sale for a given premises are determined by the conditions of the licence granted by the local licensing body in both nations. In Scotland, additional national statutory restrictions mean that alcohol cannot be sold for off-premises consumption (i.e. to take away) outside the hours of 10.00 and 22.00, and include a statutory presumption against 24-hour licences for on-trade premises.[51] In England, there are no statutory restrictions on hours of sale.[52] Since 2013, discretionary powers have been available to English licensing authorities to enforce area-wide prohibition of alcohol sales between midnight and 06.00, but these 'Early Morning Alcohol Restriction Orders' have never been implemented.[60] Stipulations relating to hours of sale have sometimes been included in what are now known as CIZs, and trading hours can also be

reviewed in overprovision assessments in Scotland. English licensing authorities also have discretionary powers under the Police Reform and Social Responsibility Act 2011 to introduce a scheme known as the 'Late Night Levy (LNL)'. LNL schemes allow licensing authorities to collect funds from alcohol outlets operating in the period from midnight to 06.00, for the specific purpose of contributing to the costs of policing the night-time economy.[61] Such schemes may be hypothesised to deter some outlets from late-night alcohol sales – to avoid paying the levy – but no robust impact evaluation of the LNL has been published. Only 10 licensing authorities in England currently operate an LNL, while two others previously operated LNLs that subsequently ceased.[62]

1.1.3 Studies of alcohol licensing in the UK

Recent studies have found that local authorities in England with a more active licensing regime (defined as those with a CIP in place, and which had declined at least one licence application) experienced a 5% reduction in alcohol-related hospital admissions rates from 2009 to 2015 (or 2% annually),[63] as well as a 4–6% reduction in public nuisance and alcohol-related crime rates,[64] over and above what would have been expected had there been a less active licensing regime (as defined above) in place. The English literature also includes research into specific aspects of local licensing policy. The implementation of CIPs, for example, has been found to differ greatly from one area to another, but all focused on influencing the *types* of premises that would be awarded new licences (typically favouring restaurants, cafes and arts venues, while at times discouraging traditional pubs or nightclubs).[65,66] A comparative case study found some evidence of PHTs advocating the rejection of all new licence applications in CIP areas, but even licensing authorities that appeared to take a hard line enforcing CIPs still accepted applications relating to premises perceived by the Licensing Committee to be compatible with licensing objectives.[65] Thus, CIPs are unlikely to contain overall outlet density but may impact on density of outlets of specific types. A quantitative evaluation of one local authority's CIP in London found moderate reductions in crime and no impact on ambulance call-outs.[67] A study using novel quantitative methods to assess the impact of specific licensing decisions or activities found some evidence that closure of a nightclub (after a series of problems prompted a Licensing Committee review) and, in a separate case, local policy guidance led to small improvements in social outcomes.[68] LNLs remain under-researched, although a qualitative evaluation is currently going through peer review. A House of Lords Select Committee postlegislative assessment of the 2003 Act argued for a range of reforms, including the merger of the licensing and planning functions within local authorities.[69] A review of the English Licensing Act by the Institute of Alcohol Studies identified some potential for health and social benefits but put forward the view that the Act had been interpreted to the advantage of the licensed trade and reform was necessary.[47]

In Scotland, research by Alcohol Focus Scotland (AFS) tracks the development of SLPs in Scotland from 2013 to 2018 to identify emerging trends in licensing approaches, and the extent to which policies meet legal requirements and incorporate identified good practice.[70] The most recent review found that many of the policies showed noticeable positive progress in the consideration and interpretation of evidence and in approaches to promoting the licensing objectives. Notably, it found that Licensing Boards were seeking to respond to the trend towards purchasing alcohol from off-sales premises for consumption at home, and an increased awareness of alcohol-related harms occurring in the private as well as the public sphere. The review highlights a new approach by the Licensing Board in Glasgow, which explicitly links the availability of alcohol from off-sales premises with high levels of health harm, and states that the health objective can be used as grounds for refusal even in the absence of an overprovision policy. The review suggests that this may be a more effective way of addressing concerns about the impact of availability on health harm because it does not require data on alcohol harm to be linked directly to licensed premises at the application stage, potentially avoiding the need to demonstrate causality, which remains a challenge in the use of overprovision policies in Scotland. This is important, because the review also finds that differing approaches to the assessment of overprovision persist due to varying interpretations of what is required by law in this regard, leading to uncertainty in practice.

1.1.4 Public health team engagement in alcohol premises licensing

Following the enhancement of their statutory roles, many professionals with an interest in reducing alcohol-related harms increased their engagement with premises licensing, often supported by national bodies such as Public Health England (PHE) and AFS, among others.[71–74] However, much of the evidence relating to their role within local licensing is qualitative, is focused on a small number of areas, and does not seek to systematically identify public health activity nor to robustly quantify health or social impacts.[27] No single study has collected data in both Scotland and England.

At the time when English public health functions transferred to LG, Martineau *et al*.[75] hypothesised that the absence of a public health objective for alcohol licensing in English legislation could undermine PHTs' efforts to influence local licensing systems. Subsequent mixed-methods research into licensing systems in London supported this view, finding that public health professionals felt a lack of status within their local licensing system. Some felt confident enough to make representations on licence applications independently, but others sought to strengthen their position by working with other responsible authorities, providing data to support decision-making and/or seeking to influence SLPs.[76,77] Some PHTs attempted to work around the lack of a public health objective by focusing on social harms that have public health relevance.[76,77] A separate qualitative interview and observation study focused on public health involvement in licensing in six London boroughs also found varying perceptions of public health success and reported practices, and noted that some public health actors felt that working in the political environment of LG required a change in their professional identity away from a medical focus.[78] A comparative case study of two urban local authorities in the north-east of England found that economic, organisational and personal factors influenced their licensing authorities' different approaches to public health and alcohol harm reduction.[79]

Early research in Scotland found that licensing stakeholders struggled to understand the public health objective and how to operationalise it.[80] Early efforts by public health actors were felt to have achieved mixed results, with some Licensing Boards introducing large-scale overprovision policies and others strongly resisting public health engagement.[72,81–83] While research in England (above) found the lack of a public health objective to be a barrier to public health engagement, Scottish studies have considered its limitations. Fitzgerald *et al*.[81] concluded that, notwithstanding the introduction of the public health objective, there remain significant political and other challenges in orienting local Licensing Boards towards decisions more likely to contain the availability of alcohol in Scotland.

Research into public health involvement in English and Scottish licensing has extended its focus beyond the licensing objectives to look more generally at how PHTs engage with licensing systems. PHTs may, for instance, make representations directly to licensing authorities, provide data in support of a representation by the local police or Trading Standards, respond to consultations on CIPs or, as has been more common in Scotland, take the lead in developing the case for the establishment of overprovision areas.[65,72,82,84] These and other studies found that some PHTs have developed processes for reviewing and responding to licence applications, collated local data sets on outlet density and alcohol-related harms, supported the development of licensing policies, involved local communities, or directly engaged with licence holders.[65,72,82,84,85] In 2018, Fitzgerald *et al*.[85] considered the Scottish licensing system through the lens of democracy and power, concluding that many stakeholders involved – including public health representatives and the wider public – were relatively disempowered in decision-making processes. Research from England similarly found that opportunities for public involvement in local alcohol decision-making were limited, although the study identified some evidence of PHTs engaging with local residents, as well as business owners, to gather evidence to support proposals for CIPs.[86]

1.1.5 The impact of public health engagement in licensing on alcohol-related harms

Despite this activity from public health actors, no studies have yet measured the health and social impacts of public health involvement in the English or Scottish licensing systems. PHTs' decisions to commit resources to involvement in local licensing systems have substantial implications, particularly given the fiscal restrictions experienced by LG over the last decade in both England and Scotland

and the continued financial uncertainty affecting public health and other LG budgets.[87,88] Hence it is important to assess whether PHT involvement in alcohol licensing is likely to be a worthwhile use of resources. Somerville noted that PHTs felt that their potential to achieve improvements in population health through licensing was probably small at best, and recommended further research to ascertain the actual impact of public health involvement on population-level alcohol-related health harms.[78]

Attempts to influence alcohol harms through controls on availability, including PHTs' engagement in licensing, can be viewed as interventions taking place within a wider, interactional system.[89] Conceptualisations of alcohol systems vary but in relation to licensing will involve responsible authorities/SCs (including PHTs), Licensing Committees/Boards, the alcohol trade and the general public. In engaging with the licensing system, and with support from national organisations such as the Office for Health Improvement and Disparities (formerly PHE) and AFS, PHTs have developed a range of approaches.[84,90] These approaches are used to varying degrees of intensity and in varying combinations in local areas across England and Scotland, creating a natural experiment, which has yet to be evaluated.

1.2 Rationale for research

In summary, PHTs in England and Scotland have faced challenges in adapting to working in a complex licensing environment.[47,48,72,78,82,91] While there is quantitative evidence that the alcohol licensing system can impact on health and social outcomes, and qualitative evidence of PHTs engaging with that system, we do not have evidence that PHT engagement makes a difference to health and social outcomes. Further, we lack robust, national-level evidence of impacts, processes and costs relevant to PHT engagement in English and Scottish alcohol licensing systems. We therefore designed this study 'Exploring the Impact of alcohol premises Licensing in England and Scotland' (ExILEnS) to provide novel evidence to inform future licensing policy and related public health practices, nationally and locally.

1.3 Aim and research questions

This study seeks, for the first time, to robustly measure PHT involvement in the alcohol premises licensing system over time and to assess whether greater levels of involvement are associated with reduced alcohol-related harms. Given the complexities referred to above, the study includes a strong focus on processes and mechanisms, as well as assessing health, crime outcomes, and aimed to assess, as far as possible, the costs of such public health engagement.

We aimed:

> *to critically assess the impact and mechanisms of impact of public health stakeholders' engagement in alcohol premises licensing in England and Scotland from April 2012 to March 2019 on alcohol-related harms, by comparing areas with differing types and intensities of engagement.*

Our primary research question was:

i. Does intensive public health engagement in alcohol licensing (PHIAL) reduce alcohol-related harms, in local authorities where such activity exists, compared with authorities with low levels of, or no, such activity?

Secondary research questions were:

ii. What are the costs and cost savings, mechanisms of action, and impact on health inequalities of public health engagement in licensing?

iii. How do engagement, processes, acceptability, and outcomes vary between Scotland (where a public health objective for licensing exists) and England, and from PHTs and licensing perspectives?

This study will contribute to understanding the potential mechanisms of effect of such PHT activity within a complex system and is intended to generate detailed, policy-relevant evidence that can be acted on locally, as well as informing potential national legislative changes and, where appropriate, international licensing regimes.

2 Methods

2.1 Objectives, components and research pathway

The study has four sets of objectives addressed by four corresponding work packages (WPs). The objectives of each WP are outlined below, with a summary of what was done and any aspects that were not fully realised. We further discuss alterations to our original plans in *Appendix 4*, *ExILEnS lessons learned*. *Figure 1* summarises the study as delivered, including the links between WPs, which are further explained below.

2.2 Work package 1: describing and measuring public health team engagement in alcohol premises licensing

The aim of this WP was to describe and explore PHT engagement in alcohol premises licensing, the local licensing regime and related processes in 20 high-activity and 20 low-activity PHTs over the period 2012–8. There were four original objectives as follows:

a. Identify and recruit 40 local PHTs in England and Scotland that vary demographically and in the timing, breadth, components and intensity of their efforts to engage in alcohol premises licensing since April 2012.
b. Establish a clear picture of PHT, licensing and confounding activity in each area from April 2012 to March 2019.
c. Establish measurable indicators of the intensity and costs of PHT engagement in licensing (i.e. the PHIAL measure) and local licensing activity in each area
d. Explore perceived mechanisms of change and real and perceived barriers to PHT engagement in licensing, from the perspectives of public health, licensing, police and other stakeholders.

2.2.1 Recruitment and sampling

We recruited PHTs working in 40 local authority areas (28 in England, 12 in Scotland) by soliciting expressions of interest and making direct approaches. PHTs were deliberately sampled to maximise variation in terms of levels of activity in engaging with alcohol premises licensing, as well as being purposively varied by region and rurality. Twenty higher-activity PHT areas were identified through intelligence gathering and scoping calls and recruited. The identity of recruited areas was passed to the WP2 team, who matched them to candidate lower-activity PHT areas for the WP1 team to assess and approach. Twenty lower-activity PHT areas were successfully recruited in this way. One lower-activity area subsequently dropped out, leaving 39 PHTs in the study. A full profile of participating PHTs is included in *Appendix 2*, reproduced from Fitzgerald *et al.*[2]

2.2.2 Development of the PHIAL measure

The development of the PHIAL measure is described in further detail in Fitzgerald *et al.*[22] The purpose of the measure was to categorise PHT activity and to enable quantification of the level of activity by each PHT over time. Preliminary categories of PHT activity were developed based on prior literature, and guided data collection with PHTs. Relevant activity from April 2012 to March 2019 was identified through structured interviews (n = 66), documentation analysis and follow-up checks, and expert consultation. Extensive internal discussion led to the development of a system of grading that would allow simple categorical assessment of the extent and nature of each activity for each 6-month period, given the nature and depth of typical PHT data. Following several iterations and testing, this included binary ratings (e.g. yes/no), or up to a four-point rating scale (e.g. higher/medium/lower/none) depending on the activity. The resulting grading system was applied to the data from all 39 areas, to generate preliminary grades for each time period, noting any instances where grading was

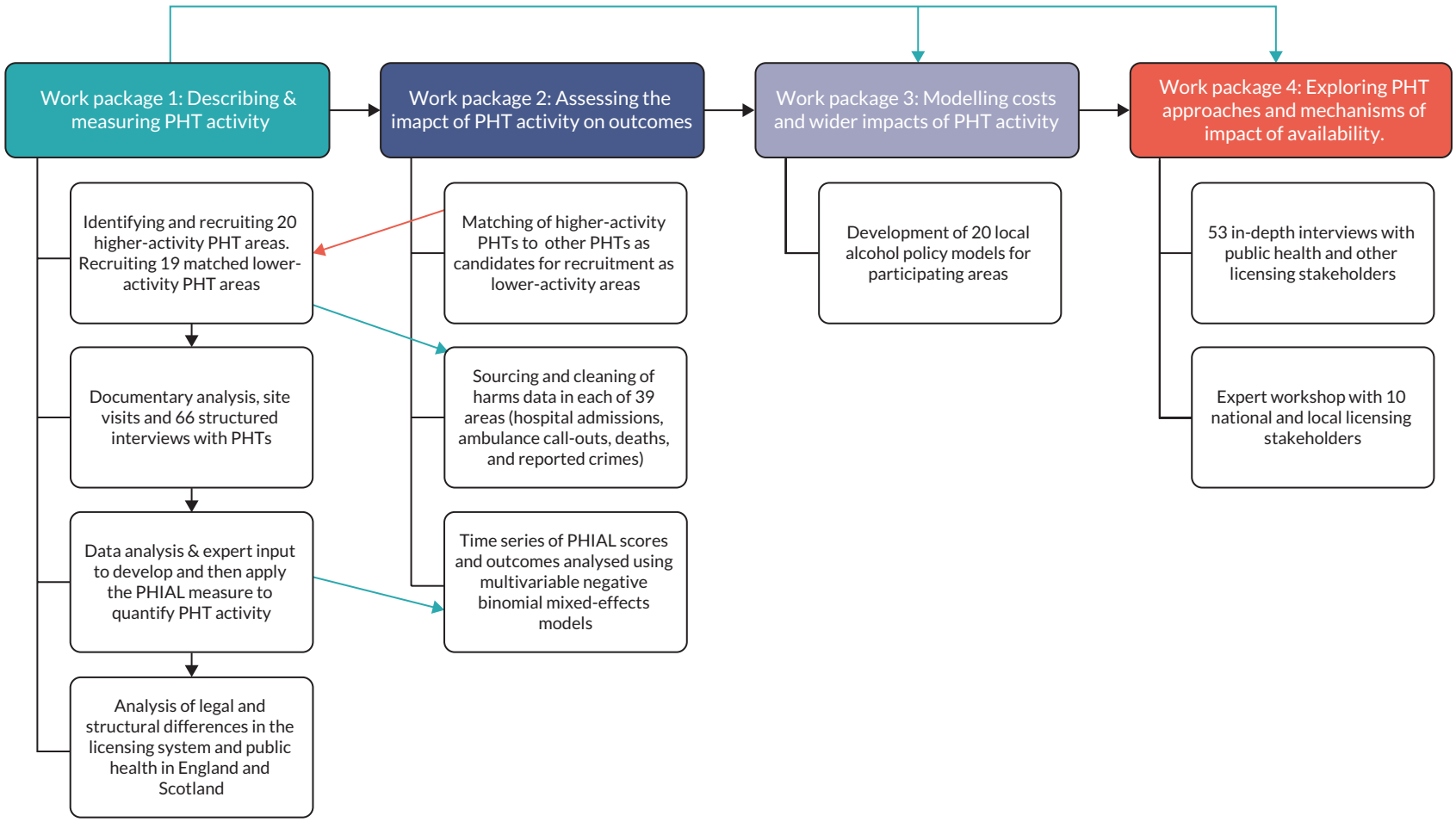

FIGURE 1 Research pathway showing elements of study. The work underpinning WPs 2, 3 and 4 ran in parallel with the first three elements of WP1 (see *Appendix 4*, *ExILEnS lessons learned*).

not straightforward. These informed further team discussions and amendments to finalise grading scales for all activities, along with accompanying guidance notes. Grades were converted to fractional scores out of 1 for each activity type for each time period. With further expert consultation and team discussion, a consensus was reached to categorise each activity as 'high', 'medium' or 'low' according to their likely relative impact on alcohol-related health harms and crime. Weights were applied as a simple multiplier (low = × 1; medium = × 2; high = × 3) to the score for each activity type in each 6-month period. The final measure (abbreviated version in *Table 2*, full version in Table S4 in Fitzgerald *et al.*[2]) therefore enables calculation of a weighted overall intensity score for total relevant activity for each 6-month period.

Relevant PHT activity for the 39 participating areas was assessed for each 6-month period using the final PHIAL measure. Nineteen activity types in six categories were mapped out and described in detail in the measure, which was used to describe the patterns and range of activities used in different areas including comparing timing and intensity of activity for PHTs in Scotland and England. The six categories were as follows and are described in the findings below:

1. staffing for PHT activity to influence local alcohol licensing
2. reviewing alcohol licensing applications
3. influencing and responding to individual licence applications
4. use of routine or bespoke data on alcohol licensing and alcohol-related harms
5. influencing local stakeholders or licensing policy
6. engagement or involvement of the public.

