



Short Communication

Making integration foundational in population health intervention research: why we need ‘Work Package Zero’

M. Alvarado ^{a,*}, T.L. Penney ^b, C.C. Astbury ^b, H. Forde ^a, M. White ^a, J. Adams ^a^a MRC Epidemiology Unit, University of Cambridge School of Clinical Medicine, Box 285 Institute of Metabolic Science, Cambridge Biomedical Campus, Cambridge CB2 0QQ, United Kingdom^b Global Food System and Policy Research, School of Global Health, Faculty of Health, York University, 4700 Keele Street, Toronto, Canada

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ABSTRACT

Objectives: We aimed to identify when and how integration should take place within evaluations of complex population health interventions (PHIs).**Study design:** Descriptive analytical approach.**Methods:** We draw on conceptual insights that emerged through (1) a working group on integration and (2) a diverse range of literature on case studies, small-n evaluations and mixed methods evaluation studies.**Results:** We initially sought techniques to integrate analyses at the end of a complex PHI evaluation. However, this conceptualization of integration proved limiting. Instead, we found value in conceptualizing integration as a process that commences at the beginning of an evaluation and continues throughout. Many methods can be used for this type of integration, including process tracing, realist evaluation, congruence analysis, general elimination methodology/modus operandi, pattern matching and contribution analysis. Clearly signposting when integrative methods should commence within an evaluation should be of value to the PHI evaluation community, as well as to funders and related stakeholders.**Conclusions:** Rather than being a tool used at the end of an evaluation, we propose that integration is more usefully conceived as a process that commences at the start of an evaluation and continues throughout. To emphasize the importance of this timing, integration can be described as comprising ‘Work Package Zero’ within evaluations of complex PHIs.© 2022 The Author(s). Published by Elsevier Ltd on behalf of The Royal Society for Public Health. This is an open access article under the CC BY license (<http://creativecommons.org/licenses/by/4.0/>).

Introduction

Population health interventions (PHIs) are upstream interventions with the potential to impact a large number of people at once, often with a focus on the prevention of disease and/or reducing inequalities in health outcomes.¹ Examples include sugar-sweetened beverage (SSB) taxes, large-scale infrastructure interventions to promote physical activity, minimum unit pricing for alcohol and restrictions on tobacco advertising.

Complex interventions are defined either by the nature of the intervention (e.g. number of components, range of pathways, etc.) or the nature of ‘interactions between the intervention and its

context.’² Given the importance of context to PHIs,³ most can reasonably be thought of as complex interventions.

Evaluations of complex intervention often ask a research question that is some form of ‘did it work?’² Although this is a crucial question, decision makers also need to know: ‘should we do more of this or more of that?’ and ‘what happened? what did the PHI contribute?’⁴ Addressing these questions often necessitates the use of multiple types of evidence and study types.

Accordingly, evaluations of PHIs typically include multiple methodologically distinct ‘work packages’ (WPs), each with specific research questions which together aim to deliver a holistic perspective on the intervention. Each WP corresponds to a distinct research question within the evaluation (e.g. concerning health-related outcomes, processes, economics, etc.) and usually involves the collection and analysis of different kinds of data. There is then often a WP with the aim of ‘integrating’ the different strands to answer a summative question about the PHI under study. This WP

* Corresponding author.

E-mail address: mra47@cam.ac.uk (M. Alvarado).

is critical since ‘without integration, questions are left unanswered and possibilities for deeper insights unexplored.’⁵ In practice, this ‘integration’ WP is usually undertaken at the end of the study.

There are several challenges associated with ‘integration’ as a final WP. First, the evaluation team may find it challenging to know what to do with multiple findings at the end of a study, particularly when impending project deadlines limit time and resources available in the final months of an evaluation. Second, it might become clear that key ‘bridging’ analyses are missing, limiting the depth or nuance that can be brought out. Third, there may be a tendency for quantitative results to dominate qualitative ones in the final ‘bringing together’ process.⁶

We suggest that conceptualizing integration as ‘Work Package Zero’ will help embed integration within PHI evaluations, support evaluation teams to make the most of diverse types of evidence and produce holistic and complexity-informed insights regarding PHIs.

Main text

What do we mean by ‘integration’?

The term ‘integration’ has many meanings.⁷ We build on Woolley’s definition and suggest that integration entails bringing together multiple components ‘in such a way as to be mutually illuminating, thereby producing findings that are greater than the sum of parts.’⁸

Although integration is sometimes thought of as the mixing of quantitative and qualitative approaches, we posit that integr-

ation is relevant whenever multiple sources or types of data are used.⁵

We differentiate between integration and synthesis. Synthesis can be thought of as bringing together similar types of studies, each focused on different instances of a similar intervention. Integration can be thought of as bringing together different types of studies, each focused on the same instance of a specific intervention.

What methods can be used for integration in evaluations of population health interventions?

