Assessing the implementation of physical activity-promoting public policies in Ireland: A Study using the Physical Activity Environment Policy Index (PA-EPI)

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Abstract

Background: Government policy can promote physical activity (PA) as part of a multilevel systems-based approach. The Physical Activity Environment Policy Index (PA-EPI) is a tool which assesses the implementation of government policy on PA by drawing on the experience of national stakeholders. This study is the first to assess the extent of policy implementation using the PA-EPI tool and provides information on how PA policy implementation can be improved thereby maximising policy impact.

Methods: This study was undertaken in 8 steps. The first steps involved collecting information about the implementation of PA policy in Ireland and validating this information with government officials. A panel of 32 independent PA stakeholders were consulted and asked to rate the extent of implementation of all indicators of the PA-EPI. Finally, based on this information recommendations for implementation actions were generated, identified and disseminated.

Results: Of the 45 indicators of the PA-EPI, one indicator received a rating of “None / Very Little”, 25 received a rating of “Low” and 19 received a “Medium” implementation Rating. No indicator was rated as fully implemented but the best implemented indicators related to sustained mass media campaigns promoting PA and the PA monitoring. We generated a shortlist of 10 priority recommendations for implementation.

Conclusions: In Ireland, over half of the indicators received a low score for implementation. Our study reveals substantial implementation gaps and provides a pathway for addressing these gaps. In time, studies utilising the PA-EPI will enable cross country comparison and benchmarking of PA policy implementation.

1. Introduction

Supporting increased opportunity to participate in physical activity (PA) is a health promoting endeavour. There is sizeable, and growing, scientific literature linking PA behaviours to a range of different health outcomes in support of this claim (Rütten et al., 2016). This literature has been strengthened by recent systematic reviews demonstrating that PA behaviours contribute to reduced mortality (Ekelund et al., 2019) improved mental health outcomes (McDowell et al., 2019; Gianfredi et al., 2020), lower burden of disease from non-communicable diseases (NCDs; Katzmarzyk et al., 2022) and from infectious diseases (Sallis et al., 2021). PA participation has also been linked to social outcomes such as increased happiness (Castellanos-García et al., 2022) and social capital (Fu et al. 2018). Hence, enabling people to engage in PA provides opportunity for people to exercise a greater element of control over their own health and wellbeing.

In light of these health and social benefits, the World Health Organisation (WHO) has published global targets seeking to promote PA. The Global Action Plan on Physical Activity (GAPPA) aims for 15% relative reduction in inactivity by 2025 (WHO, 2018). However, studies of trends in PA levels reveal that inactivity levels have been stubbornly unchanging thus far in the twenty-first century (Guthold et al., 2018, cf. Hallal
et al., 2012). This suggests that if these trends continue, the GAPPA target will not be met (WHO, 2022). Therefore, new strategies for supporting healthy PA behaviours are required (Guthold et al., 2018).

It has been argued that strategies targeting the so-called ‘upstream’ barriers to PA should be pursued (Lakerveld et al., 2020). In essence, this requires a strategy of building and implementing public policy (WHO, 1986; 1988) in the domain of PA. Theoretical support for this idea comes from ecological models of health promotion which highlight the importance of policy action. Empirical support comes from review studies which identify social and environmental factors which influence population PA levels (Volf et al., 2022; Zukowska et al., 2022). These findings suggest that policy action is necessary to affect changes to these environments to empower people to engage in healthier PA behaviours.

The WHO began to issue PA policy guidance documents in the mid-2000s (Gelius et al., 2021a) and the number of policies promoting PA has increased since then. Presently over 90% of countries globally report having produced a national PA policy (Sallis et al., 2016; Klepac Pogrmilovic et al., 2020) though evidence exists that PA policy is not effectively operationalised (Sallis et al., 2016; WHO, 2022).