We successfully recruited PHTs that varied demographically, and that varied in the 'timing, breadth, components and intensity of their efforts to engage in alcohol premises licensing'.[2]

2.2.3 Deviation from protocol

We originally sought to gather and quantify the strength of the licensing regime in place in each area (policies and application decisions), and of potential confounding activities (such as PHT-led training for health staff on alcohol brief interventions, or drink-drive initiatives); however, the development of the PHIAL measure proved more onerous than anticipated (see *Appendix 4*, *ExILEnS lessons learned*). While we gathered qualitative data on these aspects, we were unable to quantify them in a way that would have enabled their use in WP2. The only way to gather this kind of licensing data currently is through highly onerous manual collation, comparison and checking, because the data do not exist in any accurate, accessible national data set. This gap in national data was a further barrier to the development of a licensing intensity measure.

2.3 Work package 2: assessing whether public health team engagement in licensing is associated with alcohol-related harms

The aim of this WP was to quantitatively evaluate whether PHT engagement in licensing had a measurable impact on health harms and crime rates, using routine data from April 2009 to March 2019.

There were three original objectives:

a. Match the selected intervention local areas to 20 best possible control areas using a 'genetic matching' algorithm: an extension to propensity score matching which, in addition to the propensity score, also takes into account weights of covariates[92] (to obtain a 'maximum variability' of exposure data set).
b. Collect quantitative data on a set of key alcohol harm and crime outcome indicators on which subsequent evaluation will be based.

TABLE 2 The ExILEnS intensity measure of public health involvement in alcohol premises licensing

Activity category	Activity category definition	Activity subcategory	Activity subcategory definitions	Grading: each scale to be rated for each 6-month period (grades converted to fractional scores out of 1 as indicated in brackets)	Weighting High (×3) Medium (×2) Low (×1)
1. Staffing for PHT activity to influence local alcohol licensing	Staffing of PHT activity to influence local alcohol licensing	**1.1 Senior leadership**	Active involvement and support from senior public health figures	Higher: Director of Public Health (DPH) or equivalent senior leader is actively involved in influencing local alcohol licensing. (1) Lower: DPH or equivalent senior leader is not actively involved (0)	High
		1.2 Staff continuity	Continuity of staffing engaged with activities described in this measure	Length of time the longest serving person has been actively working on licensing issues in current or other organisation: Higher: 3+ years (1) Medium: 1–3 years (⅔); Lower: < 1 year (⅓) None: no one in post (0)	High
2. Reviewing alcohol licensing applications	Engaging in an activity or process to decide whether to take action in relation to individual alcohol licensing applications	**2.1 New licence applications/licence variations (other than 2.2)**	Engaging in any activity or process to decide whether or not to take action in relation to new local alcohol licensing applications or licence variations (other than variations in opening hours – which is covered by 2.2)	Higher: Routine process is used to review all applications or to screen all to identify a subset for more detailed review (1) Lower: ad hoc process is used, or applications are only reviewed if flagged by another body (e.g. police) (½) None: No process in place for reviewing applications (0)	Medium
		2.2 Reviewing or monitoring applications or decisions relating to temporaryincreases in availability	Engaging in any process to review or monitor applications or licensing decisions that may lead to temporary increases in availability	Higher: Engaged in reviewing or monitoring of temporary increases in availability through both opening hours and one-off licence applications (1) Lower: Engaged in reviewing or monitoring of temporary increases in availability through either opening hours OR one-off licence applications (½) None: Not engaged in reviewing or monitoring of temporary increases in availability through either opening hours OR one-off licence applications (0)	Low
		2.3 Monitoring responses to applications	Any action or process used for keeping track of the number and type of local alcohol licensing applications received, and/or applications responded to by the PHT, the rationale for the response, or outcome of such applications, other than 2.2	Higher: A database is maintained of applications received, responses made and outcomes, with additional intelligence added (e.g. reasons for decision, follow-up, notes for future similar applications) (1) Medium: A database is maintained of applications received, responses made and outcomes (⅔) Lower: Applications received are logged only (⅓) None: No process or database (0)	Medium

TABLE 2 The ExILEnS intensity measure of public health involvement in alcohol premises licensing *(continued)*

Activity category	Activity category definition	Activity subcategory	Activity subcategory definitions	Grading: each scale to be rated for each 6-month period (grades converted to fractional scores out of 1 as indicated in brackets)	Weighting High (×3) Medium (×2) Low (×1)
3. Influencing and responding to individual licence applications	Engaging in any activity to influence the submission, type, content or outcome of alcohol licensing applications (excluding that covered elsewhere)	**3.1 Influencing or preventing applications prior to submission**	Any activity/process intended to influence the content or submission of local alcohol licensing applications *before the point of submission*	Higher: PHT provides guidance to applicants on what they will object to (either direct, or in writing) (1) Lower: No guidance is provided to applicants on the PHT policy (0)	Low
		3.2 Shaping submitted applications prior to decision	Any activity/process (other than a representation) intended to influence the content of *submitted* local alcohol licensing applications before a decision is made on them	Higher: PHT provides direct guidance to applicants on what they will object to, to enable the applicant to redraft the application or operating plan as needed (1) Lower: No guidance is provided to applicants on the PHT policy (0) If there are no potential applications in that period, grade as low	Low
		3.3 Making representations or objections	Formal representations or objections in relation to local alcohol licensing applications of any type	Higher: PHT makes four or more of their own representations or objections in relation to licensing applications received (3). Medium: PHT makes one to three of their own representations or objections (⅔) Lower: PHT supports representations or objections made by other parties (⅓) None: No action is taken in relation to representations or objections (0) If no applications received during 6 months, score as 'None'	High
		3.4 Involvement in reviews of premises licences	Any activity or process intended to influence the likelihood or outcome of a review of an alcohol premises licence or appeal of a review decision	Yes/No in the 6-month period (1 or 0)	Medium

continued

TABLE 2 The ExILEnS intensity measure of public health involvement in alcohol premises licensing *(continued)*

Activity category	Activity category definition	Activity subcategory	Activity subcategory definitions	Grading: each scale to be rated for each 6-month period (grades converted to fractional scores out of 1 as indicated in brackets)	Weighting High (×3) Medium (×2) Low (×1)
		3.5 Involvement in appeals to decisions resulting from 3.3	Any activity to support the defence of a licensing decision (other than a review) resulting from public health representation/objection	Yes/No in the 6-month period (1 or 0)	Medium
4. Use of routine or bespoke data on alcohol licensing and alcohol-related harms	Collection, collation, analysis, or other use of data (other than specified in 2.3 above or 6.1 below) to inform, or use in support of, PHT activity to influence local alcohol licensing	**4.1 Collation or analysis of existing data**	Collating, analysing, preparing, curating or illustrating routinely available data	Higher: Analysis, preparation, curation or illustration of relevant routine data is conducted to support activities in other dimensions (1) Medium: Preparation, curation or illustration of relevant routine data is conducted to support activities in other dimensions (½) Lower: Little/no attempt is made to analyse, prepare, curate or illustrate routine data to support other dimensions (0)	High
		4.2 Establishing new or expanded data collection processes	Establishing new or expanded processes for conducting research or gathering data (of any kind) to inform or use in support of PHT activity to influence licensing	Yes: A new or expanded data collection or process is established requiring major effort (1) No: No new data collection or process is established (0)	Medium
5. Influencing local stakeholders or licensing policy	Any activity to influence licensing policy or people, or other stakeholders (other than the public)	**5.1 Contributing to the development of licensing policy**	Any activity to directly inform, or contribute to the development of, local licensing policy including SLPs, standard licensing hours, cumulative impact or overprovision policy or other licensing-specific local policy	Higher: the PHT leads or is directly involved in the drafting of licensing policy (1) Medium: the PHT makes written submissions on licensing policy (e.g. commenting on or submitting draft text, reports or recommendations) (⅔); Lower: the PHT makes some efforts to influence the drafting of licensing policy (e.g. policy-specific meetings or presentations) (⅓) None: little or no evidence of attempts to directly influence policy (0)	High
		5.2 Influencing or collaborating with local authority licensing team and associated services	Any contact or collaboration with local authority licensing stakeholders including local authority lawyers or licensing teams, on licensing matters	High: Collaboration / close working with local authority licensing stakeholders (1) Medium: Regular routine contact with local authority licensing stakeholders (⅔) Low: Infrequent or ad hoc contact with local authority licensing stakeholders (⅓) None: No contact (e.g. if no one in post) (0)	Medium

TABLE 2 The ExILEnS intensity measure of public health involvement in alcohol premises licensing *(continued)*

Activity category	Activity category definition	Activity subcategory	Activity subcategory definitions	Grading: each scale to be rated for each 6-month period (grades converted to fractional scores out of 1 as indicated in brackets)	Weighting High (×3) Medium (×2) Low (×1)
		5.3 Informing or influencing elected representatives responsible for licensing decisions	Any contact or liaison on licensing matters with elected representatives who have responsibility for decision-making on licensing	High: Close partnership working (1) Medium: Regular routine contact (⅔) Low: Infrequent or ad hoc contact (⅓) None: No contact (0)	High
		5.4 Involvement in formal or statutory multiagency licensing groups	Any involvement in multiagency groups, consisting of stakeholders from several organisations or backgrounds, which meet regularly to discuss licensing matters	High: PHT takes a leadership role in multiagency groups as defined and participates regularly (1) Medium: PHT participates regularly in multiagency groups as defined (⅔) Low: PHT participates infrequently or ad hoc (⅓) None: No such groups are known to exist or PHT does not participate (0)	Medium
		5.5 Collaboration with statutory bodies with legal responsibilities in relation to alcohol licensing	Any collaboration or joint working with other statutory bodies with legal responsibilities in relation to alcohol licensing matters (other than coded above)	High: Close partnership working (1) Medium: Regular routine contact (⅔) Low: Infrequent or ad hoc contact (⅓) None: No contact if no one in post on licensing (0)	Medium
6. Engagement or involvement of the public	Any activity to engage or involve the public in relation to alcohol licensing, including the use of media	**6.1 Contact, collaboration or initiatives with members of the public or community groups regarding alcohol licensing**	Any contact, meetings or collaboration between PHTs and members of the public or community groups, including involvement of the public in data collection or formal consultations	Higher: PHT leads or initiates engagement, consultation with or a survey of the general public or community groups (1) Medium: PHT contributes to existing public meetings / research / groups about licensing issues (½) Lower: PHT has little or no involvement in public engagement as described (0)	High
		6.2 Media publicity	PHT engagement or use of the press, media outlets or social media on licensing matters	Yes: PHT makes proactive use of media or social media to promote its stance on alcohol licensing (1) No: PHT makes no use of media/social media on licensing issues (0)	Low

Note
Abbreviated version; for full version with notes, see table S4 in Fitzgerald *et al.*[2]

c. Evaluate whether, and to what extent, the intensity and components of the intervention (i.e. activities within the PHIAL measure) are associated with subsequent measurable changes in the key outcome indicators.

2.3.1 Quantitative data collection of selected alcohol harm and crime outcomes

We collected 2009–18 time-series data, aggregated at a local authority level to 6-month periods to match the PHIAL exposure metric temporal resolution, for a set of key outcome measures determined at the start of the project. These included measures of harm: alcohol-related hospital admissions (narrow measure), which was the primary outcome on which statistical power analyses were based; hospital admissions for acute conditions related to alcohol; alcohol-related mortality; alcohol-specific mortality; and ambulance call-outs. They also included crime indicators: sexual and violent crimes and public order offences. In England hospital admissions were obtained from UKHSA Local Alcohol Profiles, and data for other outcomes from the Office for National Statistics. In Scotland, health harms data were obtained from the Information Services Division Scotland and crime data from the Scottish Government. Outcomes data were linked to the PHIAL measure at the same temporal and spatial resolutions and additionally to a set of area-level temporally variable covariates: nation (England or Scotland), season, area-level socioeconomic status [Index of Multiple Deprivation (IMD)], population density, average age in area, and, for England only, whether an area was a local alcohol action area (LAAA).[93,94]

2.3.2 Statistical modelling

Time series were modelled using negative binomial mixed-effects models incorporating a random intercept for each area. An offset was specified as the mid-year population number for each area. Associations between each outcome and '18-month average PHIAL' (the primary exposure metric), 'cumulative PHIAL score' and 'change in PHIAL score' were modelled such that the PHIAL score at each time point impacted on the outcome in the same period (a 'snare' model). In addition, we modelled 6-month lagged correlations in which PHIAL scores were hypothesised to affect the subsequent 6-month period. Baseline models included PHIAL score and time, while random and fully adjusted models also included all covariates. Final models were the most parsimonious models, with the lowest Akaike information criterion values and fewest number of predictors, but with the predictors for the correlation between exposure and outcome being similar to the fully adjusted model. Where statistically significant associations ($p < 0.05$) were observed, 1-holdout resampling was conducted in which areas were sequentially removed and models recalculated to assess whether significant findings were stable or resulted from inclusion of single areas.

2.3.3 Deviations from protocol

We originally aimed to also include A&E attendances for alcohol-related conditions. However, we decided not to use this outcome as we were unable to link attendances to all local authorities because of overlap of A&E catchment areas and study areas, while we were also unconvinced that the number of A&E attendances in a particular hospital is representative of the burden in a particular area. We further analysed the total composite PHIAL score as the exposure measure and have not conducted PHIAL component-specific analyses; we aim to do this in future.

2.4 Work package 3: modelling costs and wider impacts of public health team activity

This WP aimed to examine implementation costs, estimate the short-term impact of PHT engagement in licensing on alcohol consumption and the longer-term impact (up to 20 years) of the intervention on health and healthcare costs, and explore the likely distribution of effects across the population. The original objectives of this WP were to:

a. estimate and compare the overall costs to PHTs of implementation activity
b. develop locally specific policy models for each active intervention area

c. use these models to estimate the wider impacts of the intervention in terms of long-term health benefits, NHS cost savings and how these impacts may affect health inequalities
d. estimate the potential impact of high-intensity PHT activity in two exemplar areas (one in England, one in Scotland) which are not currently active.

2.4.1 Model development

We developed new versions of the Sheffield Alcohol Policy Model[95] for each of the recruited LG areas, to allow both short-term modelling of any inequality impacts of changes in PHT involvement in licensing and longer-term modelling of the overall impact of PHT involvement. The following data were collated to prepare the models:

- population estimates for each age, sex and quintile of the English and Scottish IMDs[96,97]
- hospital admissions rates for each age, sex and IMD quintile for each of 45 different alcohol-related conditions[98]
- mortality rates for each age, sex and IMD quintile for each alcohol-related condition
- healthcare costs per admission for each alcohol-related condition
- weekly alcohol consumption in units
- alcohol prices per beverage category, per age, sex and IMD quintile subgroup
- criminal offence count estimates by age and sex for a range of different offence categories
- costs associated with each criminal offence.

We identified and obtained the most appropriate data for each of these categories. There were challenges in ensuring maximum comparability across both crime and health data between English and Scottish areas, due to differences in the criminal justice systems and the way in which diagnoses are recorded for hospital admissions. We consulted with stakeholders and the wider project team to make sure all data were as similar as possible across all models.

Where possible, local area-level data were used; however, if such data were unavailable, work was undertaken to find the best possible alternative solution. For example, neither the Health Survey for England nor the Scottish Health Survey have large enough sample sizes to provide robust estimates of alcohol consumption at LG area level. We therefore revised (for England) and adapted (for Scotland) an approach we had previously developed[99] using English data which reweights the national survey data using local data to produce a synthesised local consumption survey data set for each of our areas of interest.

2.4.2 Deviation from protocol and potential future value of this work

The original plan was to incorporate the findings from WP2 with the local models we had built. However, the findings from WP2 were non-significant and close to zero, with little or no evidence to support an association between PHT involvement in the licensing process and the outcomes used in our models (i.e. alcohol-related hospital admissions and mortality). As a result, we were unable to undertake the planned modelling, although the models have been built and will be available for use in future projects which look at the longer-term impacts of local or national policies that might influence alcohol consumption. Such policies might include action on pricing, alcohol availability or other public health interventions. In addition to these models, we have also developed new approaches to estimating local area-level alcohol consumption in Scotland and generated more comparable data on alcohol-related health and crime between England and Scotland, both of which are likely to be of value in future work. We collated data collected through the WP1 analysis and interviews relating to the staff commitments associated with PHT activity. Our aim was to combine this information with standard pay scales as well as any other information collected on other related costs, to estimate the overall cost of PHT involvement in the licensing process. Unfortunately, in practice these data were inconsistently recorded or unclear, with either estimates of staff full-time equivalent commitments to PHT activity, or information on the pay band of those staff being difficult to obtain. As a result, we were unable to produce any robust estimates of the staff costs associated with PHT implementation actions.

2.5 Work package 4: exploring public health team approaches and mechanisms of impact of availability

This WP had two original objectives:

a. to revise and refine hypothesised theories of change to qualitatively examine how PHT activities and key aspects of the licensing system may lead to changes in licensing outcomes and related harms
b. to synthesise all findings, plan dissemination and identify recommendations for practice, policy and future research, and disseminate.

2.5.1 Recruitment, sampling, data collection and analysis

Within the 20 higher-activity areas, potential stakeholders for interview were identified through direct contact, initial site visits undertaken as part of WP1, and snowball sampling. Purposive participant selection aimed to optimise diversity in terms of public health and licensing stakeholder remit and location. Informed consent was obtained prior to each interview. Interviews were conducted by telephone, between November 2018 and October 2020. Fifty-five individuals agreed to participate, and two were uncontactable to arrange interviews. Separate topic guides were developed for the five stakeholder groups [public health, licensing managers/officers, elected members, police (licensing) officers and licensing lawyers/clerks] based on existing alcohol licensing literature and research team discussion. The topic guides (summarised in O'Donnell *et al.*[5]) included a focus on interviewee roles, responsibilities and purpose in the licensing system, public health approaches to engaging in licensing, and interviewee views on such approaches and the ways in which temporal and spatial availability impact on alcohol harms. Interviews lasted between 32 and 156 minutes (median = 72 minutes) and were audio-recorded. Interview transcripts were analysed thematically with NVivo 12 (Lumivero, Denver, CO, USA) using inductive and deductive approaches.

Secondly, two small online discussion groups were conducted in January 2021 with a different sample of stakeholders working in England (n = 6) and Scotland (n = 4) with expertise in public health and licensing. These groups included representation from local and national government, police, third sector and academia identified via relevant networks and recommendations. Both discussions were audio-recorded, with participant consent obtained in advance. Groups discussed views on the ways in which temporal and spatial availability interventions might impact on alcohol-related harms, and the possible mechanisms of change involved, including relevant preliminary findings from in-depth interviews (questions are summarised in O'Donnell *et al.*[5]).[99] Transcripts were analysed to identify extracts providing confirmatory and contradictory insights compared with in-depth interview findings. These extracts also informed further analysis of the in-depth interview data, alongside team meeting discussions and with input from advisory group members with legal and policy backgrounds.

