



Public Health Nutrition Intervention Management



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ADDITIONAL COPIES

The complete suite of 18 Public Health Nutrition Workforce Development units developed by the JobNut Project and the related Educator's Guide are available for downloading at the following website:

<http://www.medicine.tcd.ie/nutrition-dietetics/jobnut/>

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TRINITY COLLEGE DUBLIN
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Intelligence > Determinant Analysis

Action

Evaluation



Intelligence

Unit 4 - Determinant Analysis

Learning Objectives

On completion of this unit, students should be able to:



1. Identify proximal and contributory determinants of public health nutrition problems
2. Describe causal relationships between determinants of public health nutrition problems
3. Ascertain intervention points based on analysis of determinant sequencing and causal flows

Intelligence

Unit Readings

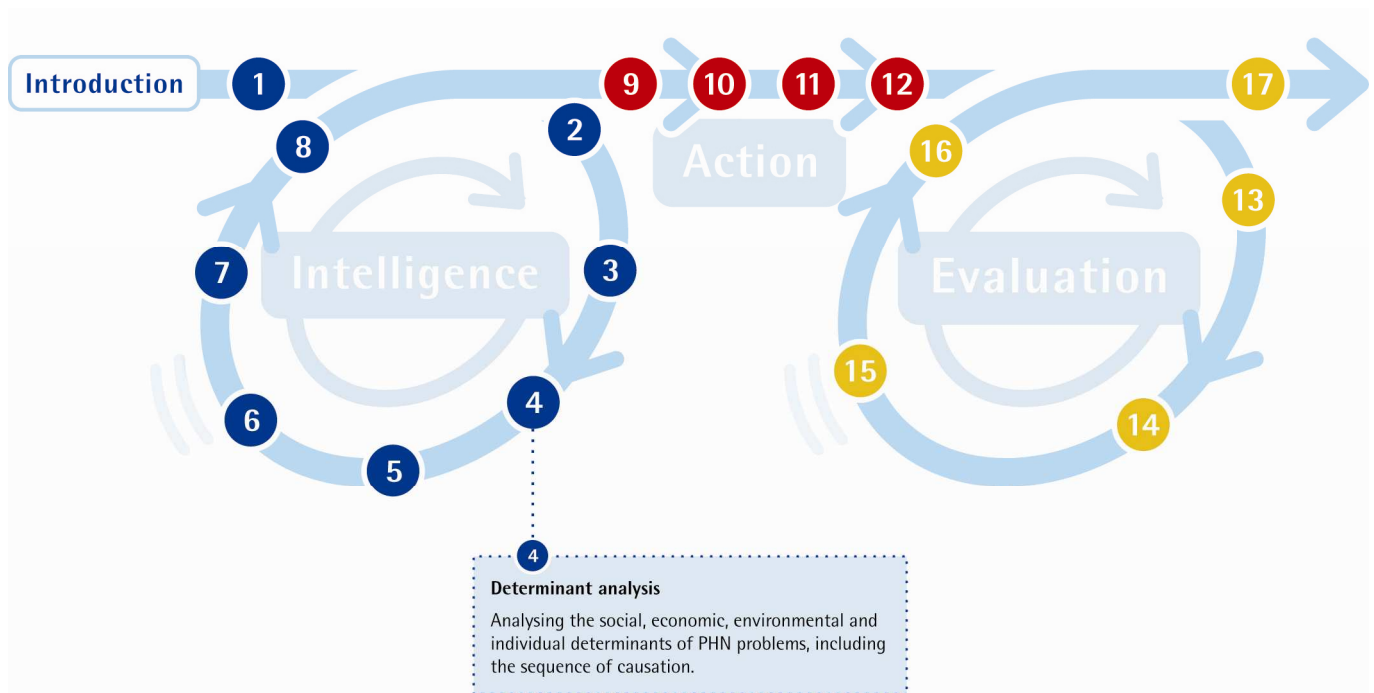


- Miilunpalo, S. Evidence and theory based promotion and health-enhancing physical activity. *Public Health Nutrition*. 2001. 4(2G): 725-728.
- Miller, M. and Stafford, H. *Framework trial to develop an intervention portfolio to promote fruit and vegetables - summary report to the National Public Health Partnership*. 2000. National Public Health Partnership: Victoria. p. 3-4, 7-8.
- Kritstjansdottir, A., Thorsdottir, I., Bourdeaudhuij, I., Due, P., Wind, M. and Klepp, K. Determinants of Fruit and vegetable intake among 11-year-old school children in a country of traditionally low fruit and vegetable consumption. 2006. *International Journal of Behavioural Nutrition and Physical Activity*. 2006. 3 (41): 1-9.