Alongside the rise in national PA policies, there has been a concomitant rise in the number of scientific publications concerning PA policy since the mid-2000s. This indicates the development of PA policy research as a scientific field (Rütten et al., 2016; Klepac Pogrmilovic et al., 2019a). The maturing of PA policy research is also evidenced by the development of tools like the WHO’s Health Enhancing Physical Activity Policy Audit Tool (HEPA PAT; Bull et al., 2015), which facilitates comparative policy research, or the Comprehensive Analysis of Policy on Physical Activity (CAPPA) framework which categorises PA policy research according to purpose of analysis, policy level under analysis, policy sector, type of policy, stage of the policy cycle and scope of the analysis (Klepac Pogrmilovic et al., 2019b).

Rütten and colleagues (2016) highlight a gap in the nascent field of PA policy research namely that there have been relatively few studies into how policymaking processes influence PA policy interventions. An example of how the policy process can influence PA intervention is through the extent of policy implementation (in essence, the processes by which policies are put into effect [Howlett et al., 2009 p12]). Research is needed to ensure that policies that exist on paper are fully implemented in practice.

The Physical Activity Environment Policy Index (PA-EPI) is a recently developed PA policy research tool. The PA-EPI consists of a list of 45 indicators designed to assess the implementation of policies that create healthy physical activity environments (defined as the ‘context, opportunities and conditions that influence one’s PA choices and behaviours’ [Woods et al., 2022; p4]). The indicators take the form of statements about the physical activity environment and are referred to as 'Good Practice Statements' or GPSs. The GPSs are divided across the two overarching components of the PA-EPI: the policy component (with eight subdomains: education, transport, urban design, healthcare, mass media, community, sport and workplace) and the infrastructure support component (with seven subdomains: leadership, governance, monitoring and intelligence, funding and resourcing, platforms for interaction, workforce development and health in all policies). It is envisaged that, by identifying areas of weakness (and of strength) in the implementation of PA promoting policies, the PA-EPI will motivate policy action on
improving PA. By highlighting and publicizing area of low implementation, and the actions needed to improve implementation, the PA-EPI motivates policy action on the issue of physical inactivity.

This study makes Republic of Ireland (henceforth referred to as Ireland) the first country to have the extent of the implementation of its PA policies assessed using the PA-EPI. According to the Global Observatory for Physical Activity, less than half (46%) of the population of the Ireland engages in sufficient PA to meet health recommendations, and consequently inactivity is contributing to 8.4% of all deaths in Ireland (Ramirez Varela et al., 2021). Identifying implementation gaps in the PA policy response is part of the solution to increasing the proportion of the population meeting the PA guidelines, and to reducing the impact of inactivity. This study has two aims: to assess the extent of PA policy implementation in the Republic of Ireland identifying critical implementation gaps, and to provide recommendations for prioritise Government actions to strengthen policy implementation.

2. Methods

2.1 Study Design

This study was conceived as a sequential mixed method process where early steps generate information which is utilised in subsequent steps. A key milestone was the generation of an evidence document (steps one to four) containing information describing the extent of implementation of PA-promoting public policy in Ireland for each of the 45 indicators. This evidence document was laid out as a series of tables. Each table contained the following sections:

- Wording of an indicator (i.e. the GPS),
- Scope of the GPS,
- Best Practice Exemplars (BPEs); Examples of public policies that had been implemented globally corresponding to the GPS
- Political context; information on actions advocated for by the WHO, the WHO Regional Office for Europe and the EU in their respective policy guidance documents
- Evidence of implementation in Ireland.