2.5.2 Developing theories of change

Prior to the study's commencement, we developed simple linear theories of change and an overarching logic model suggesting that diverse local PHT activities may contribute to changes to local licensing *policy*, effect change in the environment (*places*), and thus influence health and crime outcomes (for *people*). Over the course of the study, we discussed at multiple team meetings and with expert advisors what the pathways to change might be from different public health activities to licensing change, and from changes in licensing to alcohol-related harm. On the former, we considered how to group PHT activity types (from the 19 identified) to reflect differing PHT approaches, and whether different approaches might have differing degrees of success. We developed preliminary logic models and directed acyclic graphs to help develop our theories; however, given the limitations in prior evidence, we had no strong basis on which to refine or finalise these theories. On the latter, we examined evidence and theory on links between temporal and spatial availability and harms, and developed systems maps, based on systematic inspection of the interview data and prior expertise. We used these systems maps (see *Appendix 3*) as an engagement tool in our online discussion groups (above) to gain stakeholder

insights. These discussions introduced further complexity, especially as discussion group members and interviewees were uncertain about the local validity of the mechanisms presented and any evidence base supporting them. Ultimately, we felt that attempting to present the nuances of overlapping PHT approaches and thinking in a diagram would be unhelpfully reductionist, and that the availability systems maps need to be systematically stress-tested with theory and evidence-driven pathways (see Section 3.7). We concluded that our data would be better represented in qualitative reports rather than in the form of a diagram. Our qualitative findings add to current theorisations, but any theory of change is underdeveloped in practitioners' thinking as well as in the international literature.

2.6 Public and practitioner involvement

As a study of public health practice in the licensing system, the public audience for the study is primarily PHTs and licensing teams across the UK rather than members of the lay public. We therefore paid a lot of attention to ensure that these stakeholders were adequately involved in the research. Firstly, Tim Nichols, who had recently retired as Head of Regulatory Services in Brighton & Hove City Council with responsibility for licensing, joined our team as a co-investigator and contributed to team meetings and thinking as a full team member throughout the study. Secondly, Laura Mahon, lead for licensing at the time at AFS, joined our team to support our recruitment, methods, analysis and interpretation from a Scottish perspective. James Nicholls, co-chair of the UK Licensing and Public Health Network, was also a co-investigator, providing an English perspective. On our steering group, we benefited from the expertise of Maria Smolar, lead for licensing at PHE, as well as two local authority licensing lawyers: Tim Briton, Gateshead Council in England, and Andrew Fraser, (now former) Head of Democratic Services at North Ayrshire Council in Scotland. Colin Sumpter, a public health practitioner with experience in licensing at the London Borough of Camden and Islington, also joined our team for some time. We involved local public health leads for licensing in our expert consultations for the development of the PHIAL measure[22] and licensing stakeholders from diverse backgrounds in our expert workshop that followed the in-depth interviews.[100]

We involved two lay members on our advisory group, one from England and one from Scotland. We also received input on the text of our *Plain Language Summary* from three lay members of the SPECTRUM Consortium Alcohol and Food Discussion Group at the University of Stirling.

3 Findings overview

Our findings derive from the 66 structured and 53 in-depth interviews described in WPs 1 and 4 (Section 2), as well as the longitudinal modelling from WP2. We report them in the following logical topic order in the sections below (the objectives addressed by each findings section are indicated in brackets):

1. how PHTs in England and Scotland engage in alcohol premises licensing policies and decisions (Objective 1b)
2. measuring the nature and intensity of PHT activity in engaging in licensing from 2012 to 2018: the PHIAL measure, and comparison between England and Scotland (Objective 1c and Research Question iii)
3. legal, structural and practice-based explanations for differences in the nature and intensity of PHT activity on licensing between Scotland and England (Objectives 1d and 4a, Research Question iii)
4. a detailed examination of the perceived impact of a public health objective for licensing in Scotland and its absence in England on PHT practice and outcomes (Objectives 1d and 4a, Research Question iii)
5. an evaluation of whether PHT engagement in licensing had a measurable impact on health harms and crimes (Objectives 2b and 2c, Research Question i)
6. an exploration of how and why PHTs approach their engagement in alcohol licensing in different ways (Objective 4a, Research Question iii)
7. an examination of stakeholder beliefs on how changes in spatial and temporal availability enacted through the licensing system may impact on alcohol-related harms (Objective 4a, Research Question iii).

3.1 How public health teams in England and Scotland engage in alcohol premises licensing policies and decisions

We distinguished and described 19 types of activity by which PHTs engaged in alcohol premises licensing policies and decisions, which were divided into six overarching categories: (1) staffing; (2) reviewing licence applications; (3) responding to licence applications; (4) use of data; (5) influencing licensing stakeholders or policy; and (6) public involvement. The 19 activities are defined in *Table 2*. Within each activity type, a significant range of practices was observed, with reasons for variation including available resources, previous experience, support at the local authority level, data availability, or legal support. Brief examples of each activity type are given in the full version of the PHIAL measure[2] and examples of specific activities will be outlined in more detail in Purves *et al*., including approaches which may be of interest to PHTs more broadly. We found examples of very detailed databases logging, tracking and evaluating decisions on licence applications which in some cases included notes on what worked well (or did not) in the PHT response, to inform future practice. There is likely to be a rich data set in such systems that it may be valuable to collate and analyse nationally. Many PHTs put significant effort into regularly curating data into summaries analysed by data zone or locality, presented in accessible formats for licensing colleagues and committee members; others even established new data collection processes specifically to inform licensing. PHTs in England were highly active in engaging with applicants to influence premises' operating plans and extract commitments on safety (e.g. CCTV); this was considered a role for licensing colleagues rather than public health in Scotland. Scottish PHTs in particular made ample use of the public health objective to lead and submit independent representations or objections in response to licence applications. Some PHTs either led or significantly contributed to the actual drafting of SLPs, and others actively involved local communities in licensing.

3.2 Measuring the nature and intensity of public health team activity in engaging in licensing from April 2012 to March 2019: the PHIAL measure, and comparison between England and Scotland (Objective 1c and Research Question iii)

The PHIAL measure was further developed to detail how each of the 19 activity types should be graded, scored and weighted to enable the generation of intensity scores for a given 6-month period for each PHT broken down by category and subcategory. The categories and subcategories are outlined in *Table 2* and the measure is reproduced in full in Fitzgerald *et al.*[2] The maximum available overall weighted score for any 6-month period is 42.

The scores for PHT activity for the 14 6-month periods between April 2012 and March 2019 inclusive ranged from 0 to 35. *Figure 2* is reproduced from Fitzgerald *et al.*[2] and illustrates the overall score over time for PHTs in higher- and lower-activity areas in England and Scotland. Scores over time for all areas are illustrated in grey for comparative purposes in each panel. The measure successfully identified variations in intensity of activity between different areas, as well as differences in intensity of activity within areas over time. The recruitment strategy was successful in sampling a diversity of higher- and lower-activity areas in both nations. In England, a step change in activity is apparent from 2014 onwards in many active areas. Participating PHTs in Scotland tended to be more active on average in the early years (2012–4 approximately) across all areas and across all time periods for higher-activity areas. Some areas in England did not engage in any relevant activity during the whole study period. The scores for specific activity types (subcategories are outlined in *Table 2*) over time illustrated that there was a high level of staff continuity (1.2) in all areas, and the use of data (4.1

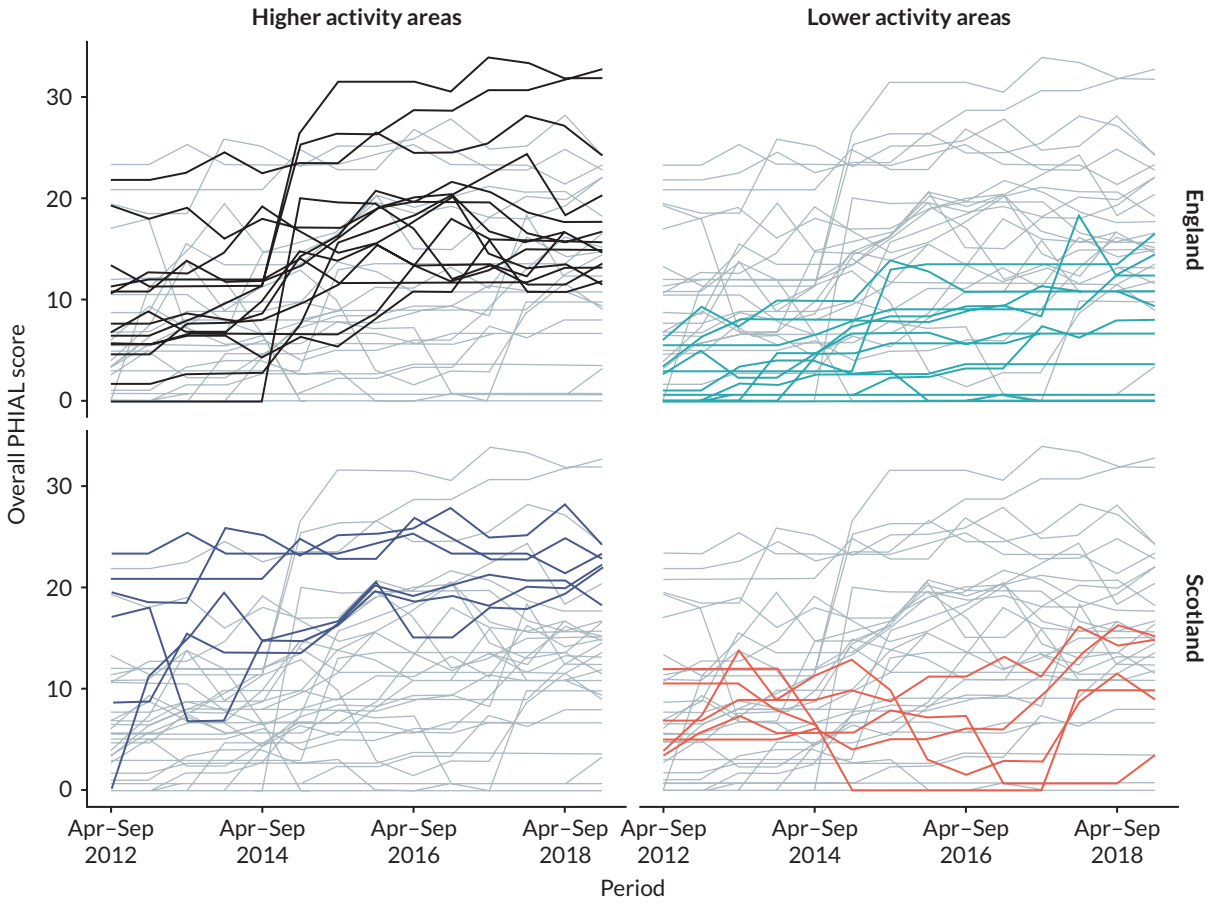

FIGURE 2 Temporal patterns of PHIAL scores for 6-month periods from April 2012 to March 2019 for each of 39 participating LG areas. Scores over time for all areas are illustrated in grey for comparative purposes in each panel. Reproduced with permission from Fitzgerald *et al.*[2]

and 4.2) was a prominent feature of practice in higher-activity areas in both nations (see *Figure 3*, reproduced from Fitzgerald *et al.*[2]). Working with the media (6.2) was rare overall. PHTs in Scotland had higher scores on average for senior leadership (1.1), developing policy (5.1) and working with the public (6.1), and they were more commonly involved in making or leading representations to object to licence applications (3.3). PHTs in England engaged in a greater diversity of activity in category 3 around responding to licence applications, being more likely than their colleagues in Scotland to have sought to influence licence applications pre submission (3.1), or to have shaped submitted applications (3.2). Involvement in reviews of premises licences (3.4) was unusual but more common in England.

3.3 Legal, structural and practice-based explanations for differences in the nature and intensity of public health team activity on licensing between Scotland and England (Objectives 1d and 4a, Research Question iii)

Although similar in many respects, the licensing systems in Scotland and England are separate and independent, and governed by different legislation. The fact that there is a public health objective for licensing in Scotland but not in England is well known, but by comparing the two systems in detail, and the structure of public health organisations that input to licensing in both nations, we were able to identify other important differences.[49] These included: differences in the timing and content of legislation and of when SLPs fell for renewal; differences in the timing of support provided

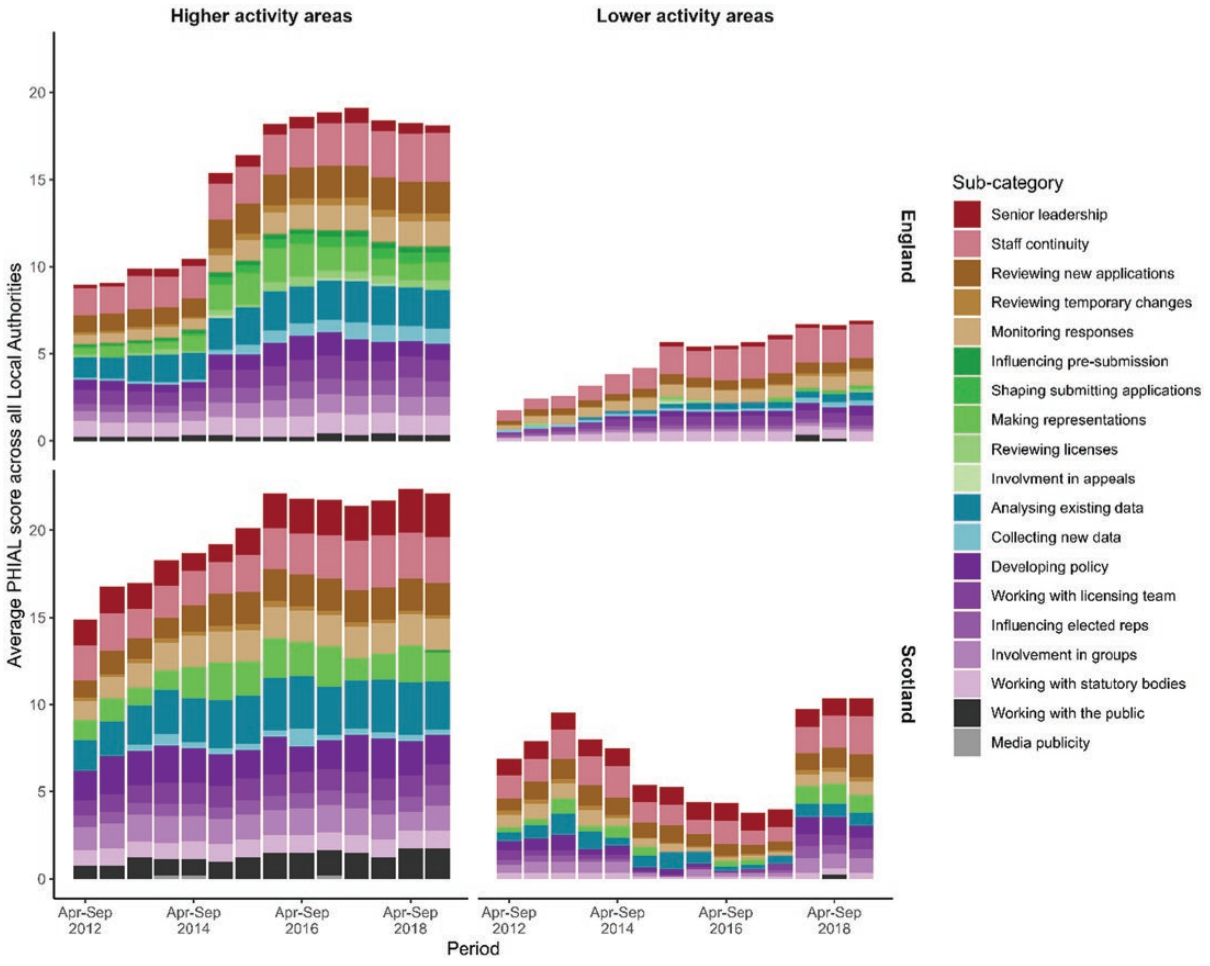

FIGURE 3 PHIAL scores at subcategory level over time averaged for all participating PHTs. Reproduced with permission from Fitzgerald *et al.*[2]

on licensing matters by national bodies; and the fact that all new licence applications are heard at a Licensing Committee ('Board') meeting in Scotland, whereas an application in England is only heard at a Committee meeting if an objection or representation on the application is outstanding. In England, unlike in Scotland, responsibility for local public health matters, including health input to licensing, moved to LG in England in 2013, where it is led by Directors of Public Health and supported by public health professionals.[101] Some PHTs in England therefore work directly alongside licensing teams in LG. In contrast, actors from several different NHS and cross-sectoral organisations are routinely engaged in alcohol licensing matters in Scotland, giving rise to a greater number of senior staff to involve in the work. These legal and structural differences, and other differences in the beliefs or philosophy of PHTs, can be seen to explain the differences in the timing and nature of activity identified in Section 2.2.

Differences in the timing of the original legislative changes that gave public health organisations a statutory role in licensing, and early support to PHTs from AFS, may have led to earlier engagement of PHTs in Scotland on licensing matters. Legal differences in the timing of renewal of SLPs, with them occurring more frequently in Scotland and at the same time for all Licensing Boards, may have led to greater PHT activity there to influence SLPs. This was also a reason for engagement in Scotland from as early as 2012 because all Licensing Boards in Scotland had to renew their SLP by 2013. In contrast, at this time, public health was being restructured in England; PHE and other regional bodies in England became more active in getting local PHTs engaged in licensing from 2014 onwards.

The existence of a public health objective for licensing in Scotland may have partly explained why PHTs there were often more active in objecting to licence applications without involving other statutory stakeholders such as the police. There was also a mistaken belief among some Scottish PHTs that collaboration with the police on objections was not permitted by law. In England, some PHTs felt that they needed to work with the police or other responsible authorities because they perceived that public health data were not taken seriously, or that such data did not always fit exactly under the four other licensing objectives. Therefore, PHTs were more likely to support representations or objections made by the police, the licensing authority or others. The lack of a public health objective may have made English PHTs less confident about objecting, and nudged them towards a greater diversity of approaches, including negotiating conditions on licences with applicants rather than objecting outright. The importance of the public health objective is discussed further in Section 2.4. In England there was a greater incentive to resolve objections to licences in order to avoid a time-consuming Licensing Committee meeting, at which there was no guarantee of success in seeking to have a licence declined. In Scotland, as the Licensing Board meeting had to consider each application anyway, this incentive to negotiate/compromise did not exist for PHTs to the same extent. Some differences in practice also arose from differing public health views on the appropriateness of liaising with industry actors, beliefs about the legality and necessity of collaborating with other stakeholders, and the value (or futility), from a public health perspective, of trying to influence retail practices in licensed venues. This view appeared to have softened in a couple of Scottish areas over time.