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From: Hughes R, Margetts B. *Public Health Nutrition: A Practitioners Handbook*. Blackwell Publishing, 2009.



Determinant Analysis

Preamble

The basic assumption that underpins determinant analysis as a step in the intelligence stage of the intervention management bi-cycle is that population nutrition problems can not efficiently be addressed without understanding the causes. Most problems or issues in public health nutrition (PHN) are not random events but have multiple causes or determinants. Determinant analysis is consistent with the *upstream* strategy focus explicit in preventative approaches to health. Identifying determinants helps focus strategies so that they change *upstream* the factors that lead to *downstream* outcomes.

Analysing Determinants

Public health practice is concerned with identifying, modifying and evaluating change in the determinants (or causes) of health and health problems. Determinant analysis involves identifying the factors affecting health or causing a problem and reviewing the linkages or relationships among these factors. Determinant analysis recognises that problems have multiple causes and that identification of causal relationships is an important for strategy selection and prioritisation. A detailed understanding through rigorous, and inclusive analysis of the causes or determinants of a health-problem is essential for effective action at a community/population level.

Determinant analysis is an extension of problem analysis, community and stakeholder engagement. It applies the intelligence collected about the problem to identify and analyse the causes of the specific population nutrition problem.

Considering the socio-ecological determinants of the identified population nutrition problem is a critical analytical and conceptual exercise in the formative stages of designing preventative interventions. Various models, based on the socio-ecological approach to health, exist to assist with determinant identification and classification (such as the *precede-proceed* model). The use of classification models that characterises determinants by their effect, level and causal link is another logical approach that enables intervention points to be selected based on analysis of determinant sequencing and causal flows (1).

Precede-Proceed Model

One of the useful models for systematically exploring and understanding the determinants of a problem is the **Precede-Proceed Model**. This model focuses on identifying the subset of factors that need to be addressed by the intervention, premised on the socio-ecological view of health and the need for multi-dimensional, multi-sectoral efforts to address health problems (2).

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The Precede-Proceed Model suggests determinants that influence health behaviour can be classified as:

- **predisposing factors** - personal factors that influence personal motivation to change, including attitudes, values, beliefs, knowledge
- **enabling factors** - facilitators or inhibitors that support or hinder change in behaviour or the environment, including societal forces or systems, resources or skills
- **reinforcing factors** - factors that provide feedback and further assist, hinder or prohibit a behavioural or environmental change.

To illustrate, The Precede-Proceed model has been used to categorise the determinants of physical activity from 33 studies (2). The results are shown in Table 1.

Table 1. Precede-Proceed Model example - determinants of physical activity

Determinant category	Determinant description	Direction of association
Predisposing factors	Attitudes Expected health and other benefits Intention to exercise Self-motivation Self-schemata for exercise Past participation High risk of heart disease Perceived effort	
Enabling factors	Income/ socio-economic status Barriers to exercise Lack of time Mood disturbance Perceived level of health or fitness Self-efficacy for exercise Perceived access to facilities	
Reinforcing factors	Social isolation Group cohesion Social support (staff/ instructor) Social support (spouse/ family)	

Source: (2)



Intelligence

Reading

Miilunpalo, S. Evidence and theory based promotion of health-enhancing physical activity. *Public Health Nutrition*. 2001. 4 (2G): 725-728.



Exercise 1.

Read the article from Miilunpalo that describes the determinants of physical activity. In the table above note the direction of association and consider whether you think that this association is likely to also be causation (i.e. the relationship noted is more than statistical, but actually helps explain why the problem exists)

Workshop/tutorial option:

Complete the exercise in small groups followed by a whole-class debriefing.



Exercise 2.

Considering one of the four scenarios provided, complete the following table by brainstorming ideas using your preliminary knowledge of the problem and professional observations.