The sources utilised to generate the evidence document, such as the MOVING database of implemented PA policies (World Cancer Research Fund International, 2020), are described in the evidence document itself (which is available as a supplement). Following the generation of the evidence document, data collection aimed at understanding the extent of implementation of the GPSs (steps 5 and 6) and further to generate and recommend implementation actions for the future (steps 7 and 8), was undertaken. The sequence was based on an eight-step process developed by Swinburn and colleagues (2013, see Fig. 1) to guide researchers in conducting policy assessments using the Food-EPI (a tool for researching food policy implementation which inspired the PA-EPI). Ethical approval for this study was obtained from the Research Ethics Committee of the Faculty of Education and Health Sciences at the University of Limerick (2022_02_01_EHS).
The process drew upon the knowledge of a coalition of national stakeholders. This coalition consisted of two mutually-exclusive groups: public officials and a panel of independent PA experts. The ‘public officials’ group included civil servants affiliated with governmental departments and high-ranking employees of state agencies. The independent experts included researchers with knowledge of the PA environment in Ireland and practitioners working for organisations promoting PA (see Fig. 2).

2.2 Study Procedure

Suitability of the PA-EPI tool to the National Context
Step one of the process is to analyse the context and decide which of the GPSs to utilise in the policy assessment and to begin drafting the evidence document. Some indicators of the PA-EPI may not be relevant for states where there is substantial decision-making power devolved to subnational levels of government.

Ireland is a small unitary state. There are two levels of government: national level and local level government, established in accordance with Article 28A of the Constitution of Ireland. However, the local level of government has responsibility for a limited number of functions and its autonomy from national government is amongst the most limited in the EU (Ladner et al., 2016). Due to the level of involvement by national government for all indicators, the full list of PA-EPI indicators was retained without adaptation.

Collection of relevant documents
Step two of the process is to collect evidence to generate the ‘Evidence of implementation in Ireland’ sections of the evidence document. Prior to the commencement of the study an audit of the Ireland’s policy context utilising the WHO’s Health Enhancing Physical Activity Policy Audit Tool (HEPA PAT) had been conducted (Gelius et al., 2021b; Kelly et al., in preparation). The HEPA PAT is a tool which provides an overview of public policies relating to PA (WHO Regional Office for Europe, 2015) and it has been endorsed as a comprehensive instrument for describing the current state of PA policies (Klepac Pogrmilovic, et al., 2019a). The research team accessed a copy of the Irish HEPA PAT document and used it to identify policy documents with commit to actions that may promote PA. This document also provided information on the key documents and agencies involved in the promotion of PA (for example: Ireland’s PA policy, the National Physical Activity Plan [NPAP]). The HEPA PAT search was supplemented with a search of the webpages of government departments and state agencies, such as the Health Service Executive (HSE) or Sport Ireland, for information on other relevant policy documents and action plans. A third strategy which was utilised was extensive snowballing using the documents already identified. This involved reference checks of the included documents as well as internet searches of using the names printed on the documents to identify related documents such as action plans or implementation reports.

Evidence-grounding the actions
The third step was to extract information from the policy documents that were identified and to populate the ‘Evidence of implementation in Ireland’ sections of the evidence document. Documents identified through the search were downloaded and searched for information. Policy documents were identified as
cross cutting (for example: NPAP) or domain specific (for example: documents outlining the Physical Education curriculum). For each GPS, a search of the cross cutting policy documents and the relevant domain specific policies was conducted. Documents were scanned for lists or tables (for example: lists of actions or indicators) and keyword searches were performed based on the wording of the indicators. Internet searches were conducted for initiatives mentioned in the document to identify additional information (for example: dedicated websites or press releases). The evidence of implementation identified was summarised in short paragraphs in the evidence of implementation in Ireland sections of the tables for each of the 45 GPSs.

Validation with Public Officials
Step four: A purposive sample of public officials from different departments and agencies of the permanent civil service was identified based on their prior collaborations with the PA research community in Ireland. The public officials were civil servants who had acted as representatives for their departments and agencies at PA events and whose role was identified from publicly available information. The research team reached out to the public officials via email and asked them to ensure the completeness of the evidence document. The email contained a link an online questionnaire developed using Qualtrics software. The questionnaire presented the public officials with the each of the 45 GPSs of the PA-EPI on separate pages above the collected evidence of implementation in Ireland corresponding to the GPSs. Beneath the evidence of implementation, was a questionnaire item which allowed the government officials to indicate amendments that needed to be made to make the evidence of implementation comprehensive. An example of the questionnaire layout is provided in Figs. 3a and 3b. Four public officials provided feedback on the evidence document leaving 72 comments. A second draft of the evidence document was developed incorporating feedback from the public officials.