All six active PHTs in Scotland sought to involve the public in licensing either occasionally or consistently throughout the period 2012–9, whereas just three of the 14 such areas in England did so. This can be explained in part by the existence of local Licensing Forums in Scotland (a statutory requirement that does not apply in England) on which members of the local community and local young people, as well as statutory and trade stakeholders, should sit. These forums were routinely attended by PHTs, and sometimes PHTs took a more active role, organising or chairing the forum on behalf of the Licensing Board. Over and above this, some areas used time-limited funding to boost their engagement with local communities, but this was rarely sustained due to resource constraints. Engagement with the public in England was largely limited to consultation on alcohol matters more generally rather than specific to licensing.

3.4 A detailed examination of the perceived impact of a public health objective for licensing in Scotland and its absence in England on public health team practice and outcomes (Objectives 1d and 4a, Research Question iii)

Using both structured and in-depth interview data, we analysed views on (and, for Scotland only, experiences of) the public health licensing objective.[3] Reponses from Scottish participants suggest that PHTs have been able to establish a sustainable and constructive role in licensing systems. While challenges to full participation remained, respondents felt that the inclusion of the public health objective was significant in enabling better engagement, with one commenting that they couldn't 'underestimate the value of it being written down . . . within a law'. Scottish respondents also noted that the public health objective was often less about preventing, or closing, premises than about establishing a licensing culture which shifted attention from 'looking at it from a case-by-case basis to actually thinking about the wider, whole population approach'.

Interviewees in England largely supported the creation of a public health licensing objective for England and Wales. They felt that it would raise the profile of public health within their licensing systems and 'help in terms of making the case from the health perspective'. There was not a strong belief that such an objective would (or necessarily should) lead to a significant reduction in the number of outlets in a given area, or even the number of applications that were rejected. Respondents were pragmatic in recognising the limitations of public health involvement in licensing, even while many felt that – as a principle – it should be a primary consideration. However, there was also a widespread sense that the lack of an objective was a 'frustration', which necessitated operational workarounds that could otherwise be avoided.

Responses suggest that English PHTs have been on a similar journey to their Scottish counterparts in finding ways to develop constructive working relationships with other licensing stakeholders. However, there remains a widespread perception among respondents that the role of PHTs in England remains hampered by the lack of a public health objective. Interviewees felt that a public health objective would significantly help in establishing PHTs as more equal partners in the licensing system, rather than keeping them 'tied to a grid [they] don't actually fit in'. A formal objective would provide structure and legitimacy to representations and help ensure input at strategic and area-wide levels was given sufficient weight.

It was strongly felt that PHTs had unique contributions to make in terms of both data and knowledge and, since health harms were among the primary risks associated with alcohol retail, that their evidence and insights should be given substantial weight. Many felt that a public health licensing objective would better enable the use of health data – such as alcohol-related harm trends, A&E visits, or ambulance call-outs – to inform planning and policy. This increased leverage would allow public health considerations to play a greater role not only in the promotion of good practice at a premises level but also in using licensing to help shape the retail environment in ways that better reduce risk and health harms (e.g. through promoting outlets with mixed food and alcohol offers, creating effective cumulative impact policies, recognising the particular impact of off-sales on health harms and so forth).

One English respondent commented that 'having health as a licensing objective is not the be-all and end-all, but . . . it would significantly help in terms of public health's role as a responsible authority'. Our data suggest that although PHTs *can* function in the licensing environment without a public health objective and have made significant strides in developing effective working relationships, they would be better enabled to support the reduction of public health risks through licensing if such an objective were in place.

3.5 An evaluation of whether public health team engagement in licensing had a measurable impact on health harms and crimes (Objectives 2b and 2c, Research Question i)

This element of our study aimed to assess associations between the intensity of local PHT engagement with alcohol licensing and selected health and crime outcomes.[4]

Analyses of associations between 18-month average PHIAL scores (the primary exposure metric a priori defined in our protocol[1]) indicate little evidence of correlations with any of the selected outcomes (see *Table 3*, *Figure 4*).

A positive correlation of 6-month lagged 18-month average PHIAL scores (see *Table 4*), the primary exposure metric, with the incidence of public order offences was observed, but we consider this an artefact, given firstly that this contradicts the direction of a plausible association, and secondly that 1-holdout resampling indicated this association was reliant on the inclusion of a single area.

TABLE 3 Associations of 18-month average PHIAL score (a priori defined primary exposure metric) and selected outcomes

	18-month average PHT engagement (PHIAL) score		
	Multivariable results[a]		
Outcome	**Effect[b]**	**95% confidence interval**	***p*-value**
Effects on health outcomes			
Alcohol-related hospital admissions (narrow)[c]	0.001	−0.007 to 0.008	0.866
Acute alcohol-related hospital admissions[c]	0.003	−0.006 to 0.012	0.476
Alcohol-related mortality	0.002	−0.002 to 0.005	0.315
Alcohol-specific mortality	0.004	−0.003 to 0.010	0.300
Ambulance callouts[c]	0.000	−0.002 to 0.002	0.709
Effects on crime outcomes			
Public order offences	0.007	−0.001 to 0.015	0.068
Sexual crimes	−0.001	−0.006 to 0.004	0.789
Violent crimes	0.001	−0.003 to 0.004	0.574

a Full multivariable models adjusted for nation (England or Scotland), nation-specific time trends, season, area-level IMD, population density, average age, baseline PHIAL score and baseline outcome, and, for England only, whether an area was a LAAA. Presented results based on backwards selection from full model to obtain most parsimonious models (ensuring effect size does not change). Differences with forest plot in *Figure 4* are due to rounding.
b Effect estimate (β) describes the change in outcome (per 100 events) with one unit change in 18-month average PHIAL score.
c Per 100 events.

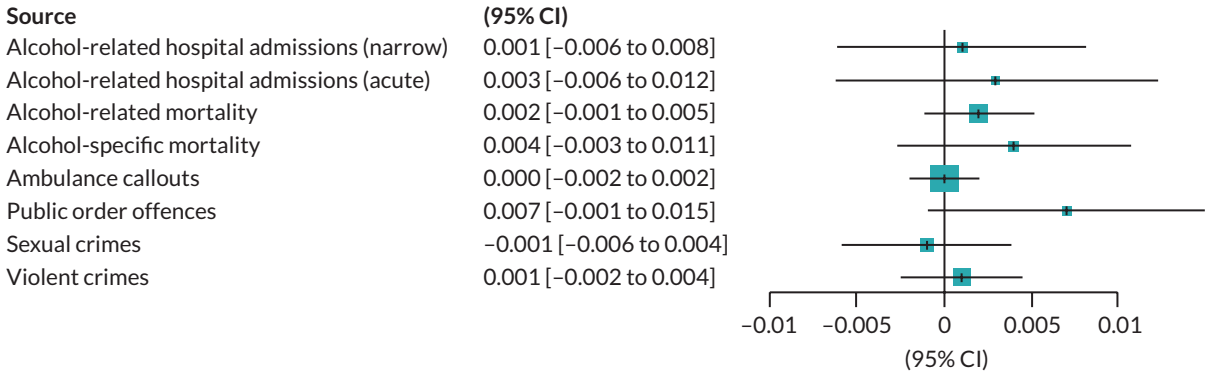

FIGURE 4 Forest plot of 18-month average PHIAL score (a priori defined primary exposure metric) and selected outcomes. Details provided in *Table 3*.

Associations between cumulative PHIAL score, both lagged and unlagged (see *Table 5*), and change in PHIAL score (see *Table 6*) with outcomes also provide little evidence that increased engagement had a measurable impact. Similarly, negative associations were observed for alcohol-related mortality and cumulative PHIAL score in our secondary analysis, but these associations also relied on the inclusion of specific areas. Moreover, we hypothesise that if such an association were to exist, it would be more likely to show up with the alcohol-specific mortality measure in the time frame of our study period, which it did not.

Nation-specific analyses for the 6-month lagged primary outcome showed small negative associations for 18-month average PHIAL score in Scotland, but not in England. We interpret these as chance findings given the small sample size in Scotland and absence of associations with related outcomes, than true differences between nations (see *Table 7*).

Taken together, our findings provide little evidence that allocating PHT resources to engaging in alcohol licensing is associated with downstream reductions in crime or adverse health outcomes related to alcohol consumption, either in the short term or over a 7-year follow-up period.

3.6 An exploration of how and why public health teams approach their engagement in alcohol licensing in different ways (Objective 4a, Research Question iii)

Health stakeholders took three different approaches to their work with the licensing system.[5] (1) Many took a 'challenging' approach, trying to make alcohol less easily available, to change drinking culture over the long term. They felt this was in line with research evidence, which some licensing stakeholders welcomed, but others felt it was a narrow, 'nanny state' approach. (2) Other health stakeholders were less active, providing data or other support to licensing teams or police colleagues only when asked.

TABLE 4 Associations of 6-month lagged 18-month average PHIAL score and selected outcomes

	6-month lagged 18-month average PHT engagement (PHIAL) score		
	Multivariable results[a]		
Outcome	**Effect[b]**	**95% confidence interval**	***p*-value**
Effects on health outcomes			
Alcohol-related hospital admissions (narrow)[c]	0.000	−0.007 to 0.007	0.935
Acute alcohol-related hospital admissions[c]	0.003	−0.006 to 0.012	0.534
Alcohol-related mortality	0.000	−0.003 to 0.003	0.813
Alcohol-specific mortality	0.002	−0.005 to 0.008	0.640
Ambulance callouts[c]	0.001	−0.001 to 0.003	0.521
Effects on crime outcomes			
Public order offences	**0.011**	**0.003 to 0.018**	**0.008**
Sexual crimes	−0.003	−0.007 to 0.002	0.280
Violent crimes	0.000	−0.003 to 0.004	0.853

a Full multivariable models adjusted for nation (England or Scotland), nation-specific time trends, season, area-level IMD, population density, average age, baseline PHIAL score and baseline outcome, and, for England only, whether an area was a LAAA. Presented results based on backwards selection from full model to obtain most parsimonious models (ensuring effect size does not change).
b Effect estimate (β) describes the change in outcome (per 100 events) with one unit change in 18-month average PHIAL score.
c Per 100 events.

TABLE 5 Associations (per PHIAL unit exposure) of cumulative PHT engagement score and selected outcomes

	Cumulative PHIAL score		
	Multivariable results[a]		
Outcome	**Effect[b]**	**95% confidence interval**	***p*-value**
Effects on health outcomes			
Alcohol-related hospital admissions (narrow)[c]	0.000	−0.001 to 0.001	0.956
Acute alcohol-related hospital admissions[c]	0.000	−0.001 to 0.002	0.537
Alcohol-related mortality	**−0.000**	**−0.001 to −0.000**	**0.049**
Alcohol-specific mortality	−0.000	−0.000 to 0.001	0.445
Ambulance callouts[c]	−0.000	−0.000 to 0.000	0.187
Effects on crime outcomes			
Public order offences	**0.001**	**0.000 to 0.002**	**0.004**
Sexual crimes	0.000	−0.000 to 0.001	0.771
Violent crimes	0.000	−0.000 to 0.001	0.199
	6-month lagged cumulative PHIAL score		
	Multivariable results[a]		
Outcome	**Effect[b]**	**95% confidence interval**	***p*-value**
Effects on health outcomes			
Alcohol-related hospital admissions (narrow)[c]	−0.000	−0.001 to 0.001	0.931
Acute alcohol-related hospital admissions[c]	0.000	−0.001 to 0.002	0.563
Alcohol-related mortality	**−0.000**	**−0.001 to −0.000**	**0.021**
Alcohol-specific mortality	−0.000	−0.001 to 0.000	0.315
Ambulance callouts[c]	−0.000	−0.000 to 0.000	0.139
Effects on crime outcomes			
Public order offences	**0.001**	**0.000 to 0.002**	**0.003**
Sexual crimes	0.000	−0.001 to 0.001	0.823
Violent crimes	0.0002	−0.000 to 0.001	0.219

a Full multivariable models adjusted for nation (England or Scotland), nation-specific time trends, season, area-level IMD, population density, average age, baseline PHIAL score and baseline outcome, and, for England only, whether an area was a LAAA. Presented results based on backwards selection from full model to obtain most parsimonious models (ensuring effect size does not change).
b Effect estimate (β) describes the change in outcome (per 100 events) with one unit change in 18-month average PHIAL score.
c Per 100 events.

They reported that it was not possible to make alcohol less available through licensing, and their support instead helped licensing teams to promote good management of bars/shops and prevent crime or disorder. (3) In the third approach, health stakeholders worked actively in close partnership with licensing teams. The approach taken was shaped by several factors, including the response of licensing stakeholders and constraints in the licensing system common to both England and Scotland, as well as in some cases, the presence or absence of a public health objective. Teams in Scotland all focused on challenging the licensing system to address concerns about availability. There was more of a mix of approaches in England, with some teams limiting their involvement to a passive, supportive role. Several teams in both nations took a collaborative approach, working closely with licensing colleagues and where a focus on challenging the licensing system to address availability often sat alongside efforts to influence the type or operation of premises that were licensed.[5]

TABLE 6 Associations (per PHIAL unit exposure) of changes in PHT engagement score (at each time point compared with previous time point) and selected outcomes

	Change in PHIAL score		
	Multivariable results[a]		
Outcome	**Effect[b]**	**95% confidence interval**	***p*-value**
Effects on health outcomes			
Alcohol-related hospital admissions (narrow)[c]	0.000	−0.0117 to 0.0119	0.990
Acute alcohol-related hospital admissions[c]	−0.001	−0.0263 to 0.0250	0.961
Alcohol-related mortality	**0.005**	**0.0008 to 0.0091**	**0.020**
Alcohol-specific mortality	0.006	−0.0042 to 0.0151	0.269
Ambulance callouts[c]	0.001	−0.0016 to 0.0040	0.409
Effects on crime outcomes			
Public order offences	−0.005	−0.0150 to 0.0051	0.333
Sexual crimes	0.004	−0.0024 to 0.0100	0.231
Violent crimes	0.002	−0.0028 to 0.0063	0.446
	6-month change in PHIAL score		
	Multivariable results[a]		
Outcome	**Effect[b]**	**95% confidence interval**	***p*-value**
Effects on health outcomes			
Alcohol-related hospital admissions (narrow)[c]	0.001	−0.011 to 0.013	0.829
Acute alcohol-related hospital admissions[c]	0.006	−0.020 to 0.031	0.663
Alcohol-related mortality	0.001	−0.003 to 0.005	0.628
Alcohol-specific mortality	0.006	−0.0044 to 0.016	0.277
Ambulance callouts[c]	0.000	−0.003 to 0.003	0.986
Effects on crime outcomes			
Public order offences	−0.009	−0.020 to 0.001	0.070
Sexual crimes	0.004	−0.002 to 0.010	0.168
Violent crimes	−0.000	−0.005 to 0.004	0.981

a Full multivariable models adjusted for nation (England or Scotland), nation-specific time trends, season, area-level IMD, population density, average age, baseline PHIAL score and baseline outcome, and, for England only, whether an area was a LAAA. Presented results based on backwards selection from full model to obtain most parsimonious models (ensuring effect size does not change).
b Effect estimate (β) describes the change in outcome (per 100 events) with one unit change in 18-month average PHIAL score.
c Per 100 events.

Many PHTs adapted their initial 'challenging' approach, which appealed strongly to international evidence and focused on actively reducing availability, to be more pragmatic and better aligned with the perspectives and goals of other stakeholders. In many areas, especially in Scotland, this did not mean dropping a focus on availability, but meant being more strategic about how to progress it, such as through policy. In some cases, licensing stakeholders spoke of a 'bedding in' process where they invested time in training PHTs until they possessed the knowledge and experience necessary to effectively engage in the licensing process. Others described how deliberations within the licensing system had benefited from public health involvement and focus on evidence. Our findings suggest that since being enabled to engage with alcohol licensing in 2011–2, the role of PHTs has evolved.

TABLE 7 Country-specific associations (per PHIAL unit exposure) of 6-month lagged 18-month average PHIAL score and selected outcomes

	6-month lagged 18-month average PHIAL score[a]		
		ENGLAND	
Outcome	**Effect[b]**	**95% confidence interval**	***p*-value**
Effects on health outcomes			
Alcohol-related hospital admissions (narrow)[c]	0.001	−0.010 to 0.011	0.910
Acute alcohol-related hospital admissions[c]	0.004	−0.009 to 0.017	0.560
Alcohol-related mortality	0.001	−0.003 to 0.006	0.561
Alcohol-specific mortality	0.004	−0.006 to 0.015	0.390
Ambulance callouts[c]	0.001	−0.001 to 0.004	0.303
Effects on crime outcomes			
Public order offences	**0.010**	**0.001 to 0.020**	**0.040**
Sexual crimes	0.001	−0.004 to 0.007	0.627
Violent crimes	0.001	−0.004 to 0.005	0.717
Effects on health outcomes		**Scotland**	
Alcohol-related hospital admissions (narrow)	0.004	−0.003 to 0.011	0.232
Acute alcohol-related hospital admissions[c]	0.002	−0.012 to 0.016	0.818
Alcohol-related mortality	−0.000	−0.004 to 0.003	0.823
Alcohol-specific mortality	−0.004	−0.011 to 0.003	0.280
Ambulance callouts[c]	−0.001	−0.004 to 0.002	0.509
Effects on crime outcomes			
Public order offences	**0.016**	**0.004 to 0.028**	**0.008**
Sexual crimes	**−0.009**	**−0.017 to −0.001**	**0.039**
Violent crimes	−0.002	−0.006 to 0.003	0.479

a Modelled using the same statistical models as used for main analyses, with the exception of country-specific time trends and removal of 'local alcohol action' in Scottish models. Full multivariable models adjusted for nation (England or Scotland), nation-specific time trends, season, area-level Index of Multiple Deprivation, population density, average age, baseline PHIAL score and baseline outcome, and, for England only, whether an area was a local alcohol action area (LAAA). Presented results based on backwards selection from full model to obtain most parsimonious models (ensuring effect size does not change).
b Effect estimate (β) describes the change in outcome.
c Per 100 events with one unit change in 18-month average PHIAL score.

