NIHR | Public Health Policy Research Unit

Policy Brief

The Demand of Population Health Interventions (Depth) tool

Considering intervention effect on health inequalities

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Executive summary

- Interventions to promote diet and physical activity may affect socioeconomic inequalities in health. The differing demands that different interventions place on individual resources, e.g. time, finance and mental capacity may explain why some interventions are more likely to widen inequalities than others.
- The ***Depth*** tool identifies three intervention characteristics that influence an interventions resource demands, grouped into twenty categories
- In a proof of concept review, we found that interventions in two of these categories were more likely to widen inequalities and interventions in three other categories had no effect on inequalities. We did not find enough evidence on interventions in the remaining fifteen categories to draw conclusions on them.
- Interventions that work mainly by cognitive mechanisms, i.e. aim to change knowledge or skills consistently widened inequalities. This was particularly the case when individuals had to change their daily routines in order to be exposed to interventions.
- The Depth tool can be used to consider the impact of interventions on socioeconomic inequalities when selecting, designing and evaluating interventions.

Context

Many policies have been proposed and implemented to improve diet and physical activity. While some may appear to be effective overall, they may also widen existing socio-economic inequalities.[1]

Public health information campaigns such as *Better Health* – www.nhs.uk/better-health – require individuals to notice, spend time on and be capable of reading, understanding and acting on information provided. This places demands on their time, financial and mental resources. In contrast, interventions such as fortification of flour with folic acid[2] make very little demand on individuals' resources.

These two examples are extremes and there are many other intervention types in between. Many individual resources are socio-economically patterned and people in the highest socioeconomic groups may be most able to meet the demands of interventions with high resource demands. We refer to this as the 'agentic demand' of interventions.

This brief introduces the Demands for Population Health Interventions (Depth) tool that categorises interventions by the agentic demand they place on individuals and hence the likely impact of interventions on inequalities. The Depth tool will help those designing and selecting dietary and physical activity policies and interventions.

Research evidence

We developed the Depth tool based on established evidence synthesis methods. We tested and refined it through qualitative workshops and surveys with academic and policy experts to ensure it is valid and reliable.

We applied the Depth tool to studies included in three existing systematic reviews on the effect of population health interventions on inequalities in diet and physical activity. As this was a 'proof-of-concept' review the results should be interpreted like a feasibility study. We hope to conduct further work to refine the Depth tool and apply it to a wider range of interventions.

1. Adams, J et al. Why are some population interventions for diet and obesity more equitable and effective than others? The role of individual agency. *PLoS medicine* 13.4 (2016): e1001990. **2**. www.gov.uk/government/consultations/adding-folic-acid-to-flour/proposal-to-add-folic-acid-to-flour-consultation-document

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Research findings

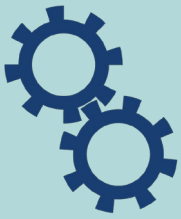
Key finding 1: There are three intervention characteristics that influence agentic demand

We identified three intervention characteristics that affect the resource demands that interventions make on individuals: exposure, mechanism of action and engagement.

Exposure: How an individual first comes into contact with the intervention

- **Active:** Individuals need to change their existing daily activities or initiate new activities
- **Passive:** Individuals do not need to make a change from their existing daily activities

Mechanism of action: How the intervention is proposed to work



- **Socio-cultural:** Change a community or society's attitudes, beliefs, norms and values
- **Cognitive:** Change individual knowledge, attitudes, beliefs or skills
- **Financial:** Change the relative monetary cost of intended behaviours, including reducing the cost of a desired behaviour or increasing the cost of alternative behaviours. (Includes free or reduced-price tangible goods)
- **Physical environmental:** Change the availability, accessibility, safety, placement or properties of infrastructure, facilities, objects or stimuli in the wider physical environment. (including the digital environment)
- **Biomedical:** Drug or medical techniques that aim to alter the intended behaviour or biological systems

Engagement: How an individual is required to respond to the intervention

- **Active:** Recipient needs to be aware of the mechanism of action and have purposive interaction with it
- **Passive:** Recipient not required to be aware of or interact with the mechanism of action

These three intervention components combine into a matrix of 20 categories. **Table 1,** below, shows examples of interventions in each category.