Rating of implementation
The fifth step was to assess the extent of implementation of the PA-EPI GPSs in Ireland. In essence, the extent to which policies are in effect. Independent experts were identified either from their roles as researchers who have published on the topic PA in Ireland or from their roles as PA promoters representing non-governmental organisations operating in Ireland. Independent experts were recruited via email and asked to complete an online questionnaire. Thirty-two individuals were contacted: thirteen were academics (41%) and nineteen of the independent stakeholders were practitioners (59%). Sixteen independent stakeholders (50%) rated the extent of implementation of the GPSs of the PA-EPI in Ireland. Participants who accessed the questionnaire were asked to rate the evidence of implementation for each of the GPSs on a five-point scale. Participants were also provided with a “cannot rate” option. They were also provided with the opportunity to comment on the implementation of each of the GPSs. An example of this questionnaire’s layout is provided in Fig. 4.

Calculating rating scores and identification of actions
The ratings scores were downloaded by the research team and the median rating was calculated for every indicator. Median was preferred over the mean as a measure of central tendency as the distribution of the ratings was skewed. The computed median scores where then utilised to categorise extent of
implementation as “very little/none”, “low”, “medium” or “high”. Interrater Reliability (IRR; Gwet’s AC2 coefficient) was calculated for the implementation ratings using Agrestat software. The IRR for the implementation ratings was 0.554 (95% CI: 0.495–0.612; percentage agreement 87%). The comments provided by the independent stakeholders were also downloaded and implementation recommendations were extracted from these comments.

**Prioritisation**

The seventh step involved a workshop to recommend policy implementation actions. All stakeholders were invited to attend in-person, but an online option was also provided through the platform Microsoft Teams. Five independent stakeholders and two public officials participated in the workshop. Attendees were presented with the median rating scores for the implementation of the GPSs in Ireland and the implementation recommendations extracted from the comments in the previous phase and asked to contribute further recommendations. Attendees debated the wording of implementation recommendations. Some implementation recommendations were removed and wording of some of the implementation recommendations was revised by the research team in light of attendee's recommendation. The revised list of implementation recommendations was circulated to all workshop attendees by the research team via email for confirmation. Following the finalisation of wording, a questionnaire was sent around to all independent stakeholders asking them to select five implementation recommendations from the policy domains and rank them based on the criteria of importance, achievability and equity. The criteria of importance, achievability and importance were an adaptation of the criteria described by Vandevijvere and Swinburn (2017) in a protocol developed to guide researchers on how to use the Food EPI (mentioned previously). These criteria are displayed in the additional file 2. Participants were also asked to select five implementation recommendations from the infrastructure support domains and rank them based on importance and achievability. Fifteen independent stakeholders (47%) voted on the implementation recommendations generated at the workshop. The scores for importance and achievability were inverted (so the top ranked recommendation from an individual rating received a score of 5 and the fifth ranked recommendation received a score of 1) and summed together. The five implementation recommendations with the highest summed score were selected as the ‘priority’ implementation recommendations. The process of summation was conducted for recommendations on both the ‘policy’ and ‘infrastructure support’ components of the PA-EPI yielding a total of 10 priority implementation recommendations.