Workshop/tutorial option:

Complete the exercise in small groups followed by a whole-class debriefing

CPD option:

Complete the exercise based off a population nutrition problem of significance in the community or population you are working with in your current job role.



Brainstorming - defined by Wikipedia, is a group creativity technique designed to generate a large number of ideas to find solutions to a problem. Brainstorming is a fun way of generating ideas and discussing topics.



<p>In your own words succinctly define the problem you are dealing with</p>	
<p>Thinking about this problem, brainstorm factors that are causes of the problem according to the following categories</p>	
<p>Predisposing factors: Attitudes, values, beliefs, perceptions that affect personal motivation</p>	
<p>Enabling factors: barriers/ enablers created by societal forces or systems, resources or skills</p>	
<p>Reinforcing factors: factors that further assist, hinder or prohibit a behavioural or environmental change</p>	
<p>CONSIDER</p>	<p>Are your normative views (expert) different to the causes of problems as experienced by the target population?</p> <p>Potential difference should be addressed through target group consultation and participation throughout the intervention process.</p>



Characterising Determinants by Effect

Another method for characterising determinants is to distinguish whether they have a positive or negative effect on the problem/issue under review.

- **Hazards** are social, biomedical or behavioural determinants which pose a threat to health.
- **Protective factors** provide a defence against adverse health events or states, or enhance well-being. **Promoting factors** are desirable and beneficial and also play a protective role.

Occasionally, protective/promoting factors are the inverse of a hazard. For example, a poor diet and physical inactivity is hazardous however, a healthy diet and regular physical activity can be protective and promote quality of life (1). Table 2 provides an example of hazardous and protective/promoting determinants.

Table 2. Determinants by effect example - Fruit and vegetable intake

Determinant type	Definition	Example
Hazards and risk factors	Pose a threat to health	Hazards can be from the physical environment, or social/ behavioural/ biomedical: <ul style="list-style-type: none"> ▪ Poor availability ▪ Poor quality ▪ High cost ▪ Access and isolation
Protective/promoting	Provide a defence against adverse health events or are desirable and beneficial to health	Protective or promoting determinants for fruit and vegetable intake include: <ul style="list-style-type: none"> ▪ High availability - schools, workplaces, corner stores ▪ Healthy eating policy in schools/ workplaces ▪ High cultural value in fruit and vegetables

Source: (1)

Characterising Determinants by Causal Link

Analysis of determinants needs to consider both proximate and contributory effects. Health problems like obesity are caused by factors that can be classified as immediate or **proximate**. These determinants directly impact on the problem (eg. Sedentary lifestyles and energy-dense diets impact directly on obesity). At the same time, there may be several more **distal** determinants which create conditions for or increase the effect of the proximate determinant. Often it is only possible (and desirable) to act on the contributory determinants rather than the proximate cause. Table 3 provides an example of proximate and contributory determinants.



Table 3. Determinants by Causal Link Example - Fruit and Vegetable Intake

Determinant type	Definition	Example
Proximate DIRECT	Directly impacts on the problem	Adequate intake of fruit and vegetables is recognised as a proximate determinant for several diseases including obesity, Type 2 diabetes, cancer and heart disease
Distal/ Contributory INDIRECT	Increase the effect of the proximate determinant	The tendency of an individual to consume adequate fruit and vegetables, and the rate of adequate fruit and vegetable intake in the community is caused by a range of contributory determinants including: <ul style="list-style-type: none"> ▪ Age ▪ Habit ▪ Knowledge and skills ▪ Perceptions of cost and safety

Source: (1, 3)

Characterising Determinants by Level

Determinants of health occur at two levels; **specific determinants** and **social and environmental-level determinants**. Specific determinants relate to ‘downstream’ health events more closely related with individual causes of ill health. Specific determinants encompass both behavioural and biomedical factors. Social and environmental determinants are broader ‘upstream’ factors external to the individual. Social and environmental determinants can have either a hazardous or protective effect on health (1).

Both social and environmental, and specific determinants can have a proximate or contributory effect. For example an economic recession may lead to an individual losing their job. The *proximate* effect may be that the job loss causes anxiety and adverse physiological response to the stress, *contributory* effect may be less income to buy adequate fruit and vegetables which overtime also has physiological consequences. Table 4 provides an example of specific and social and environmental determinants. Social and environmental determinants can have either a *hazardous* or *protective* effect on health. Strong networks of support for example, may act as a buffer against the stresses caused by job loss.