There are many methods available for integration in evaluations of PHIs, including process tracing, realist evaluation, congruence analysis, general elimination methodology/modus operandi, pattern matching and contribution analysis.^{5,9} We summarize these methods in more detail in Table 1 and provide key references to methodological guidance and applied examples.

To varying degrees, all the aforementioned methods emphasize theory as the foundation for bringing together multiple types of findings. Some methods focus on the intervention’s theory of change (e.g. contribution analysis, pattern matching). Others emphasize greater engagement with the broader theoretical literature (e.g. process tracing, realist evaluation) through middle-range theory¹⁰ and theories about social mechanisms, and may enrich PHI evaluations by encouraging evaluators to think beyond intervention theory. This engagement with higher-level theory would enable evaluators to build on, test and refine theories related to underlying causal mechanisms with broader applicability.

Table 1
Integrative methods for evaluation of population health interventions.

Integrative Methods	Description	References	Applied Example in Evaluation
Contribution analysis	“aims to compare an intervention’s postulated theory of change against the evidence [...] to critically construct a ‘contribution story’ which builds up evidence to demonstrate the contribution made by an intervention, while also establishing the relative importance of other influences on outcomes” ⁹	Methods: Mayne 2008, ¹¹ Mayne 2012 ¹² Examples: Belcher et al., 2017, ¹³ Befani & Mayne 2014 ¹⁴	A sustainable forestry management program in the Congo Basin. ¹³
General elimination methodology/Modus operandi/Congruence analysis	“The methodology entails systematically identifying and then ruling out alternative causal explanations of observed results.” ⁹ Used to ask “which explanatory approach provides more/new insights?” and to compare “the descriptive and explanatory merits of different theories” ¹⁵	Methods: Blatter 2012, ¹⁵ Scriven 2008 ¹⁶ Examples: Wauters and Beach 2018 ¹⁷	A career coaching program with Flemish adults. ¹⁷
Pattern matching	“Pattern matching involves the specification of a hypothesized pattern, the acquisition of an observed pattern using empirical data, and an attempt to match the two. This moves beyond single hypothesis testing because the complexity of the pattern is important.” ¹⁸	Methods: Trochim 1989 ¹⁹ Examples: Foley et al., 2022 ¹⁸	Travel behaviours (amount, mode of choice) in Africa, with a focus on gender and socioeconomic differences. ¹⁸
Process tracing	“Process tracing (PT) is a form of within-case analysis that makes inferences to the best explanation of a case based on evidence, including the temporal sequence of events.” ²⁰	Methods: Beach and Pedersen 2019, ²¹ Bennett and Checkel 2014, ²² Fairfield and Charman 2017 ²³ Examples: Raimondo 2020, ²⁴ Alvarado et al., 2021, ²⁵ Wauters and Beach 2018, ¹⁷ Befani & Mayne 2014 ¹⁴	A risk signalling effect around sodas and sugar-sweetened juices following the introduction of the Barbados SSB tax ²⁵
Realist evaluation	“Sets out to test a Middle Range Theory (MRT), detailing how the mechanisms initiated by a programme should cause desired outcomes. [...] Pawson and Tilley (1997) sum this up as ‘mechanisms + context = outcomes’” ⁹	Methods: Pawson and Tilley 1997, ²⁶ Pawson and Tilley 2009 ²⁷ Examples: Renmans et al., 2020, ²⁸ Marchal et al. 2010 ²⁹	A performance-based financing intervention focused on health centres and hospitals in Western Uganda. ²⁸

Note: The methods listed in this table are not exhaustive, but are provided as an indicative list of potentially integrative methods that can be useful for population health intervention (PHI) evaluators.