**Dissemination**

Step eight: An in-person dissemination workshop was conducted and all participants were invited to attend. The workshop was a joint event organised in collaboration with other research teams involved in health promotion research in Ireland, including research utilising the Food EPI tool. The workshop featured guest speakers with expertise in researching healthy diet and PA promotion and a panel discussion between prominent Food and PA policy stakeholders. The research team presented research underpinning the development of the PA-EPI and the implementation and prioritisation findings. A dissemination report presenting the findings was published and copies were provided to all workshop attendees. Electronic versions of the dissemination materials were uploaded to the internet on a website.
associated with the project ([www.jpi-pen.eu](http://www.jpi-pen.eu)). Further dissemination activities are planned, including a further dissemination event are planned including press releases and a dedicated PA-EPI website.

### 3. Results

The process generates three outputs: the evidence document that contains information describing the extent of implementation PA-promoting public policy in Ireland, an implementation scorecard presenting the rating of the implementation status of PA policy in Ireland (according to expert opinion) and a list of implementation actions for developing the PA environment in Ireland further. The evidence document is available in the additional file 1, the results of the implementation rating exercise is described in section 3.1 and prioritisation exercise is described in 3.2.

#### 3.1 Level of implementation of physical activity environment policy in Ireland

The ‘policy’ subdomains contain 21 of the 45 GPSs (see Fig. 5, where the wording of the indicators is paraphrased). Twelve of the 21 GPSs received a low implementation score and 8 received a medium implementation score. One indicator received a “Very little / none” implementation rating from the expert panel. Three of the policy domains, Transport, Urban Design and Mass Media, were rated as having a ‘low’ level of implementation on every indicator. Two of the policy domains, Community and Sport were rated as having a ‘medium’ level of implementation on every indicator. The lowest rated indicator, W02, was in the workplace subdomain.

The ‘infrastructure support’ subdomains contain 24 of the 45 GPSs (see Fig. 6, where the wording of the indicators is paraphrased). Thirteen of the GPSs received a low score and 11 received a medium implementation score. One of the infrastructure support domains, Health in all Policies, was rated as having a ‘low’ level of implementation on every indicator and one, Platforms for Interaction was rated as having a ‘medium’ level of implementation on every indicator.

#### Strengths and Gaps

None of the indicators received the highest categorisation of implementation status. The highest scoring indicator in the policy domains was the first indicator in the ‘Mass Media’ subdomain, which pertains to public policies for sustaining mass media campaigns. The action of promoting PA through media campaigns is mentioned in several policy documents including the National Sports Policy (Department of Transport, Tourism and Sport, 2018) and NPAP (Healthy Ireland; 2016). Further, the Republic of Ireland has various media campaigns that promote PA, including the ‘Let’s Get Back’ campaign which encouraged the Irish public to be physically active during the COVID-19 emergency.
The highest scoring indicator in the infrastructure support domains was the first indicator in the ‘Monitoring and Intelligence subdomain, which pertains to the monitoring of PA levels across the life course. Ireland has several surveys which collect data on PA levels, focussing on different stages of the life course. The Children’s Sport Participation & Physical Activity (CSPPA, n.d.) study, for example, examines sport and PA participation in children aged 10–19 while the Irish Longitudinal Study on Ageing (TILDA; Trinity College Dublin, n.d.) includes data collection on PA in an older population. However, the other indicators in the monitoring and intelligence subdomain, (pertaining to: the monitoring of PA environments, the monitoring of links between PA outcomes and NCDs, the monitoring of the outcomes of PA policy and the monitoring of inequality-related determinants of PA) all received a low rating.

The low implementation scores for the indicators related to transport, urban design, healthcare and health in all policies identifies a need for redoubled efforts to address the implementation gaps in these domains.

3.2 Prioritisation of implementation actions

The top five implementation recommendations for policy and infrastructure support based on importance and achievability are presented in Tables 1 and 2. Regarding policy domains, the expert panel recommended that positions with responsibility for promoting PA be established in school, and health and social care settings. They also recommended increasing the capacity of health and social care staff to promote PA, replacing standalone PA campaigns with a long term coordinated effort to promote PA opportunities in the media and the establishment of minimum criteria for inclusion before application for sport capital grant are considered.