Early challenges have been partially resolved through a range of practical and pragmatic solutions. Participants reported developments in several aspects of their role as staff experience, partnerships and data availability improved.

Reflecting the longer time period of data collection and the wider geographical spread, the findings from our structured interviews suggest that PHTs active in licensing have adopted a much broader range of approaches to influencing licensing than previously reported. These activities included resourcing, processes, responses, data collection, making representations, impacting on policy and licensing stakeholders, and engaging the public.

3.7 An examination of stakeholder beliefs on how changes in spatial and temporal availability enacted through the licensing system may impact on alcohol-related harms (Objective 4a, Research Question iii)

In this qualitative study, licensing stakeholders, including public health, found it challenging to articulate with confidence specific pathways by which increases or decreases in alcohol availability may impact on consumption and harms, and were largely unfamiliar with this way of thinking.[6] Stakeholders had a surface familiarity with available international evidence – some discussed the existence of evidence linking outlet numbers to harm, but none cited studies of the link between later opening hours and crime, despite this also being a strong feature of the international literature.[25,102,103] Their uncertainty also reflects current gaps in the evidence base, which have been highlighted in previous research[39,40] and are discussed further below. Nonetheless, the mechanisms discussed could be categorised into five overarching types as follows:

1. *Access*: Shaping consumption through ease/convenience of access or removal of access to alcohol.

This was the most straightforward mechanism discussed by participants, who linked greater access to alcohol with greater consumption and harms. Some public health stakeholders spoke of the potential for increased spatial availability to lead to increased alcohol consumption as a result of the 'convenience factor'. In addition, participants discussed how restrictions on temporal availability put controls on people's access to alcohol in situations where people were perceived as unable to control their own drinking. While these mechanisms were clearly described for increased availability, there was a sense that attempts to reduce harm through restrictions on availability may not be successful due to several potential moderators of this mechanism category, including, in England, the existence of 24-hour off-licences, and access to alcohol through online/app-based retailers or via home delivery services.

2. *Visibility*: Shaping consumption and/or consumption norms through visibility of alcohol (including pathways via drinking cues and normalisation).

Participants described two potential mechanisms of impact arising from greater visibility of alcohol. Firstly, increased spatial availability, whereby more premises would be seen by consumers, was suggested to increase consumption because each sighting could act as a reminder or 'cue' to drink alcohol. The second potential mechanism relating to visibility discussed by participants was based on the idea that greater visibility of alcohol would lead to children's normalisation of alcohol consumption. A few interviewees discussed this in relation to restricting off-licence opening hours in the morning, which was felt to have a potentially important role in limiting children's exposure to alcohol marketing and consumption during the morning school run. The pathway to greater alcohol consumption and harm was not explicitly described here but would presumably play out over a longer time period than the other mechanisms described.

3. *Premises and area-level norms*: Shaping norms of consumption or behaviour at premises or area level, through premises type and operation.

Several public health stakeholders in England felt that certain types of premises were more or less likely to be associated with alcohol-related harms because they enabled or promoted certain 'norms' of alcohol consumption and/or behaviour. A few suggested that certain 'vertical' drinking establishments (with more people standing rather than sitting) encouraged heavy episodic drinking, and that louder dance-focused premises may be associated with greater disorder and violence. Reducing the numbers of such premises could therefore have a positive impact, whereas food-focused premises were felt to be less likely to be associated with increased consumption or disorder.

Participants also noted the potential to impact on *area-level norms* or 'culture' by preventing vertical drinking establishments from opening but facilitating the opening of new food-based businesses. Such

'place-shaping' was also focused on off-licence premises, which were felt by some participants to be more problematic than on-licence premises, in part because off-licences tend to sell cheaper, high-strength alcohol (see next section below) but also because on-trade venues offer a more controlled drinking environment.

4. *Affordability*: Shaping consumption through pricing, including availability of high-strength/low-cost alcohol.

Several public health and licensing professional interviewees associated off-licence premises with greater alcohol consumption and harms than on-trade premises due to the greater affordability of alcohol available in the off-trade in general. The potential impact of temporal restrictions on off-licence sales in England (such as the limited opening hours – 10 a.m. to 10 p.m. – for off-licences in Scotland) was not discussed, although 24-hour off-licence opening hours were thought to limit potential benefits from limiting on-trade sales in England. Interviewees in England felt that the availability of high-strength, low-cost alcohol contributes to greater consumption and harms, including public health and crime and disorder. This category of products is not available in Scotland due to minimum unit pricing.

5. *Management of the night-time economy*: Shaping harms through manipulating the late-night environment (via staggered closing times).

The late-night availability of alcohol can also be manipulated through having staggered closing times for late-night on-trade premises rather than most premises closing at a fixed time. Some licensing stakeholders felt that staggered closing reduced the likelihood of public nuisance/disorder, by limiting the flow of customers exiting premises at the same time. Others suggested that staggered closing hours simply change the location of harms, because people leave one premises that closes earlier and find another nearby premises that closes later.

Several of these mechanisms encompassed more specific mechanisms of impact or pathways specific to certain population subgroups, including people with alcohol dependence and children. Some have not been studied previously; for others, evidence is mixed, weak or incomplete and merits further critical scrutiny, especially for specific subgroups and contexts.[39]

3.8 Stakeholder perspectives on implications of the COVID-19 pandemic

Licensing stakeholders reported that COVID-19 had 'changed the whole face of licensing' and gave specific examples relating to changed priorities and ways of working.[104] Some had to withdraw from work on alcohol licensing, whereas others noted a strengthening of partnership working with other licensing stakeholders also focused on COVID-19 matters. Several stakeholders expressed concern about relaxation of licensing regulations around takeaway alcohol and outdoor drinking spaces, which they feared might not be fully reversed. Interviewees further noted concerns about the reshaping of the market as a result of COVID-19, including difficulties for on-trade businesses and benefits for online and home delivery retailers.

4 Discussion and conclusion

4.1 Interpretation

4.1.1 Diversity of types and level of activity on licensing

By including a relatively large sample of PHTs (*n* = 39) and assessing their engagement in licensing over a long period (7 years), we were able to identify and assess for the first time, in detail and depth, the intensity of PHT activity to engage in alcohol licensing. Our finding that there are PHTs in England which do not engage at all in local licensing concurs with the findings of a prior study of eight London areas.[77] Our finding that many PHTs across England, and some in Scotland, engage only to a very low extent (e.g. only by logging applications or occasionally supporting representations made by others) accords with other research previously carried out in London.[78] This was predicted by Nicholls[48] when highlighting a 'risk of disillusionment, frustration, or simple lack of capacity' as threats to continued public health engagement in alcohol licensing. In our structured interviews with PHTs in lower-activity areas, it was apparent that lack of capacity, and prioritisation of other public health activities were factors in decisions not to engage during our data collection period (2012–9). The latter is likely to have been a more widespread issue during the COVID-19 pandemic.

In contrast, we also found many areas that had developed an impressive array of activities and systems to support a high level of engagement in licensing. Many of these activities have been identified previously in smaller studies as above and in Scotland, but the depth and breadth of our analysis has allowed us to distinguish cases where PHTs have gone furthest in their commitment to this work. We found examples of very detailed databases logging, tracking and evaluating decisions on licence applications which in some instances included notes on what worked well (or did not) in the PHT response to inform future practice. There is likely to be a rich data set in such systems that may be valuable to collate and analyse nationally. Many PHTs put significant effort into regularly curating data into summaries analysed by data zone or locality, presented in accessible formats for licensing colleagues and committee members. Others even established new data collection processes specifically to inform licensing. Some PHTs in England were highly active in engaging with applicants to influence premises operating plans and extract commitments on safety (e.g. CCTV), though this was generally considered a role for licensing colleagues rather than public health in Scotland. Scottish PHTs, in particular, made ample use of the public health objective to lead and submit independent representations or objections in response to licence applications. Some PHTs either led or significantly contributed to the actual drafting of SLPs, and others supported the active involvement of local communities in licensing. Differences in approach and innovative practices appear to have developed iteratively in areas and nations, but with some important influences specific to England or Scotland (discussed further below). No single PHT was highly active across all the activity types assessed, and no areas scored the maximum available. While some differences reflected deliberate decisions not to engage in certain activities, and PHT beliefs about the most effective or appropriate approaches (see below), the variation in activity points to opportunities for learning between PHTs that is not specific to Scotland or England. It also highlights the potential for further analysis of the impact of different activity types or groups. Further support from national bodies, perhaps working together, could enable such peer-to-peer sharing of practice, intelligence and experience going forward, as well as providing a route by which the practices and innovation identified in this study could be shared in greater detail.

4.1.2 Differences in activity between Scotland and England and in the approaches taken by public health teams: the influence of the public health objective

As this was the first comparative study across two licensing systems in the UK, we were able to compare in detail the extent to which being based in Scotland or England was a key factor influencing PHT practice. We found that variations in activity between PHTs in the two nations were influenced by legal,

structural and philosophical differences including, but not limited to, the presence of a public health objective in Scotland.[49]

Our findings suggest that the presence of a public health objective in Scotland has been helpful to PHT engagement by conferring legitimacy on public health stakeholders and data, as suggested in earlier English studies.[76,78] The objective appears to partly explain why PHTs in Scotland were more active in making representations or objections to licence applications independently of other stakeholders, and were more comfortable with adopting a challenging approach to the licensing system. The lack of a public health objective made some English PHTs less confident about doing so and was most likely a factor in some teams being more passive or choosing not to engage with licensing at all. Somerville found that some licensing and police stakeholders in England felt that a passive, supportive role for public health was most appropriate, though others felt that PHTs should have an equal role to other responsible authorities,[78] more akin to the situation in Scotland.

Early studies in Scotland show that the introduction of the public health objective was far from instantly transformative, and that many challenges emerged as stakeholders grappled with engaging in a licensing system that carried a traditional focus on local and individual concerns.[48,80] Public health stakeholders were new to licensing, and their expectations and approach have evolved over time as they have learned from experience and licensing colleagues.[5,82] For example, they no longer object to all licence applications and are more focused on the importance of the SLP, as well as building relationships with licensing colleagues and raising awareness of alcohol harms. Overall, there is a sense in Scotland that the public health objective, and the efforts of PHTs in conjunction with national advocacy work, may be slowly reorienting local licensing systems and stakeholders to be more comfortable with a broader, population-based lens. A comparison of local SLPs published in 2013 and 2018 in Scotland suggests that a more strategic approach is evolving on the promotion of the licensing objectives, as the statements 'attempt to place licensing policy in context, provide explanations for policy positions, refer to supporting evidence, and acknowledge and reflect the views of consultees in the formulation of policy'.[70] Other tweaks to the Scottish system may aid its evolution: a requirement for Licensing Boards to publish annual reports is seen as a positive move towards greater accountability on all the licensing objectives.[53,105]

Early struggles with the public health objective partly arose from a clash of perspective between public health and licensing teams, the former favouring international academic evidence, and the latter being more likely to value local data and practical knowledge in making decisions.[48,81,82] Our new data suggest that these struggles have lessened in some areas in Scotland (and to some extent in England), with both parties apparently developing a constructive understanding and appreciation of the value of different kinds of evidence. Some licensing stakeholders described how useful PHT approaches to, and contributions of, evidence have been. At the same time, public health stakeholders appear to have lowered prior expectations that the licensing system could simply reject licence applications across the board, or make a substantial difference to availability (see O'Donnell *et al*.[5] and below).

In summary, our data provide extensive evidence of successful PHT engagement in the licensing system in Scotland and England, but also show that such activity is generally higher in Scotland.[49] There is a widespread sense that the public health objective strengthens the role and legitimacy of public health involvement in Scotland and could helpfully do the same in England. It is important not to view the public health objective as a panacea, however, and to consider its introduction alongside other changes that may enable the licensing system to better protect against alcohol-related harms and within a broader evidence-based alcohol policy framework (see recommendations for decision-makers below).

4.1.3 Differences in activity between Scotland and England and in the approaches taken by public health teams: other important influences

By comparing the legal systems and structures in Scotland and England in detail alongside our in-depth data on PHT activities, we were able to identify influences on PHT activity other than the public health

objective that have not previously been highlighted in the literature. Seemingly small differences in the set-up of the licensing system appear to have an important influence on how PHTs engage in this arena.[49] The system in England allows a licence application to be granted without being considered at a committee meeting ('hearing') if there are no objections, creating an incentive for parties to agree. Thus, PHTs in England sought to negotiate with applicants or their solicitors to reach agreement on operating conditions or other changes to licence applications to avoid needing a hearing. This practice has been noted previously – for example, by Reynolds *et al*.[77] – but our analysis highlights that the same incentive does not exist in Scotland, where all new licence applications are considered at Licensing Board meetings. This also partly explains why PHTs in Scotland were less likely to negotiate on licence applications: they tended to be more focused on containing availability by preventing new premises from opening than on shaping how premises operated,[5,106] and felt that negotiation would not have made the same sense anyway.

It is also apparent that support from national bodies (AFS and PHE, as was) alongside regional groups in England is likely to have been an important influence. In England, the work of PHE on this agenda has recently waned, and some regional bodies no longer exist (e.g. DrinkWise North West). This may have influenced a falling-off of PHT attention to licensing in our study, which is quite likely to have been exacerbated by the COVID-19 pandemic. We also identified a surprising (mistaken) belief among some experienced PHT colleagues in Scotland that working with other SCs to share data and coordinate a joint response to a licence application would constitute illegal 'collusion'. There is no basis for this belief in civil licensing law, and it suggests a need for corrective communication with SCs, perhaps by licensing teams or AFS. Finally, Scottish PHTs did not generally feel it was appropriate for them to liaise directly with licence applicants; they seemed to be more sensitive to likely conflicting interests between public health and licence applicants. This may also reflect differing national contexts, with the UK government reported to be more comfortable with industry influence in alcohol policy.[107,108]

4.1.4 How public health team activity, and the licensing system more generally, may impact on alcohol-related harms

We found that the extent to which PHTs engaged in diverse activities to influence alcohol premises licensing policies and decisions was not associated with measurable reductions in health harms or crimes linked to alcohol, nor in overall ambulance call-outs, over the 7-year period of this study. This null finding raises important questions relating to alcohol availability, licensing and public health.

We were unable to quantitatively assess direct impact on the licensing system, in part because data on licensing decisions and licensed premises are not consistently or easily available, reliable or accurate. This means that we cannot be sure whether the lack of impact of public health involvement was because their activities failed to make a material change to the licensing system in their area (e.g. in terms of changing the number of licence applications submitted or the proportion that were approved) or because changes in the licensing system as a result of their involvement had no impact on alcohol-related harms. If the former, it would mean that PHTs did not materially influence licensing, perhaps merely reinforcing what would have happened anyway in the system. However, our in-depth interviews with public health and other licensing stakeholders suggested that PHTs provided valued input into alcohol licensing, contributing to or influencing decisions and policies in identifiable ways[5] as in earlier studies,[77] and the more likely explanation therefore is that such changes had little or no impact on alcohol-related harms.

However, PHT impact is situated within, and necessarily limited by, the relatively permissive nature of the licensing system in the two nations. Alcohol outlet density in the UK is high by international standards,[109] and even the strongest local licensing policies could not legally reduce outlet numbers, but merely contain them at current levels. Existing licences cannot be revoked on overprovision/cumulative impact grounds and licence applications can continue to be granted even in such areas.[65] In practice, even containment of physical availability is unlikely in most areas; while some Scottish Licensing Boards have put in place overprovision policies covering their entire jurisdictions, they usually apply to a

particular premises type. Furthermore, the systems for assessing CIZs/overprovision are not equipped to take account of the rise of remote sales, online and via apps, which involve direct delivery to consumers. Licensing stakeholders, PHTs and clinicians are united in their concern about the rise in such sales, particularly since the COVID-19 pandemic, and the inability of the licensing system to contain this kind of availability in any way.[70,104] National action to address online alcohol sales before they increase even further would likely help to prevent further rises in availability, levels of drinking at home, and related harms.

PHTs described two approaches to their licensing work, with some PHTs applying both. The first approach sought to influence local licensing policies to take a more assertive approach to containing alcohol availability in order to effect longer-term, potentially more radical, culture change. The second approach attempted to achieve more immediate impacts through 'fitting in' with local licensing system goals. For some teams engaging in the latter approach, this meant deprioritising a focus on availability. While the positive effects of reducing availability on alcohol-related harm is well supported by systematic review evidence,[29,32,110,111] the relevance of such evidence locally in the UK context is uncertain.[39] The evidence for effectiveness of interventions to manage the drinking environment (e.g. server training) is low, however.[111,112] No stakeholders raised the potential of other licensing systems that take a stronger approach to managing availability, such as through a 'surrender principle' as exists in Northern Ireland (whereby a new premises can only open by obtaining a licence surrendered by another premises)[113] or through restricting the sale of alcohol above a certain strength to be sold only in shops owned by the state, as in several Nordic countries.[114]

An important observation of our data is that PHTs and licensing stakeholders paid relatively little attention to opening hours for licensed premises, and that when talking about addressing availability they tended to think in terms of spatial (numbers of premises) rather than temporal availability. Recent studies in diverse high-income cities suggest that restrictions on temporal availability, particularly after midnight, may be very effective in reducing short-term alcohol harms from on-trade premises.[115,116] This may work even where physical availability is high, but was rarely a focus of public health stakeholders in this study. One reason for this may be uncertainty about the mechanism by which changes in opening hours may lead to any harms (see below). Importantly, participants cited the 24-hour availability of alcohol in England, and the resulting ease of access to online sources of alcohol at any time of day, as one moderating factor that might impede any benefits from early closing of on-trade premises. This raises the question of whether 24-hour availability of off-trade alcohol remains appropriate in light of new rapid delivery services and easy online access, and what its impact might be on the hospitality sector (see Section 3.5). Overall trends towards lower consumption since 2005 may undermine confidence in any link between greater temporal availability and increased consumption, though diverse (and sometimes contrasting) trends in different subgroups may be an important part of the discussion.

Closing premises earlier may be more compatible with economic development than preventing licences being granted.[117–119] This highlights the importance of documenting the impacts of licensing beyond health harms and crime to include impacts on nightlife and trade in future studies. In Scotland, recent analysis of alcohol policy statements found that more Licensing Boards across Scotland had extended premises' opening hours than reduced them, and there is a risk that there will occur a 'creeping' extension to hours.[70] Given robust evidence from other high-income countries associating later opening hours with increased assaults and ambulance call-outs, PHTs and licensing stakeholders may wish to be cautious. A separate study examining extensions in late-night hours in Glasgow and Aberdeen cities is under way. It is worth noting that the policy statement analysis for Scotland was conducted by AFS (without specific funding to do so) and is very helpful for understanding trends and developments in local licensing. Currently, there is no national monitoring or comparison of local alcohol policy statements in England.