Table 4. Determinants by level example - Fruit and vegetable intake

Determinant type	Definition	Example
Specific	Health events more closely associated with individual causes of ill health.	Specific determinants can be both behavioural and biomedical: <ul style="list-style-type: none"> ▪ Behaviour: inadequate intake of fruit and vegetables, high intake of energy-dense food ▪ Biomedical: obesity, spina bifidia (inadequate folate), recurrent infections
Social and environmental	Broader ‘upstream’ factors external to the individual.	Broader external factors impacting on inadequate fruit and vegetable intake: <ul style="list-style-type: none"> ▪ Availability of fruit and vegetables ▪ Quality and price ▪ Promotion
<i>Both specific and social and environmental determinant can have a proximate or contributory effect.</i>		

Source: (1, 3)

Intelligence

Reading

Miller M, Stafford H. Framework trial to develop an intervention portfolio to promote fruit and vegetables- summary report to the National Public Health Partnership. 2000. National Public Health Partnership: Victoria. p. 3-4, 7-8.



The following hypothetical and largely incomplete determinant analysis diagram illustrates the relationship between distal and proximal determinants, and the implicit causal logic.

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Case Study



The example of obesity illustrates some simple analytical distinctions which could be made to arrive at a comprehensive understanding of the nutrition-related determinants of this health problem.

In this case the *proximate* determinants comprise the coincidence of two *hazards*, namely poor or inadequate intake of fruit and vegetables, and excessive intake of energy-dense (high sugar-fat-salt) foods. These hazards may in turn depend upon other *contributory* determinants such as vast promotion of energy-dense foods (*social and environmental*), and perceptions of cost of fruit and vegetables (*social and environmental*).

Acting on the contributory determinants may be the best point for intervention and may involve strengthening *protective* and *promotive* factors such as reducing promotion of energy-dense foods, displaying per kilo pricing for all foods to enable comparison between fruit and vegetables and energy-dense foods, and improving knowledge about the harmful effects of energy-dense foods and benefits of eating more fruit and vegetables.

Practice Note



When analysing determinants of a population nutrition problem, use the variety of intelligence sources gathered throughout the previous steps of community engagement, problem analysis and stakeholder engagement to inform the analysis. Include these sources in your descriptions and diagrams to inform the reader.

Once the determinants have been identified and the determinant sequencing and interaction illustrated in a diagram by the project team it is important to undertake further consultation with the community and key stakeholders. Ongoing consultation and participation ensures the intervention points most likely to be successful are selected by those affected by and capable with addressing the problem - a key capacity building strategy.

Exercise 3.



Considering your scenario and identified problem complete the worksheet below incorporating, where appropriate, the predisposing, enabling and reinforcing factors from Exercise 2.

Workshop/tutorial option:

Complete the exercise in small groups followed by a whole-class debriefing

CPD option:

Conduct the above exercise in the context of your current work role and the community or population you are working with.

Determinant analysis

<p>Define the problem/ issue</p>	
<p><i>Proximate determinants</i> Direct known causes of the problem - also called risk factors</p>	
<p><i>Contributory determinants</i> Increase the effect of the proximate determinant</p>	





Determinant Interaction and Causal Pathways

Isolating individual determinants and understanding how they cause a problem is useful however, is not the only level of analysis required. The interaction between determinants and how they operate in context are equally important in defining and addressing a problem. Examination of determinant sequencing and interaction avoids simplistic models of causation which can lead to simplistic and ineffective solution generation.

Remaining with adequate fruit and vegetable intake as an example, research examined some of the determinants fruit and vegetable intake in African-American women in the community of eastside Detroit (4). The study examined two particular determinants: retail food store characteristics, and household income, based on a variety of intelligence sources. Intelligence indicates that larger supermarket food store have better availability, superior quality and lower prices compared to smaller food stores, and that people with higher incomes tend to consumer more fruit and vegetables. Store characteristics, including type and location are considered contributory determinants which affect the proximate determinants of availability, quality and price of fruit and vegetables while household income directly impacts on fruit and vegetable intake it can also contribute to store characteristics and location by the average level of wealth of the area. The researchers also acknowledge the impact of other contributory determinants including age and education level that affect several determinants and each other. This example provides an illustration of the complexity involved when understanding determinant sequencing and interaction.