Regarding the infrastructure supports the panel recommended increased funding for long term PA projects for the monitoring programme outcomes. They also recommended ensuring representation across lifespan, gender and socio-economic background in decision making process and dissociate physical activity from unhealthy brands. The most highly rated recommendation, both in terms of importance and achievability, was to update the Irish PA guidelines to reflect recent advances in PA guideline development.
### Table 1

Implementation actions to support healthy physical activity environments relating to the policy domains.

<table>
<thead>
<tr>
<th>Leadership in schools [EDU8]</th>
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<tbody>
<tr>
<td>Allocate a post of responsibility for a physical activity lead in every school, at both primary and post primary levels.</td>
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</table>

<table>
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<tr>
<th>Coordinated media campaign [MEDI1]</th>
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<tr>
<td>Foster cross governmental sustainable resourcing to replace standalone individual physical activity campaigns with a comprehensive, coordinated, multisector long-term multi-media/mode campaign using clear evidence informed consistent messaging over several years.</td>
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</table>

<table>
<thead>
<tr>
<th>Minimum inclusivity standards [SPOR6]</th>
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<tbody>
<tr>
<td>Establish a set of minimum inclusion and accessibility standards to be incorporated into the scoring system of the Sports Capital and Equipment Programme.</td>
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<table>
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<tr>
<th>Connected community programmes [COMM2]</th>
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</thead>
<tbody>
<tr>
<td>Improve connection between communities and healthcare services in regard to physical activity participation by increasing the resourcing and/or staffing, with a go-to person for physical activity in the community.</td>
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<tr>
<th>Capacity of healthcare staff [HEAL2]</th>
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<tbody>
<tr>
<td>Build capacity of staff across health and social care setting to promote awareness of physical activity benefits and opportunities.</td>
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</table>

### Table 2

Implementation actions to support healthy physical activity environments relating to the infrastructure support domains

<table>
<thead>
<tr>
<th>Update guidelines [LEAD1]</th>
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<tbody>
<tr>
<td>Update the Irish Physical Activity Guidelines in line with revised international guidelines.</td>
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<tr>
<th>Representation in decision making [GOVER3]</th>
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<tbody>
<tr>
<td>Have representation across the lifespan, gender and socio economic background in the development and decision making processes related to physical activity policies.</td>
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<tr>
<th>Funding for outcome monitoring [FUND1]</th>
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<tr>
<td>Provide long term funding for physical activity programmes to support tracking of evidence, outcomes and implementation.</td>
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<table>
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<tr>
<th>Research programme for special populations [GOVER1]</th>
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<tbody>
<tr>
<td>Implement a physical activity research and monitoring programme specific to special populations, in particular for disabled persons.</td>
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<table>
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<tr>
<th>Dissociate from unhealthy products [GOVER2]</th>
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<tbody>
<tr>
<td>Dissociate physical activity from unhealthy products and brands promoting unhealthy products.</td>
</tr>
</tbody>
</table>
4. Discussion

This study is the first to assess the extent the implementation of government policy actions to improve the PA environment. The process of assessing government actions generated an evidence document providing an overview of the government actions in place which support PA, revealed areas of relative strength as well as gaps in implementation, and provided priority recommendations for strengthening PA policy implementation in the future. The evidence document was praised by stakeholders who participated in the study for providing them with an overview of the available policy documents in Ireland.

Complementarity of the PA-EPI with other Policy Research Resources

The process of generating the evidence document was supported by previous work using the HEPA PAT and informed by some of the policy information collected by the MOVING database. The HEPA PAT has been recommended as a comprehensive tool for performing PA policy analysis (Klepac Pogrmilovic et al., 2019a) and it has been utilised in other European countries to conduct analyses of PA policy in numerous European countries. However, reviewers of extant PA policy tools have noted that the PAT is “more suitable for an audit than an assessment” (Klepac Pogrmilovic et al., 2019a p9), and further, that researchers should look into the possibility of complementary tools. This study highlights the complementary of the PA-EPI tool with other instruments available to PA policy researchers like the HEPA PAT.