The alcohol licensing system is a centuries-old, highly legalistic, local 'centre' of policy-making, with cultures of evidence and practice that are very different from those of public health. It has been argued

that long-term engagement may be necessary to see substantial impact.[48,82,120] It may therefore be unrealistic to expect PHT engagement in the licensing system to impact in a measurable way on health and crime outcomes, given the above constraints, in a 7-year period. However, such engagement may be starting to reshape thinking and practice in licensing to be more strategic and/or population-focused in some local areas, especially in Scotland. Radical changes to completely reshape the system (e.g. to that of Northern Ireland or to government retail monopolies)[113,114] are not under discussion; however, where national policy-makers are supportive, this may lead to small changes to licensing laws and guidance that will gradually have a positive impact. For example, Licensing Boards in Scotland are now required to publish 'annual functions reports' to facilitate transparency and some accountability. We also identified possible mechanisms by which changes in availability may gradually result in longer-term benefits (see below). It may well be that the impact of public health actors on the licensing system takes a long time to emerge, while, at the same time, unsuccessful PHT efforts lead to changes in the licensing system. This seems more likely where a public health objective has been set for licensing but is not clearly being achieved. Strong action on availability alone will not halt the normalisation of alcohol in everyday life, but it likely has a role to play in reducing harms as part of a package of wider policy measures, most of which are not under local control.[81]

Previous studies have shown a small positive effect of stronger licensing policies across a larger sample of local authorities in England[63,121,122] and in one London authority.[67] Our methods may have meant that we were unable to detect effects either because our area of analysis was too large (at LG level) or because our linear exposure–response analyses were aimed at obtaining average effects despite the complexity of the system under study. The effects of licensing (though not PHT activity) may be measurable in small areas with good, hyperlocal information on interventions, exposure and outcomes.[123] Better data on licences in use, premises operations, and so on would greatly assist with improving knowledge.

4.1.5 Mechanisms of impact of temporal and spatial availability on alcohol harms

Five overarching mechanisms by which alcohol availability was perceived to impact on harms emerged from in-depth interviews with licensing stakeholders.[99] These were: access/convenience, visibility (including pathways via drinking cues and normalisation), premises- and area-level norms of consumption and behaviour linked to characteristics of different premises, affordability (including that arising from availability of high-strength/low-cost alcohol), and management of the night-time economy (e.g. through staggered closing times). These mechanisms are plausible and not typically discussed or scrutinised in previous availability literature, in which theories largely focus on explaining why clusters of outlets or specific individual outlets are associated with elevated rates of harm, especially crimes.[124–126] Further research could identify and assess the evidential basis for the mechanisms suggested (see below).

Current evidence underpinning the links between availability and harms is mixed and also merits further critical scrutiny, especially for specific outlet types, specific subgroups (including individuals in recovery, heavy drinkers and women), areas of differing geographical, cultural and socioeconomic profiles, and over a longer time period, as well as on outcomes such as types and levels of drinking and harms, and harms to others from alcohol.[39,127] Further limitations in the evidence around the role of online availability,[128,129] availability relative to a person's place of work or daily travel, and interactions between availability and price[39] may also give rise to expanded areas of focus for developments in the licensing system and public health practice.

Of the mechanisms suggested in our data, the importance of visibility is supported by evidence on the pro-consumption influence of visibility as a 'drinking cue' for both drinkers and those in recovery,[130] triggering a desire for alcohol[131,132] outwith the control of the individual.[133] The idea that visibility of premises might also be a normalising influence on children's attitudes towards alcohol (like a form of marketing) is emerging from studies of children's exposure to alcohol in different settings, and children's own expressed desire for reduced exposure.[134,135]

Stakeholders also suggested that attempts to remove low-cost, high-strength alcohol from sale in off-licences were motivated by a desire to 'control the drinking of those unable to control it themselves', such as people with alcohol dependence. While there was an implied link in stakeholder reports between earlier alcohol consumption and greater consumption later on a night out, they did not mention the direct influence of intoxication as being a similar barrier to control for late-night drinkers. This may be an important omission in discussion of restrictions on sales late at night – and is easy to understand. The risks suggested by stakeholders arising from the norms of specific types of premises, including 'vertical drinking' establishments, can be explained by Gruenewald's 'niche theory': alcohol premises engage in 'niche marketing' to specific social groups, drinkers return to establishments at which they find people like themselves, and consequent social stratification of the marketplace increases the levels of related problems in some outlets.[128] Efforts to 'place-shape' through licensing policies welcoming applications from certain types of licensed premises while discouraging vertical drinking establishments (e.g. in cumulative impact areas) may have limited effectiveness.

Licensing stakeholders, including public health, found it challenging to articulate specific pathways by which changes in alcohol availability may impact on alcohol harms, and were largely unfamiliar with thinking about mechanisms of change. This may be due in part to the absence of discussion and scrutiny of some of these mechanisms in the availability literature, as well as to weaknesses and limitations in the studies that have considered links between availability and harms. The inability of stakeholders to clearly articulate stories of these mechanisms is likely to hinder their ability to effectively advocate for changes in licensing at local or national level, as evidence suggests that such stories may be at least equally important as, if not more important than, academic evidence in influencing local policy-makers.[48,136]

4.2 Implications

The implications of the study are outlined below, with reference given to specific findings where relevant. We also include overarching suggestions for future change arising from reflection on the findings as a whole.

4.2.1 Implications for policy and policy-makers

1. *A strategic national approach in England and in Scotland to managing the availability of alcohol is needed* to monitor, evaluate and propose responses to trends and progress in availability and licensing in terms of the statutory objectives, with joint leadership from government departments responsible for justice, health and child protection. This national approach should include:
    a. *an open online licensing and availability database* (to address several weaknesses in current data) comprising an accurate and live register of licensed premises currently trading, including: type of premises, ownership, conditions of licence, size, indoor and outdoor capacity and trading hours, date opened, and sales information for alcohol delivered (see Section 2.2)
    b. *routine comparative analysis of local licensing policy statements and licensing data* for content, development and trends in efforts to deliver on licensing objectives in the public interest (see Section 4.1.4)
    c. *adequately resourced national support for local PHTs* involved in licensing to inform them about relevant legal and national developments and to enable peer-to-peer sharing of practice, intelligence and experience, including identification of common challenges and solutions (see Section 4.1.1)
    d. *regular review of whether the licensing systems are likely achieving the objectives set for them*, including consideration of whether reform or replacement of the system would be in the public interest and potential benefits or risks of alternatives in terms of achieving the objectives (Section 4.1.4 & 4.1.5).
2. *A public health objective for alcohol licensing should be introduced in England without further delay*, as there is convincing evidence that it would be valuable to, and valued by, public health and other licensing stakeholders. This would help to legitimise the role of health and health data in the

licensing system in England and has been implemented in constructive ways in the system in Scotland. The new objective should be planned alongside other changes in law or guidance to better enable the licensing system to achieve the licensing objectives (Section 4.1.2).

3. *Policy-makers should act as a matter of urgency to review, trial if necessary, and implement policy options for the regulation and restriction of remote (online/app-based/telephone/delivery-based) sales of alcohol nationally*, given the reported rise in such sales and in harms arising for some groups following the COVID-19 pandemic. Such a review should include concerns about age verification but go beyond this to consider the contribution of these sales to overall availability and harms, and how they undermine local efforts to address the cumulative impact of alcohol outlets in a given area (Section 4.1.5).
4. *Given the constraints on the licensing system in terms of reducing or even containing availability, the Scottish Government should clarify how current licensing (or other) legislation is intended and expected to address the availability of alcohol and its intended contribution to reducing alcohol-related harms* (overarching recommendation). The national alcohol framework for Scotland identifies the licensing system as the mechanism through which action on the availability of alcohol will be taken forward, in part because addressing availability is one of just three 'best buys' for alcohol policy identified by the World Health Organization. However, it is not currently clear how progress can be achieved.
5. *A national alcohol strategy for England is needed*, to include action on alcohol availability and the matters raised in this report, as one of the three 'best buys' identified by the World Health Organization for reducing alcohol-related harms (alongside regulation of marketing and pricing of alcohol). (Overarching recommendation).
6. *Research funders (NIHR, CSO, Scottish Government, UK Government) should seek to address gaps in current understanding about mechanisms of impact of availability changes on harms.* This should include a scoping review of relevant evidence as well as primary research to fill gaps identified; for example, studies of how children and people in recovery from alcohol problems are exposed to and impacted by alcohol's spatial and temporal availability and how it may promote the normalisation of alcohol consumption across diverse groups and situations. Further work is needed to create accurate evidence-informed stories of the potential mechanisms for PHTs to draw on when communicating with policy-makers. In the meantime, these potential mechanisms can be borne in mind by public health and licensing stakeholders when making decisions on local licensing policy (Section 4.1.5).

4.2.2 Implications for practice (including public health teams)

1. *Given the importance of availability as a key driver of alcohol harms, PHTs should continue to engage with local alcohol premises licensing systems to provide an important and necessary context for policy development and decisions.* Given that the value of such engagement remains uncertain in the short to medium term, PHTs should be realistic about how their involvement could influence local licensing policy and practice over time. Their involvement and experiences should be carefully evaluated, as reporting the challenges faced by PHTs, or their failures, may be a prerequisite for improvements in national licensing legislation and is often valued by other stakeholders (Section 4.1.4).
2. Reducing or preventing increases in availability is a long-term aim, unlikely to be realised in the lifetime of a SLP, but increased use of health data and evidence in the formulation of licensing policy and decisions should be recognised as a legitimate and positive outcome of public health engagement (Section 4.1.4).
3. Greater consideration should be given by PHTs and other licensing stakeholders to current evidence suggesting that increases in temporal availability may drive increases in harms (Section 4.1.5).

4.2.3 Implications for research and recommended future research

In what we believe to be the first study of its kind, we developed and applied a novel measure to systematically assess the nature and intensity of public health engagement in local alcohol premises licensing in England and Scotland, identifying and describing 19 distinct activity types. We used this assessment to examine the impact of public health engagement in licensing on health and crime outcomes in the local licensing area over the 7-year period of this study, and found no evidence of such impact. As the first comparative study of licensing in England and Scotland, our findings add

to understanding of the licensing systems in the two nations by highlighting legal, structural and philosophical reasons for differences in public health practice on licensing, expanding current knowledge by identifying important influences beyond the presence/absence of a public health objective. We found that PHTs in some Scottish areas are now working well within their local licensing systems and making some progress in establishing the legitimacy and value of their data and input, influencing policy and decisions. This advances earlier evidence by suggesting that initial challenges facing PHTs may be overcome in some areas. We report novel data from a large in-depth interview study that highlights potential mechanisms of impact of alcohol availability that are not typically discussed in current literature, including visibility and affordability. Taken all together, this study adds to knowledge about the current state of the licensing systems in Scotland and England from a public health and public interest perspective. It also highlights other limitations of the systems brought to the fore due to the COVID-19 pandemic, including an inability to address online sales and the lack of a national approach to data, monitoring and support.

We discuss areas for future research below.

Public health teams' engagement in licensing

The PHIAL measure enables prospective data collection on public health activity in future studies, which would largely eliminate issues of recall bias and missing data. Our 39 PHTs can provide a cohort with which PHIAL could be used continuously to enable rapid identification of new public health approaches, or to evaluate the impact of changes to licensing regimes on public health practices. The measure (adapted as needed) could also be used to examine public health practice in different areas around Great Britain or in other jurisdictions with similar licensing regimes.

Further research could analyse the databases kept by some local areas to log action on licence applications. Timely, comparative monitoring could identify trends and anomalies in decision-making across multiple Licensing Committees, successful public health approaches, and legal aspects requiring clarification or change.

We did not analyse the relative impact of different approaches to engaging with licensing (e.g. multiple representations vs. negotiated agreements with applicants), nor did we conduct analysis of the impact of specific components examined by the measure. While likely to be valuable for PHTs, this would best be done alongside a detailed assessment of local licensing systems in policy and practice (see below). Additional information on alcohol licensing policies and environmental changes that, for example, may have affected alcohol availability and related harms in the areas would have enabled modelling of complete hypothesised causal pathways from PHT engagement influencing licensing policies and decisions which in turn might impact on alcohol-related harms. This would enable assessment of whether specific PHT approaches changed the licensing system as intended, as well as assessment of health and crime outcomes, allowing for the modelling of complete hypothesised causal pathways.

Finally, it would also be useful to better understand why some Scottish PHTs held erroneous beliefs about collusion with other stakeholders, and how clarification of this may change practice.

Licensing systems' impact on availability and harms

The licensing system, including provisions for assessing cumulative impact/overprovision, is not equipped to address remote, online or app-based sales involving direct delivery to consumers. Alongside 24-hour availability of off-trade alcohol in England, these services enable rapid, convenient access to alcohol at any time of day or night. Further research is needed to better understand the market for and growth in these services and how they could be better regulated in the interests of public health. Such studies should also consider the impact of these services on the on-trade hospitality sector and local economies more generally, and public and stakeholder views on potential regulation.

Other differences between the licensing systems in Scotland and England merit further exploration: the consequences of allowing licence applications to be granted without a hearing if no representations are submitted, and the importance of legal differences around licensing of one-off events (occasional licences in Scotland, temporary event notices in England) and extensions of hours.

Analysis and monitoring of SLPs of local areas in Scotland has proved valuable in identifying trends in opening hours, overprovision areas, public involvement in licensing and so on. A similar exercise in England would be more onerous but could have significant potential.

If a public health objective is introduced in England, it would be important to examine what difference it makes to public health and licensing practices in both higher- and lower-activity areas at baseline, potentially using the same PHTs as in this study as a baseline, but combined with a measure of the strength of the licensing system as above.

Mechanisms of impact of availability on harms

Current evidence on the links between availability and harms is mixed, and further evidence is needed around several aspects, including impacts for specific subgroups and contexts and by premises type, as discussed by others.[39,127] This evidence base would be enhanced by considering the intersectional nature of disadvantage and how this relates to both experiences of availability and outcomes associated with drinking. Addressing further limitations in the evidence around the role and use of online alcohol availability[128,129] will be important in developing further regulation of such sales.

Our in-depth interviews provide insights into some of the mechanisms by which licensing stakeholders believe temporal and spatial availability interventions may impact on alcohol-related harms. The findings point to areas for further research around the relationship between outlet density and the visibility of alcohol cues or affordability. Systematic scoping reviews of the literature to establish the extent of evidence underpinning the different pathways proposed, as well as further expert analysis, would enable more comprehensive (and critically informed) theories of change to be developed.

We have recommended support for PHTs to help them articulate clear narratives regarding the potential links between availability and harms; it would be valuable to evaluate the process and outcomes of disseminating such narratives and their impact on decision-making.[44,137]

Future studies evaluating changes in availability could benefit from considering the mechanisms of change suggested by our interviewees and including relevant outcomes to add to understanding of the diverse impacts of alcohol outlets on alcohol-related harms in the long and short term.

4.3 Strengths and weaknesses of the study/in relation to other studies

4.3.1 Overall strengths

To our knowledge, this is the first study to gather primary data on public health engagement in licensing from professionals across differing licensing regimes, and to seek to quantitatively assess the impact of that engagement on health and crime outcomes. The study was ambitious in both scale and endeavour. The data set is based on 94 structured interviews with public health professionals, alongside extensive documentation analysis from 39 PHTs in diverse communities over a 7-year period. It also includes 53 in-depth interviews with licensing stakeholders, including public health, in 20 local authority areas. The natural experiment that we sought to evaluate – diversity of public health engagement in licensing by different PHTs around the UK – was not created by the presence or absence of a discrete action or policy in different locations. Instead, it was a complex intervention consisting of multiple components that evolved and differed in nature and intensity within and between PHTs over time, without a clear start or end point – and which had not previously been

systematically documented or assessed. While not a systems study in the sense that we did not analyse other potential influences on the outcomes in question during the time period in each local area, the use of extensive qualitative data to help understand and explain the quantitative findings fits well with developments in natural experiment evaluations more generally.[138,139] We published a detailed protocol identifying our primary outcome measure,[1] and registered our analysis plans in advance (researchregistry6162).

The new PHIAL measure that we developed, and the methods we used to develop it,[2] provide a template for future research in the UK and elsewhere, both on public health involvement in licensing and on similarly complex real-world practices in other fields. Our comparison of legal, structural and philosophical reasons for differences in public health practice on licensing between Scotland and England expands current knowledge by identifying important influences beyond the presence or absence of a public health objective. This analysis provides an authoritative and thorough guide to the similarities and differences between the two licensing systems, and consequent implications for public health practice, that is likely to be of interest to those considering the design and implementation of licensing regulations in similar permit-based systems worldwide. Our in-depth interviews provide novel data by considering licensing stakeholder views on the specific mechanisms by which temporal and spatial availability interventions may impact on alcohol-related harms. These findings add considerably to the international literature by proposing potential mechanisms of impact not routinely discussed in relation to availability of alcohol, including visibility of alcohol cues and affordability. Finally, the combination of quantitative and qualitative analysis, in-depth interviews and expert input enabled a comprehensive and realistic assessment of the likely impacts of public health engagement in licensing, highlighting the limitations of the two licensing systems in addressing availability and harms, and recommendations for development of the systems in both nations from a public health perspective.

4.3.2 Strengths and limitations in structured data collection (and exposure measurement)

We sought to capture PHT activity levels accurately across the time period, using extensive documentary and interview data. Given the duration and breadth of data of interest, our large sample of diverse PHTs is a strength and provides examples of a comprehensive range of relevant activities. The activity categories and some of the subcategories (e.g. public involvement; influencing stakeholders) likely have widespread relevance. We took a team approach to coding and analysing the interview data, keeping reflective notes to iteratively develop the coding framework (which ultimately informed the PHIAL measure). We continually discussed the emerging findings across the team and checked and rechecked the coding against the data. We drew on extensive interview data in our analyses and involved legal experts and colleagues from AFS and PHE (as was) to strengthen our knowledge base, in particular when interpreting the potential reasons for differences in practice between Scotland and England.

In terms of limitations, we are unlikely to have captured all possible public health approaches to engagement in alcohol licensing in England and Scotland, and less so where different licensing regimes apply (in Northern Ireland as well as abroad). It is possible that the teams that agreed to be part of the study were biased in terms of being more interested in this issue generally than those which did not. A further possible selection bias could be that teams that did not participate were busier or otherwise under more pressure for time than those which did. In terms of affecting the transferability of our findings, given that we did not find any effect of PHT involvement in licensing on health and crime outcomes even in these interested teams, it is unlikely that the findings would have been different for teams that were on average less interested or too busy to engage with the study. Our data were also limited by recall bias: staff changes and poor records sometimes meant that there were gaps in interviewee knowledge of earlier practices or the reasons for such practices. In many, but not all, cases we were able to interview former staff to minimise the impact of this.