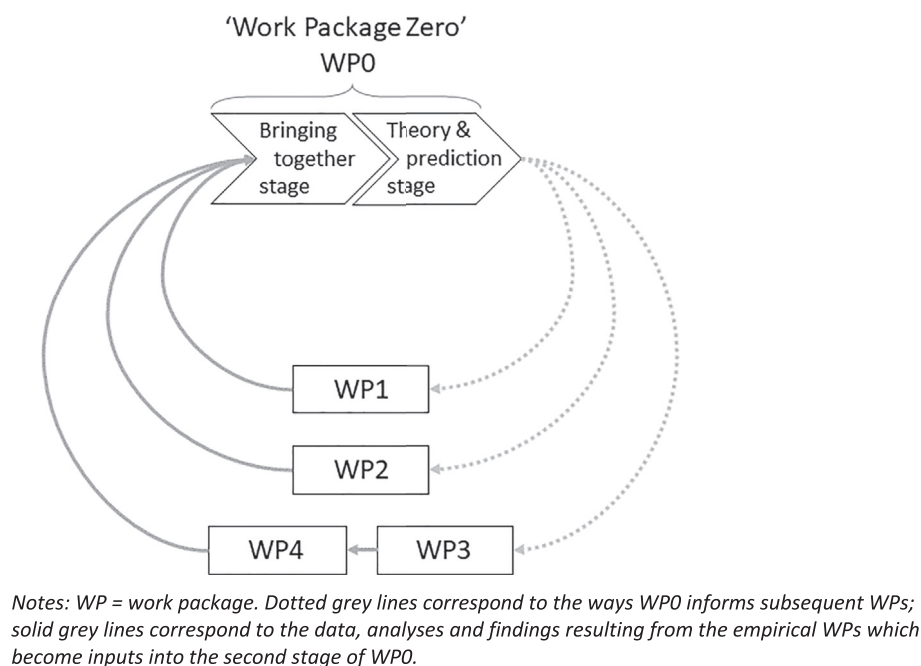


Fig. 1. Conceptualizing integration as 'Work Package Zero' within evaluations of population health interventions.

Integration as 'Work Package Zero'

We suggest that PHI evaluations would benefit from conceptualizing integration as a process that commences at the start of an evaluation — the so-called 'Work Package Zero' or WPO.

In practice, many of the PHI evaluations that we have worked on position integration as something to be done at the conclusion of a project (e.g. the final WP). However, many integrative methods (such as those listed earlier) are more appropriately seen as 'umbrella methods' which encompass the entire evaluation. These methods require substantial up-front work before any empirical evidence is collected or analysed and involve continued appraisal/ updating throughout the evaluation.

As Fig. 1 illustrates, WPO is both central to an evaluation and inclusive of both the starting and endpoint within an evaluation. Although the specific approach will vary depending on the integrative method chosen, the early stages of WPO tend to involve the identification or development of theory and predictions about the corresponding evidence that may be found. Dotted grey lines highlight the ways this stage of WPO helps to identify, prioritize and justify the choice of empirical analyses (represented here as WP1–4).

The solid grey lines depict the empirical analyses being brought together in the context of the theory and predictions identified previously. The initial work completed within WPO provides guidance on how to analyse data from multiple sources or analyses, interpret findings and revise, refine or refute the initial theory or theories. Emergent hypotheses not explicitly identified at the outset may also be developed and inform the revised theory within WPO, and lead to further analyses. Additional interconnections between WPs likely exist — for simplicity, we have streamlined the figure.

What are the benefits of, and barriers to conceptualising integration as 'Work Package Zero'?

Conceptualising integration as WPO may strengthen evaluations of PHI in several ways. First, this may reduce the chances of coming to the end of the evaluation without a clear idea of how to 'bring it

all together.' Positioning integration as the first step in planning an evaluation will encourage researchers explicitly to consider and select an appropriate over-arching method at the start of a PHI evaluation. There are many methodological approaches that may be appropriate — we are not suggesting a new approach, but rather a further legitimization of best practices and a clear label (WPO) to communicate this to researchers, funders and other stakeholders.

Second, prospectively considering how various kinds of evidence will come together provides an opportunity for researchers to focus limited resources on the types of analyses with the greatest potential to discriminate between theories or increase understanding.

Third, identifying an approach for interpreting diverse types of evidence up-front gives each type a 'seat at the table,' putting qualitative insights on fairer footing in relation to quantitative insights.⁶

There are also challenges. Many of the methods described in Table 1 will be less familiar to population health evaluators, and require additional training, resources and time to conduct. These methods are infrequently published in population health journals, and some sensitization around these methods with peer reviewers, editors and funders may also be necessary.

However, if population health evaluators hope to elucidate the ways in which PHIs contribute to change and produce evidence to inform 'what next?' and how should we improve the PHI?' it will be important to use multiple types of evidence and an over-arching integrative method.

Conclusion

In developing the idea for this commentary, we set out to identify methods to integrate different types of data at the end of a multicomponent PHI evaluation.³⁰ However, we found this conceptualization of integration did not bear out the promise of effective integration, namely producing insights that are greater than the sum of its individual parts. Rather than looking for a tool for use at the end of an evaluation, we found value in conceptualizing integration as something that starts at the planning stage and continues throughout an evaluation (WPO).

There are many methods that can be deployed in this type of integration. It will be instructive to compare and assess the relative strengths and limitations of these methods when applied in evaluations of PHIs. It will also be crucial to assess the extent to which 'integrative findings' are useful to decision makers in practice.

In some cases, especially for high-profile PHIs, multiple evaluations may be designed in parallel, with or without coordination. As a result, there may be multiple types of evidence available both within and across study teams that shed light on a particular aspect of the PHI under consideration, and the extent to which integration is feasible under these circumstances remains an open question.

We have focused on integration within evaluations of PHIs, but it will be valuable to consider whether this framing is useful in other evaluation contexts. Finally, it will be important for funders to recognize integrative methods as a valuable component of evaluation proposals and allocate resources as appropriate.

To highlight the importance of integration to both funders and researchers, we recommend the inclusion of a 'Work Package Zero' in future evaluations of PHIs.

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Ethical approval

This work did not require ethical approval.

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Competing interests

The authors have no competing interests to declare.

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