Implementation strengths and gaps

The results of this study reveal that the infrastructure support domains were judged to be better implemented than the policy domains. This is a nearly universal pattern for studies utilising the Food EPI (Vandevijvere et al., 2019; Djojosoeparto et al., 2022). Further studies will reveal whether a similar pattern emerges for the PA-EPI as well and hopefully provide insight into the dynamics underlying these patterns. The implementation status of the indicators suggest that Ireland can build on its relative strengths in the Mass Media and Monitoring and Intelligence domains. However, they also suggest that there are implementation gaps regarding transport, urban design, healthcare and health in all policies.

The low implementation ratings in the healthcare domain appears to corroborate previous research into PA promotion by healthcare professionals in Ireland. Cantwell and colleagues (2018) reported that a majority of healthcare professionals, in Ireland, did not provide cancer patients with PA advice that aligned with guidelines, while Cunningham and O’Sullivan (2021) report that only 30% of healthcare professionals, Northern Ireland and the Republic, report receiving adequate training for prescribing PA to older adults. The Republic of Ireland has a policy for promoting PA, among other lifestyle risk factors in healthcare settings, Making Every Contact Count (MECC). The findings of this study, and others which we have cited above, suggest that the implementation of MECC has not been a success. This may be explained at least in part, by the fact that an internal report commissioned by the HSE found that the health service lacked organisational readiness for this intervention prior to its enactment, It is perhaps unsurprising, therefore, that the expert panel recommended that increasing the capacity of staff across
health and social care setting to promote awareness of physical activity and better connecting community PA programmes and healthcare be implemented as a priority.

**Prioritisation**

The panel of independent experts prioritised actions in the policy and infrastructure support components of the PA-EPI. In the policy domains the panel recommended implementation actions in the Education, Healthcare, Mass Media, Community and Sport domains. A difference between the PA-EPI and the Food EPI is that policy domains of the PA-EPI arguably represent a greater number of independent health promoting settings than the Food EPI. There is a potential equity concern as targeting different settings may have disproportionate benefits for different demographics. Potential methods for reconciling differences of opinion is to ensure that a certain number of actions are prioritised per domain or based on a lifecourse perspective

A point of discussion is that some of the highest prioritised actions corresponded to indicators that had a relatively strong implementation rating. An implementation recommendation that received a high prioritisation rating was the proposal to establish a long term coordinated effort to promote PA opportunities in the media. It is also noteworthy that stakeholders did not prioritise implementation recommendations in the urban design or transport domains in spite of the identified implementation gaps in these domains. Future reasons may explore reasons apparent discrepancies between identified gaps and prioritised implementation recommendations.

**Strengths and limitations**

This study has important strengths. It is the first to utilise the PA-EPI tool to generate insight into PA policy and hence addresses a knowledge gap regarding the assessment of government action on the issue of PA. Though the PA-EPI is a pioneering approach in the domain of PA policy, it is based on internationally developed and validated methods used in the domain of food policy.

A second strength of the study is the independence of the stakeholders involved in rating and prioritisation. Though the research process engaged public officials to ensure that the evidence document is comprehensive, the rating of implementation was conducted by people who were not incentivised to provide positive findings as public officials tasked with performing a self-assessment.

This study has some limitations that should be acknowledged. The workshop component was attended by a small sample of stakeholders (n = 7 stakeholders, representing the Education, Sport, Community and Health sectors). Attendance at the workshop may have been affected by scheduling conflicts and the legacy of the COVID-19 pandemic or rates at that time may have affected the willingness of stakeholders to participate in an in-person workshop. The small sample and the spread creates the possibility that a particular viewpoint is overrepresented in the output of this exercise. The challenge of potential selection bias has been previously reported by Yamaguchi and colleagues (2022) who performed an assessment using the Food EPI in Japan. Researchers need to consider in early stages of the process how to ensure
that the stakeholders involved in the later stages represent a variety of perspectives with differing domains of expertise.