4.3.3 Public health engagement in alcohol licensing measure

Standardisation of measurement is an essential tenet of the scientific method, but applying standard measures within complex public health systems can be challenging.[140] The PHIAL measure is new, has been transparently and robustly developed, and explicitly accounts for the diversity in real-life approaches taken by PHTs as they engage in local alcohol premises licensing. The measure successfully captured differences in type and level of public health engagement in licensing within and between areas over time, with high face validity. Advisory input from a wide pool of PHT and licensing representatives as well as national experts gives us confidence that the PHIAL measure will be relevant and applicable to PHTs across England and Scotland, despite differences in organisational structures and licensing law. Our approach was informed by best practice in developing composite measures.[141] As this is the first measure of its kind in the UK or internationally to our knowledge, there is no gold standard or alternative measure against which we can assess PHIAL.

The measure and the scores generated are subject to several limitations. Through in-depth discussion among our large and varied team, with input from experts, and taking cognisance of prior literature, we made a series of judgements on the scope and the granularity of measurement. These ultimately impacted on what was scored and weighted. Our final definition of relevant PHT activity excludes efforts to change retail practices through direct engagement with existing premises or support for industry-led voluntary best practice schemes (which were in our first draft) but includes efforts to place binding operating conditions on new licences. This reflected our primary interest in licensing systems rather than business practices, and evidence suggesting that such direct working was unlikely to have significant impact.[142,143] There has also been some research into industry-led local initiatives which, though not part of the licensing system, are sometimes delivered in partnership with local authority stakeholders involved in licensing.[144–146] For example, voluntary withdrawals of cheap, high-strength beers and ciders from off-licences may increase the average price of certain types of available beverage,[144] but can be circumvented by shoppers purchasing different products or shopping at non-participating stores.[145] We discussed these initiatives in our consideration of mechanisms of impact in in-depth interviews, but they would not have been captured by the PHIAL measure except in so far as they formed part of negotiations on new licence applications.

In our comparison of practice between Scotland and England, we did not statistically analyse differences, as the study was not designed to do so; thus we only explore differences here that are very clearly visible in the data reported (see *Figure 3*). Secondly, some of the 19 types of PHT activity cover more than one specific activity and we are unable to disaggregate these to compare practice in Scotland and England at a more granular level.[49]

We assessed activity over a lengthy period (7 years), which meant that some uncertainties in historical activity could not always be resolved. Having exhausted all PHT sources, we resolved uncertainties in discussion by taking an 'on the balance of probabilities' approach where necessary. This limitation would not apply to a prospective study in which the PHIAL measure could be applied to contemporaneous public health activity. The grading process for individual PHTs inevitably involved some subjectivity of judgement, especially where data quality was lower. We sought to reduce variability by asking graders not to grade data if unsure, keeping reflective logs of uncertainties, having a second researcher review all grading, and resolving all issues by consensus. Grading guidance notes were added to the measure as needed. While this will have improved the reliability of grading, we were unable to conduct formal inter-rater reliability checks due to changes of staff within the study team.

4.3.4 In-depth interview data

The size and diversity of our data set – drawn from 53 interviews with public health, police and licensing stakeholders, including local authority lawyers and elected politicians from regions in both Scotland and England – is a key strength of this element of the study. The use of lengthy qualitative interviews provided each interviewee with the scope to discuss a wide range of views and issues based on their own understanding of what was important. While the number of participants was fewer than we

originally envisaged (80), the interviews were longer than anticipated and it is questionable whether a larger sample size would have offered value for money or added substantially to our findings. We did not include PHTs that had little or no engagement in alcohol licensing, though we were able to recruit 19 of them for structured interviews. Their rationale for not engaging may have shed further light on challenges or limitations in this work, though those are arguably well covered in earlier work.[76–78,81,85,105]

Some public health interviewees struggled to articulate their rationale for involvement in alcohol premises licensing or the mechanisms of impact of availability on harms at the time of interview; interview topics could be provided to interviewees in more detail in advance to overcome this limitation in future studies. The findings on public health approaches to licensing are necessarily limited to the experiences of these participants. We did not routinely collect data on participants' years of relevant experience, so we could not examine whether that affected approaches or mechanisms discussed. The mechanisms identified by interviewees are necessarily grounded in an England/Scotland perspective but, given the novelty of the work, have potential to contribute to theory, practice and research internationally.

4.3.5 Quantitative analysis of impact of public health team engagement on licensing

The study was based on a matched sample of areas of higher and lower engagement that were comparable with respect to other relevant characteristics. Furthermore, inferences were strengthened by the longitudinal nature of the data. Temporal patterns of primary exposure varied between and within areas over time, avoiding erroneous inferences resulting from positive or negative correlations between exposure and outcome observed in all areas across the time period. This is similarly a strength for the 'change in PHIAL score' metric, but not for cumulative exposure, which increases over the study period. An important limitation of this study is that the PHIAL exposure metric itself is not intuitively interpretable. Although the semiquantitative score enables the assessment of correlations between exposures and outcomes, the practical implication of observed associations is unclear. The analyses would further have benefited from additional information on alcohol licensing policies and environmental changes that, for example, may have affected alcohol availability and related harms in the areas, and which would have enabled modelling of complete hypothesised causal pathways from PHT engagement influencing licensing policies and decisions which in turn might impact on alcohol-related harms. We had originally intended to develop a second intensity measure exploring the strength of the local licensing system from a public health perspective, but we had underestimated the work involved in developing a new composite measure. We did not have the capacity to develop a second such measure, given that this would have required extensive manual data collection because of a lack of centralised, systematic and accurate data on licensed premises. It is likely that such a measure would still be useful for future analyses. Our sample size was informed by statistical power calculations for alcohol-related hospital admissions and crimes based on relevant previous research[1] but which was not an exact parallel, as this was the first study of its kind. As our focus was evaluating the indirect effect of PHT engagement on downstream harms, it is likely that, if associations exist, the effect size would be smaller than in the studies used in our statistical power analyses. This quantitative aspect of the study would have benefited from a larger sample size. However, with 39 areas and 119 interviews already included in the qualitative elements that generate the PHIAL scores, adding more PHTs to the study would quickly have become prohibitively resource-intensive.

4.4 Conclusion

Public health efforts to engage in local alcohol premises licensing systems did not yield measurable reductions in alcohol-related harms in the 7-year time frame of this study. Diverse and resourceful public health activities seem to be slowly reorienting the licensing system towards taking account of health considerations in policy, practice and decision-making in some licensing areas in both England and Scotland. Such progress is more clearly emerging in Scotland, where there is a public health objective. The system as currently established is unable to address alcohol availability due to specific

constraints, including a lack of mechanisms to reduce the number of licences or contain online sales. Therefore, while continuing PHT engagement may incrementally establish public health as a routine consideration in licensing practice, large-scale reductions in harms are likely to require changes to primary legislation. The core components of the licensing system are established in national legislation and guidance; however, there is little or no infrastructure or mechanisms in place to assess or monitor trends in the extent to which current licensing systems achieve the stated licensing objectives. Progress in reducing harms related to alcohol availability will require continued policy-maker attention and support, including improvements in data systems, monitoring and research to inform future policy developments, and urgent action to address online availability.

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All co-authors reviewed and approved the synopsis report.

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Ethical and other approvals

Ethical approval for the study was granted by the University of Stirling Ethics Committee for NHS, Invasive or Clinical Research (NICR 16/17 – 064/064A) and the London School of Hygiene and Tropical Medicine Observational/Interventions Research Ethics Committee (14283). NHS Research and Development approval was secured from all participating NHS Boards in Scotland. This was not required for PHTs in England, which are based within LG.

Information governance

The data controller for this study was the University of Stirling. Personal data were limited to contact details for practitioners, which was processed by the University of Stirling and the London School of Hygiene and Tropical Medicine. All data, including recordings and transcripts, were held in confidence, stored securely and destroyed in accordance with University procedures. All research activity complied with the standards detailed in the Research Governance Framework for Health & Community Care, health and safety regulations, data protection principles, other appropriate statutory legislation and in accordance with Good Clinical Practice.

Data-sharing statement

All data requests should be submitted to the corresponding author for consideration. Access to anonymised data may be granted following review.

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Glossary

Alcohol and Drug Partnerships Multiagency, strategic bodies in Scotland responsible for delivering local action on alcohol and drugs.

Applicant A person applying for a licence with the intention of carrying on a business selling alcohol or applying for a personal licence.

Cumulative Impact Zone (England) Area where there is evidence to show that the type or density of premises is having a cumulative impact that may undermine one or more of the licensing objectives.

Elected representatives/members Politicians elected to represent a local constituency in the local government administration. Across England and Scotland, these individuals are frequently referred to as 'councillors' or 'local councillors' and the local administration is referred to as the local 'council' or 'local authority' (see below).

Health and Social Care Partnerships Joint NHS Board–local authority organisations that exist in Scotland (but not England) and are responsible for delivering some local services.

Licensing Committee/Board A group of local elected representatives (councillors) who carry out licensing functions as delegated by the local authority and are elected by the local authority for a term of 4–5 years. In England 10–15 councillors sit on the main Licensing Committee, which is responsible for oversight and strategy; however, routine hearings for licence applications are usually delegated to a smaller licensing subcommittee consisting of three or more councillors. In Scotland, membership of the Licensing Board is 5–10 councillors.

Licensing conditions Restrictions attached to any licensing permission which determine how an outlet can operate. There are both discretionary conditions (which are applied on a case-by-case basis) and mandatory conditions (statutory conditions that apply to all licences). Statements of Licensing Policy will often contain a 'pool' of standard conditions that set out the types of conditions the licensing authority expects to impose.

Licensing advisor/lawyer/clerk Employee of local government who provides legal support and advice to the Licensing Committee/Board.

Licensing officer Employee of local government who supports the administration of the licensing system locally, provides guidance to those who hold or wish to apply for a licence (licensees), and monitors and supports compliance with licence conditions and the law.

Licensing objectives Objectives set for the licensing system to guide decisions and policy. Licences cannot be approved if the licensing authority deems that to do so would undermine one or more of these objectives.

- Objectives in England: (1) the prevention of crime and disorder, (2) public safety, (3) the prevention of public nuisance, (4) the protection of children from harm.
- Objectives in Scotland: (1) preventing crime and disorder, (2) securing public safety, (3) preventing public nuisance, (4) protecting and improving public health, (5) protecting children and young people from harm.

Licensed premises A building or defined location which is licensed to legally sell alcohol to the public for consumption either on or off the premises (known as 'on-trade' or 'off-trade' premises, the latter also being known as an 'off-licence').

Licence variation Any change to an existing licence; can include changing licensed hours, layout of venue, function of venue, and must be applied for.

Local authorities Local government bodies comprising elected members and staff. They are often referred to as 'councils'. Local authorities provide public services, including health (in England), social care, licensing, environmental health, education, libraries, leisure facilities and planning. Scotland has 32 local authorities. England has evolved a more complicated structure that varies by area. In some English areas there are two tiers of local authority: an upper-tier 'county' or 'shire' council, which divides into smaller, lower-tier 'district', 'borough' or 'city' councils. In other areas there is just a single tier, often called a 'unitary authority'. England has 24 upper, 181 lower, and 128 single-tier authorities. Public health teams working on licensing in England are employed by the local authority.

Local National Health Service (NHS) Boards ('Health Boards') In Scotland, local NHS Boards are responsible for administering the NHS in local areas and with responsibility for public health. These Boards became statutory consultees to the licensing system in 2011. Public health input to licensing in Scotland involves public health departments based in the local NHS Board, but can also involve practitioners in Health and Social Care Partnerships or Alcohol and Drug Partnerships.

Overprovision (Scotland) Licensing Boards are mandated to identify localities within the Board's area deemed to be 'overprovided' by alcohol outlets in general or outlets of a specific type, giving regard to the number and capacity of premises and any other matters as the Licensing Board sees fit. Overprovision assessments form part of the Statement of Licensing Policy for each area in Scotland.

Premises licence Authorisation that permits alcohol to be sold at or from the premises, under certain conditions.

Responsible authority (England) Party that is notified of licence applications. Includes local government departments (licensing, environmental health; Trading Standards; planning; child protection, the Director of Public Health); police; fire and rescue; health and safety authority; Home Office immigration enforcement authority.

Representations Comments on, or objections to, new licence applications (or applications for a variation of an existing licence) submitted to the licensing authority. In England, in areas not subject to an overprovision or cumulative impact policy, licences cannot be rejected unless a representation is received.

Statement of Licensing Policy Local policy established by the local authority, which sets out how licensable activities will be regulated as well as expectations of licence holders and operators. In England this is usually set every 5 years and is kept under review during this period. In Scotland this is published within 18 months of local government elections (normally held every 5 years) and kept under review. Licensing Boards are also required to publish an annual functions report stating how the Board has had regard to the licensing objectives and their policy statement.

Statutory consultee (Scotland) Party that is notified of licence applications. Includes the local government body, any community council within whose area the premises are situated, the relevant local NHS Health Board, the Chief Constable, and the local fire authority.

List of abbreviations

A&E	accident and emergency
AFS	Alcohol Focus Scotland
CIP	cumulative impact policy
CIZ	Cumulative Impact Zone
EXILENS	Exploring the Impact of alcohol premises Licensing in England and Scotland
IMD	Index of Multiple Deprivation
LG	local government
LNL	Late Night Levy
NHS	National Health Service
PHE	Public Health England
PHIAL	public health engagement in alcohol licensing
PHT	public health team
SC	statutory consultee
SLP	Statement of Licensing Policy
WP	work package

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Appendix 1 Further information

Dissemination approach and plans

Our planned academic publications are listed in *Table 1* in the main body of the synopsis and our conference abstracts are listed in *Table 8*. Our approach to dissemination has been one of extensive stakeholder involvement throughout the study. We have regularly briefed Scottish Government and Public Health England/UK Government, public health and advocacy colleagues on our progress and emerging findings throughout, including several meetings of the UK Public Health and Licensing Network. In the interests of brevity, we do not outline all contacts here, but give details of our most important recent dissemination activities and plans in brief in the UK.

- NF was a member of a 'Health as a Licensing Objective' short-life working group established by the Office for Health Improvement and Disparities (OHID), UK Department of Health and Social Care and will continue to support that group to understand and interpret ExILEnS findings and recommendations for decision-makers.
- NF was a witness at a hearing of the Scottish Parliament Health, Social Care and Sport committee on 1 March 2022 focused on alcohol policy and will share emerging publications with members of the committee via the committee clerk. This led to a follow-up call with the Shadow Cabinet Secretary for Health and Social Care.
- We submitted a response to the Northern Ireland Communities Committee consultation on new licensing legislation in January 2021. We also responded to a Scottish Government consultation on licensing guidance in August 2019.
- We will continue to liaise directly with government colleagues (with either alcohol policy or licensing responsibility) to share and discuss the implications of our findings and recommendations.
- We are exploring the possibility of publishing and disseminating our 'diverse practices' paper as a toolkit for PHTs, with the support of AFS and OHID.
- We hosted a stakeholder meeting on 21 November 2022 to which all participating PHTs were invited, and offered financial support to attend, along with decision-makers in licensing policy from government and public health agencies. This was organised in conjunction with another NIHR-funded study: 'Communities in Charge of Alcohol'. A separate ExILEnS dissemmination workshop was held on 13th June 2023 in Stirling for relevant stakeholders based in Scotland.
- We will utilise social media and blogs to summarise and highlight our findings as they are published.

Conference presentations

TABLE 8 Conference presentations

Citation	Conference
Niamh Fitzgerald, Rachel O'Donnell, Richard Purves, Andrea Mohan, Nason Maani, Matt Egan (2021). Exploring the key drivers for and acceptability of public health team engagement in alcohol premises licensing	Kettil Bruun Society Annual Meeting, 2021
Cheryl McQuire, Claire Ferraro, Pippa Williams, Madeleine Henney, Colin Angus, Matt Egan, Niamh Fitzgerald, Frank de Vocht (2021). Does increased public health team engagement in alcohol licencing improve health and crime in the UK?	Kettil Bruun Society Annual Meeting Workshop, 2021
Frank de Vocht, Cheryl McQuire, Claire Ferraro, Philippa Williams, Madeleine Henney, Colin Angus, Matt Egan, Andrea Mohan, Richard Purves, Nason Maani, Niamh Shortt, Laura Mahon, Gemma Crompton, Linda Bauld, Niamh Fitzgerald, on behalf of the ExILEnS consortium. Associations between public health team engagement in local alcohol licensing and public health and crime in England and Scotland: a timeseries analysis. *Lancet* 2021;**398**:S40. https://doi.org/10.1016/S0140-6736(21)02583-6	Lancet Public Health, 2021

continued

TABLE 8 Conference presentations *(continued)*

Citation	Conference
Rachel O'Donnell, Andrea Mohan, Richard Purves, Nason Maani, Matt Egan, Niamh Fitzgerald, on behalf of the ExILEnS Consortium. Navigating different public health roles in alcohol premises licensing: a multi-stakeholder interview study. *Lancet* 2021;**398**:S14. https://doi.org/10.1016/S0140-6736(21)02557-5	Lancet Public Health, 2021
Niamh Fitzgerald, Andrea Mohan (2020). Comparing public health involvement in alcohol licensing in two British nations	Global Alcohol Policy Alliance, 2020
Nason Maani Hessari, Andrea Mohan, Richard Purves, Matt Egan, Colin Angus, Madeleine Henney, Frank de Vocht, Cheryl McQuire, Tim Nichols, Gemma Crompton, James Nicholls, Niamh Shortt, Linda Bauld, Niamh Fitzgerald (2019). How can public health stakeholders influence local alcohol availability? A systematic analysis of approaches	Kettil Bruun Society Annual Meeting, 2019
Andrea Mohan, Joanna Reynolds (2019). Promoting public health through alcohol licensing	Institute of Licensing, 2019
Niamh Fitzgerald, Matt Egan, James Nicholls, Tim Nichols, Laura Mahon, Colin Sumpter, Cheryl McQuire, Nathan Critchlow, Nason Maani, Richard Purves, Andrea Mohan, Frank de Vocht, Colin Angus, Niamh Shortt, Linda Bauld (2018). Developing a measure of the intensity of public health activity to influence alcohol premises licensing in England and Scotland	Kettil Bruun Society Annual Meeting, 2018