Exposure	Engagement	Mechanism of action				
		Socio-cultural	Cognitive	Financial	Physical environmental	Biomedical
Active	Active	Group nutrition education sessions	Online self-monitoring of fruit and vegetable intake	Free bus pass for older adults	Afterschool physical activity provision	
	Passive	Moving new town with strong cycling culture	Sign up to receive text message aiming to change individual beliefs on importance of healthy diet	Sign up to receive food vouchers that cannot be used to purchase food High in saturated Fat, Salt and Sugar (HFSS)	Installing online ad blocker	Opportunistic prescription of folic acid to pregnant women
Passive	Active	Girl Scout Troop Leader joins in with physical activities	Educational material within existing church bulletin	Sugar Sweetened Beverage (SSB) taxation	Provision of free fruit at lunch time	
	Passive	SSB tax signals that SSBs are considered unhealthy	Provision of fruit at lunchtime	Passively receive food vouchers that cannot be used to purchase HFSS food	Restrict SSB portion sizes in schools	Tap water fluoridation

Key finding 2: Interventions in some categories appear to consistently widen inequalities, but we did not find any consistent evidence of categories to reduce inequalities

Table 2, below, shows results from our proof of concept review. This examined 31 studies including 163 intervention components. We found two intervention categories that consistently appeared to wider socioeconomic inequalities, and three with evidence of no effect on inequalities. For the remaining 15 categories, we did not find enough evidence to draw conclusions. There were no categories with convincing evidence that interventions are likely to reduce inequalities.

Exposure	Engagement	Mechanism of action				
		Socio-cultural	Cognitive	Financial	Physical environmental	Biomedical
Active	Active	Diet: 1 intervention Phys Act: 0	Diet: 20 PA: 7	Diet: 1 PA: 1	Diet: 0 PA: 1	
	Passive				Diet: 1 PA: 0	
Passive	Active	Diet: 9 PA: 5	Diet: 35 PA: 13	Diet: 3 PA: 1	Diet: 5 PA: 8	
	Passive		Diet: 1 PA: 1		Diet: 9 PA: 6	

Some evidence of widening inequalities

Evidence of no impact on inequalities

Not enough evidence to draw conclusion on inequalities

Key finding 3: Interventions that work by cognitive mechanisms appear to widen inequalities

We found evidence that interventions that work via cognitive mechanisms may widen inequalities. Cognitive mechanisms include interventions that aim to change individual knowledge, skills or beliefs. This finding was particularly seen when engagement was active – that is when recipients need to purposively interact with the intervention to benefit. Focusing on passive exposure and other mechanisms of action may help avoid widening inequalities.

Cognitive mechanisms of action were the most common in our review. This may reflect that these types of interventions are more politically and publically acceptable, more commonly funded and easier to implement and evaluate.

Policy implications

Implication 1: The *Depth* tool can be used to consider socioeconomic impacts on inequalities

Practitioners and policy makers can use the Depth tool when selecting or designing policies to provide a structured way to compare interventions according to their potential effect on inequalities.

There are many categories in the Depth tool where we found too little evidence to draw firm conclusions. Evaluating and reporting the effects of interventions on socioeconomic inequalities more consistently, will help expand our knowledge about which types of interventions are more and less likely to widen inequalities.

Implication 2: Cognitive mechanisms may widen inequalities

Interventions that rely mainly on cognitive mechanisms may be particularly likely to widen inequalities. Examples include educational material and information based apps. Avoiding these, or implementing them alongside interventions using other mechanisms could help reduce any negative impacts on inequalities.

Implication 3: Passive exposure may help avoid negative impacts on inequalities

Designing interventions with passive, rather than active, exposure may help avoid increasing inequalities. For example, providing the physical activities during school hours rather than afterschool changes exposure from active to passive.

Limitations and further work

We are in the early stages of using the Depth tool. The work described here reports on a proof of concept review that should be interpreted like a feasibility study.

We applied the tool to dietary and physical activity interventions. We think could also be used for other behaviours that have socioeconomic gradients such as smoking and alcohol or drug misuse, but we haven't tested this yet.

Similarly, we focused on socioeconomic inequalities, but expect inequalities according to other characteristics to follow similar patterns. The Depth tool may also be associated with other outcomes such as overall effectiveness and political and public acceptability.

The Depth tool focuses on the demands of interventions on individuals targeted, but other actors are also involved in interventions. Unfortunately, we did not find enough information to develop a robust understanding of the different ways in which other actors may be involved.

Find out more

Digital tool

Access Depth Tool online, to explore your own examples of population health interventions

depth-app.mrc-epid.cam.ac.uk

Full article

Development and application of the DePtH framework for categorising the agentic demands of population health interventions

Kate Garrott, David Ogilvie, Jenna Panter, Mark Petticrew, Amanda Sowden, Catrin P.Jones, Campbell Foubister, Emma Lawlor, Erika Ikeda, Richard Patterson, Dolly Van Tulleken, Roxanne Armstrong-Moore, Gokulan Vethanayakam, Lorna Bo, Martin White, Jean Adams

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More about the study

www.mrc-epid.cam.ac.uk/depth-tool

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