A second limitation is that the independent panel (n = 13) may have been presented with too many options as part of the prioritisation exercise. Further, the implementation recommendations were not evenly distributed across the domains with a large number of recommendations pertaining to the education domain which in turn led to focus on one part of the life course. A concern was raised that that the number of recommendations presented biased the results of the prioritisation exercise to the advantage of younger demographics. While the number of recommendations provided to the panel for prioritisation was reduced at the workshop, this process should be made highly rigorous to avoid any concerns. Researchers should consider methods for limiting the number of recommendations presented for prioritisation both in total and per domain.

A final limitation is the availability of information on best practice exemplars used for comparison in the evidence document. Early studies utilising the Food EPI tool noted that policies put forward as BPEs were often not evaluated for real world impact and hence not ideal ‘gold standards’ (Vanderlee et al., 2019). A benefit of conducting further assessments utilising the PA-EPI is that it will provide examples of good practice which can be replicated to address implementation gaps.

**Recommendations for future studies**

A study of the relative contributions of the GPSs and policy subdomains is needed to develop weightings system for the PA-EPI. The weighting system would assign a relative importance for each of the GPIs for creating healthy PA environments and allow the calculation of a single PA-EPI score for implementation at step six of the progress. This score facilitates cross comparison of national PA EPI implementation ratings and advance the use of the PA-EPI as a PA policy benchmarking tool. Though the ratings provided by the expert panel in this study suggest that there is substantial scope to improve implementation status of PA policy in Ireland, future studies can confirm whether the Republic of Ireland is a laggard or a pioneer on this issue. The benchmarking feature of the PA-EPI tool addresses a noted gap in the PA policy research literature (Gelius et al., 2020)

Further studies utilising the PA-EPI are needed, in particular in low and middle income countries. Scoping reviews have demonstrated that PA policy research is overwhelming conducted in a few high income countries (Rütten et al., 2016; Klepac Pogrmilovic et al., 2018), indicating that the field of PA policy research needs to diversify. Further, inactivity is increasing in developing countries as the dynamics that drive inactivity in developed countries emerge or are adopted (Rütten et al., 2013).

**Declarations**

Ethics approval
Ethical approval was obtained for this study from the University of Limerick Faculty of Education and Health Sciences Research Ethics Committee (2022_02_01_EHS).

Consent for publication

Not applicable.

Availability of data and materials

The datasets used and/or analysed during the current study are available from the corresponding author on reasonable request.

Competing interests

The authors declare that they have no competing interests.

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Authors contributions

KV, LK, AVH, EGB and CW contributed to design of the study and data collection through stakeholder workshops. CW supervised the project. KV led on investigation, performed formal analyses and prepared the initial draft of the manuscript. All contributed to the writing and revision of the manuscript. All authors read and approved the final manuscript.

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Figures
Process driven by existing or formed ‘national coalition’ of non-government informed stakeholders and researchers

Figure 1

Process for applying the PA-EPI adapted from Swinburn and colleagues 2013.

Stakeholders of the National Coalition

Public officials (n= 6)

Independent Stakeholders (n= 32)

Academics (Researchers) (n=13)

Practitioners (n=19)

Figure 2
Categorisation of Stakeholders.

Figure 3

a and b Example from questionnaire sent to policymakers.
Figure 4

Example from the implementation rating questionnaire sent to independent stakeholders.
Implementation scores of Policy Domain Indicators

Figure 5

Results of the implementation rating for the Policy-related domains of the PA-EPI in Ireland.
Figure 6

Results of the implementation rating for the Infrastructure support-related domains of the PA-EPI in Ireland.
Figure 7

Prioritisation of recommendations on the Policy-related subdomains.
Figure 8

Prioritisation of recommendations on the Infrastructure support-related subdomains.