Appendix 2 Profile of participating PHT areas

TABLE 9 Profile of participating PHT areas

Local authority	Level of government & urban/rural classification for England[a]	Region	Average (2012–8) population density per km^2	Average (2012–8) Index of Multiple Deprivation	Average (2012–8) alcohol-related hospital admissions (narrow)	Average (2012–8) public order offences
1	Unitary (4: Urban with city and town)	North East and Yorkshire	1300–1400	29	2500–2600	1000–1100
2	Unitary[a] (4: Urban with city and town)	London and South East	600–700	22	1400–1500	600–700
3	Unitary (4: Urban with city and town)	North East and Yorkshire	400–500	40	2500–2600	600–700
4	Unitary (6: Urban with major conurbation)	London and South East	800–900	32	15,200–15,300	600–700
5	Unitary (4: Urban with city and town)	London and South East	800–900	27	5200–5300	500–600
6	Lower tier[a] (3: Urban with significant rural)	London and South East	100–200	8	300–400	300–400
7	Unitary (6: Urban with major conurbation)	North West	500–600	27	2000–2100	1300–1400
8	Lower tier (4: Urban with city and town)	South West	300–400	15	100–200	100–200
9	Unitary (4: Urban with city and town)	North West	400–500	42	4000–4100	700–800
10	Lower tier (4: Urban with city and town)	North East and Yorkshire	1000–1100	27	900–1000	1400–1500
11	Unitary (1: Mainly rural)	South West	600–700	23	100–200	2000–2100
12	Unitary (6: Urban with major conurbation)	London and South East	300–400	15	5400–5500	400–500
13	Lower tier (4: Urban with city and town)	North West	300–400	28	900–1000	400–500
14	Lower tier (2: Largely rural)	London and South East	100–200	25	100–200	300–400
15	Unitary (4: Urban with city and town)	East	400–500	25	4200–4300	500–600
16	Lower tier (3: Urban with significant rural)	North West	200–300	23	200–300	500–600
17	Unitary (6: Urban with major conurbation)	North West	300–400	42	1700–1800	600–700

TABLE 9 Profile of participating PHT areas *(continued)*

Local authority	Level of government & urban/rural classification for England[a]	Region	Average (2012–8) population density per km^2	Average (2012–8) Index of Multiple Deprivation	Average (2012–8) alcohol-related hospital admissions (narrow)	Average (2012–8) public order offences
18	Lower tier (4: Urban with city and town)	South East	200–300	22	2000–2100	300–400
19	Unitary (6: Urban with major conurbation)	North East	1100–1200	30	2000–2100	1300–1400
20	Lower tier (3: Urban with significant rural)	North West	100–200	31	800–900	200–300
21	Lower tier (4: Urban with city and town)	South East	300–400	9	500–600	300–400
22	Unitary (6: Urban with major conurbation)	London	900–1000	35	14,700–14,800	500–600
23	Lower tier (2: Largely rural)	South West	300–400	16	100–200	400–500
24	Lower tier (4: Urban with city and town)	East Midlands	200–300	28	2700–2800	300–400
25	Lower tier (3: Urban with significant rural)	South East	200–300	23	300–400	300–400
26	Lower tier (3: Urban with significant rural)	South East	100–200	11	300–400	200–300
27	Lower tier (4: Urban with city and town)	East	300–400	23	1600–1700	400–500
28	1&2: Large and other urban areas	Scotland West	400–500	30	500–600	400–500
29		Scotland West	100–200	11	500–600	300–400
30		Scotland East	100–200	17	0–100	400–500
31		Scotland West	9000–9100	35	3400–3500	3200–3300
32		Scotland NE	900–1000	15	1200–1300	800–900
33		Scotland East	600–700	29	2400–2500	500–600

continued

TABLE 9 Profile of participating PHT areas *(continued)*

Local authority	Level of government & urban/rural classification for England[a]	Region	Average (2012–8) population density per km^2	Average (2012–8) Index of Multiple Deprivation	Average (2012–8) alcohol-related hospital admissions (narrow)	Average (2012–8) public order offences
34		Scotland East	100–200	21	400–500	700–800
35		Scotland West	300–400	28	100–200	600–700
36		Scotland East	500–600	21	200–300	1500–1600
37		Scotland West	1700–1800	23	100–200	1200–1300
38		Scotland	1800–1900	28	700–800	1500–1600
39		Scotland NE	200–300	19	10–30	300–400

a Many parts of England have both a county council (or upper-tier authority) and a district council (or lower-tier authority). County councils run public services such as education, libraries, roads and social care, while district councils are responsible for matters such as waste, environment and housing. In some other areas, instead of upper-/lower-tier authorities, a single (unitary) council is responsible for all these services. Urban–rural classification for England is available at local authority level,[147] but not for Scotland, where a breakdown of urban–rural geography specific to each local authority would identify the area in question. Reproduced with permission from Fitzgerald *et al.*[2]

Appendix 3 Systems maps

Prior to the study's commencement, we developed simple linear theories of change and an overarching logic model suggesting that diverse local PHT activities may contribute to changes to local licensing *policy*, effect change in the environment (*places*), and thus influence health and crime outcomes (for *people)*. Over the course of the study, we discussed at multiple team meetings and with expert advisors what the pathways to change might be from different public health activities to licensing change, and from changes in licensing to alcohol-related harm. On the latter, we examined evidence and theory on links between temporal and spatial availability and harms, and developed the systems maps outlined below, based on systematic inspection of the interview data and prior expertise. These systems maps were used as an engagement tool in our online discussion groups, which highlighted uncertainty about the local validity of the mechanisms presented and any evidence base supporting them. We concluded that our data would be better represented in qualitative reports rather than in the form of a diagram, and that any theory of change is underdeveloped in practitioners' thinking as well as in the international literature.

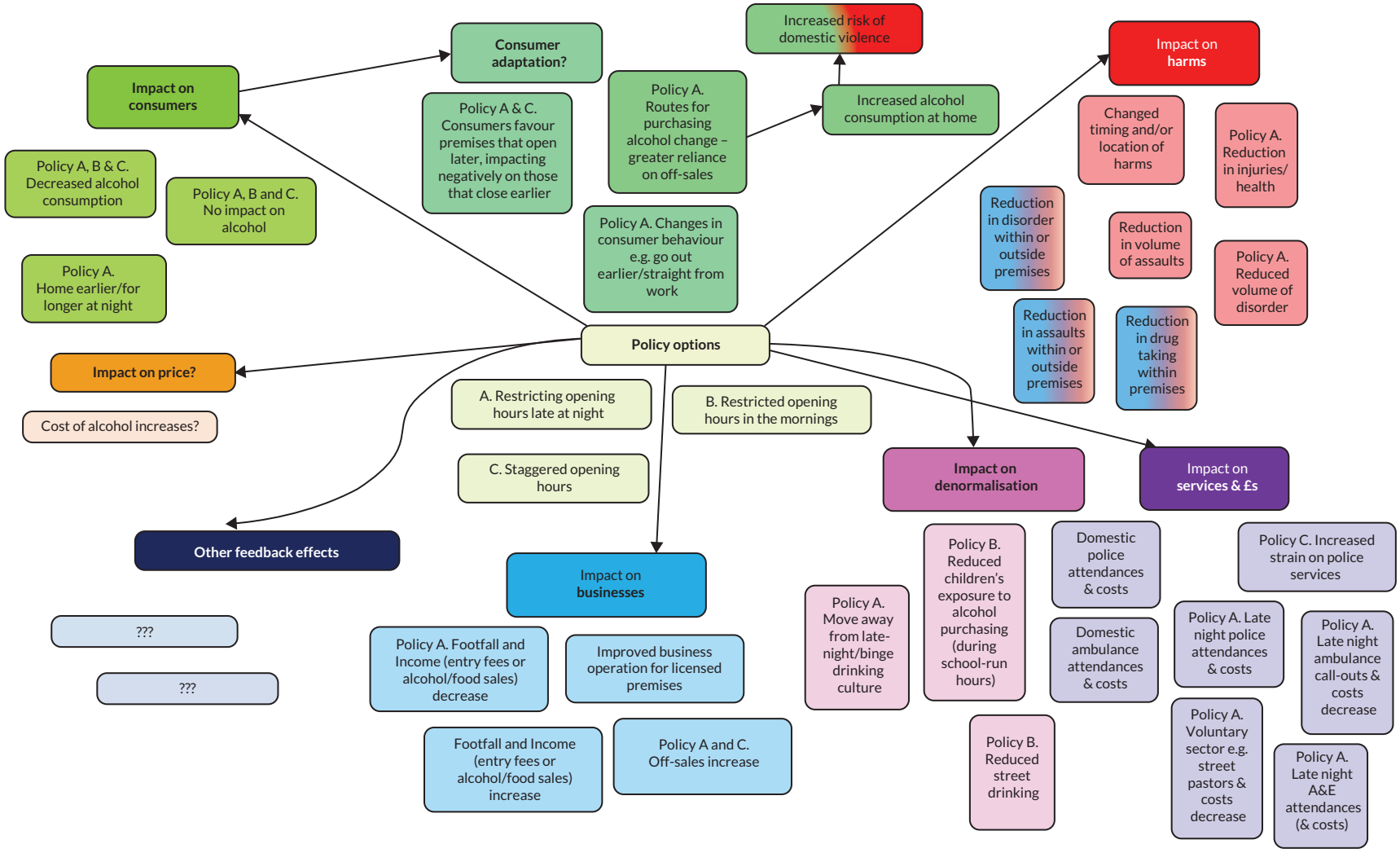

FIGURE 5 Systems map: how might reduced temporal availability of alcohol affect alcohol-related harms

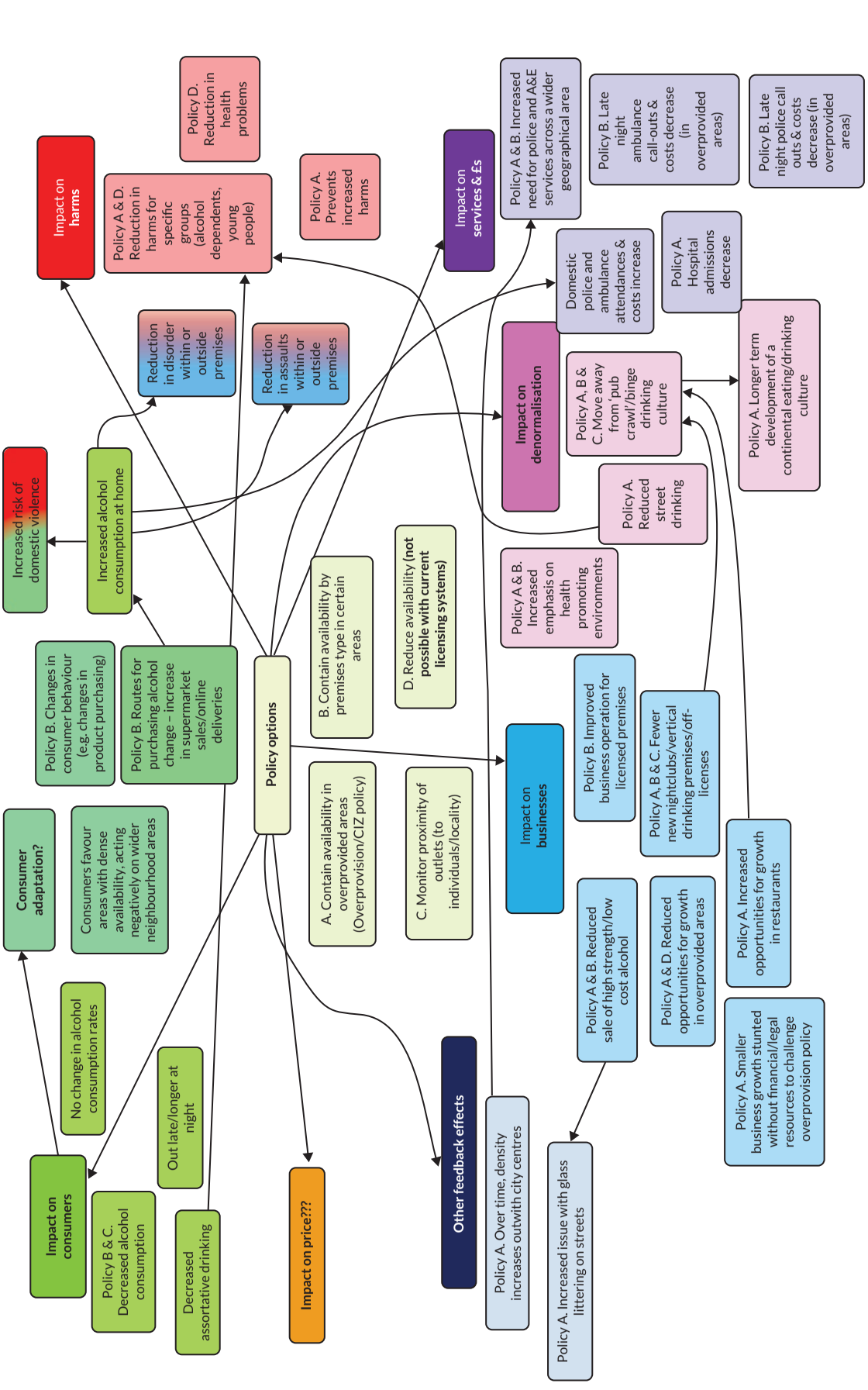

FIGURE 6 Systems map: how might reduced spatial availability of alcohol affect alcohol-related harms.

Appendix 4 ExILEnS lessons learned

Overall reflections

This was a novel, complex study, in which we needed to understand and measure the extent and intensity of a very diverse range of activities (how PHTs try to influence alcohol premises licensing) in what was (given the breadth and depth of data needed) a relatively large sample of local licensing areas. We learned a lot. We aim here to go beyond the obvious challenges of recruiting multiple PHTs and other stakeholders, managing periods of researcher absence (due to parental leave or departures of staff to other roles) over such a long study, and managing the volume of data generated across multiple institutions. Rather, we attempt to convey key lessons here that may be of interest to other researchers embarking on studies with similar methods or size.

The necessarily iterative nature of the development of the PHIAL measure was intellectually challenging and resource-intensive. There was no avoiding how time-consuming it was to bring an acceptable degree of objectivity to the measurement of PHT activities which in many cases could only be qualitatively described.

Firstly, we needed to decide what activities our new measure would cover. To do this, we had to gather data from all our 'higher-activity' areas about what they do on alcohol licensing – and so we needed a data collection tool that could capture a range of activities but also be open to identifying new activities that were not in our data collection tool because we had not come across them previously. Where we did identify a new activity in, say, Area 7, we then had to follow up with Areas 1–6 to check whether they also did something similar, and then amend our data collection tool to ensure that we explicitly asked about it for the remainder of the areas, from Area 8 onwards.

This issue played out in multiple ways over the course of our data collection – when we consulted experts about the PHIAL measure, any changes they made had to then be applied to the collection of data, and any gaps filled in follow-up calls with PHTs from whom data had already been gathered.

When analysing the data, we also used the activities of the intensity measure as our codes for each 6-month period in NVivo (QSR International, Warrington, UK), but as the measure developed, activities were added or removed. We also kept logs of any coding dilemmas, and definitions of activities were also iteratively refined to clarify where each different activity should be coded (and to avoid duplication of coding of a single activity). Every so often, we then needed to apply the latest version of the measure to the data that had already been coded using an older version – this meant parts of the same data set often had to be recoded more than once.

This was even more challenging as we developed the grading scales for the activities. We could not finalise grading scales until we had a good sense of the range of activity by having almost completed data collection, but that again meant having to then grade all the data that had already been coded. It also often meant going back again to PHTs in follow-up calls to clarify specific information necessary for grading which was not entirely clear in the original data set.

The scale of the endeavour was greater than we had anticipated at the outset, and it took us much longer than we had hoped to reach the point of having a measure we were happy with and had applied to all of the data from the 39 areas.

The development of the measure was also intellectually challenging. We found examples of other measures of alcohol policy strength which helped us to think about our processes and how we would develop a scoring system. As we were trying to quantify practice, however, the activities were much

more diverse, and there was very little guidance available to help. We faced multiple dilemmas about what to measure, at what level of depth. The final PHIAL measure was version 14.0, and we had multiple versions (and versions of versions) before that. Early on, we had a three-level measure where each of the subcategories were further broken down into component parts, but this was later abandoned as unwieldy for data collection and coding.

We had lengthy discussions about how best to grade the activity – how fine should the scales be for grading? This was helped greatly in the end by adopting the principle that the level of detail in the data should determine the level of precision of the grading process. In other words, there was no point having a five-point scale for an activity if 'high' and 'low' were the only gradings that could reliably and consistently be judged from the available interview and documentation data. This was a sensible and pragmatic principle that we applied to the development of all the grading scales in the measure.

What helped?

We benefited hugely from having excellent support from a really expert and knowledgeable team. We costed in support from AFS and Alcohol Research UK from the start, and an extremely knowledgeable representative from PHE sat on our SSC. The team of researchers themselves included several who had conducted diverse studies of licensing in England and Scotland (and were colleagues of others who had), and we benefited greatly from the input of two experienced licensing lawyers and a public health team member who joined our SSC and a former local authority lead who provided practitioner input. Between us all, we were linked into almost all other recent or ongoing studies of alcohol licensing in the two nations and were able to take account of emerging findings at an early stage through our team. The licensing system is a legal system, with all the detail that entails, and even though we started with a working knowledge of the system, the depth and breadth of our knowledge has grown enormously over the course of the study. Most of us had been grounded in either the Scottish or English system at the start of the study, and we were repeatedly surprised to 'discover' new differences and nuances in how the systems differed. We had not originally planned to write a forensic analysis of the two systems as an output, but we realised how helpful that would have been to us at the start, and that it would also be valuable to those planning reform to alcohol licensing in countries with similar systems worldwide.

Mechanisms, theories of change, logic models, systems maps and working out what it all means

A final lesson worth reflecting on is that of attempting to summarise using a diagram, flow chart or map, the impact of something as complex, broad and diverse as public health engagement in licensing, in a system as complex and multifaceted as licensing, and to represent how that may then impact on alcohol harms. We made many attempts to do this, but they all felt like oversimplifications of very complex worlds, and in the end, we felt that we would do a better job of explaining our findings in narrative. Feeding into this was the reality that it was very hard to interpret our findings in one aspect of the study until we had written up all aspects of the study and taken time to reflect on them as a whole. Thus, attempting to develop a logic model for our intervention which we could stand by, when we had not yet understood all our findings or had time to interpret them, was always going to be a challenge.