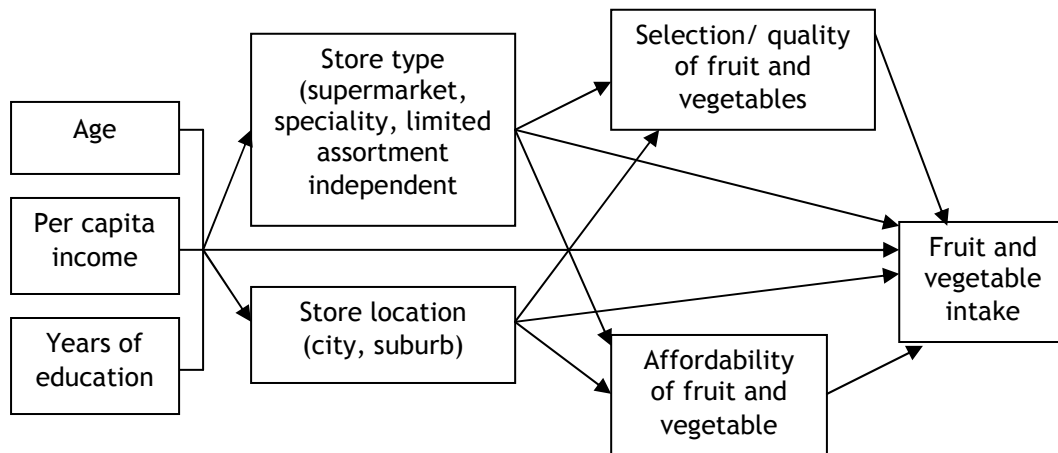
It is important to note that this study was not able to as the demonstration of causal relationships between determinants is dependent on the type of intelligence used to inform the analysis. Association rather than causation was inferred in this case however, a determinant analysis may highlight causal relationships between some determinants and association between others as deduced by the type of intelligence.

Diagrammatic Illustration of Determinant Analysis

Determinant analysis is often best presented as a diagram. The diagrammatic illustration of the food store characteristics and income as determinants of fruit and vegetable intake is present in Figure 1.



Figure 1. Determinant analysis diagrammatic example - fruit and vegetable intake



Source: (4)

A diagrammatic illustration of the determinant analysis in intervention management should logically isolate the focus of intervention strategies. Considering the above diagram, and the impact store type and location have on availability, quality and cost of food a possible intervention point is to increase the number of or access to supermarkets in areas where there are few. Further consultation with the community and key stakeholders and progressing through the remaining steps in the intelligence section of the bi-cycle will highlight whether this potential intervention is achievable and will be effective.

Practice Note



A picture paints a thousand words.

Determinant analysis is often best presented as a diagram. Determinant analysis should logically isolate determinants that become the focus of intervention strategies. Include a determinant analysis diagram that demonstrates the causative relationship between determinants and the problem in your project introduction/rationale section of your final submission. Include the sources of intelligence you have used to construct your determinant analysis model.

Intelligence



Reading

Kritstjansdottir, A., Thorsdottir, I., Bourdeaudhuij, I., Due, P., Wind, M. and Klepp, K. Determinants of Fruit and vegetable intake among 11-year-old school children in a country of traditionally low fruit and vegetable consumption. 2006. *International Journal of Behavioural Nutrition and Physical Activity*. 2006. 3 (41): 1-9.



Exercise 4.

After reading the above article by Kritstjansdottir, develop a diagrammatic illustration of the determinants of fruit and vegetable intake among 11-year-old school children in Iceland. Include interaction between determinants, as well as casual and associative relationships. Develop a key to distinguish between casual and associative determinant relationships.



Workshop/tutorial option:

Complete the exercise in small groups followed by a whole-class debriefing

Assessment

Complete a determinant analysis based on the scenario you have selected (from one of four provided). Inform your analysis with PHN intelligence and develop a diagram to illustrate the determinant relationships. Use this diagram and information to complete the determinant analysis components of the intervention management template. Limit this section to 400 words plus a diagram.



CPD option:

Conduct the above exercise in the context of your current work role and the community or population you are working with.

Key Points

- Determinant analysis involves identifying the factors affecting health or causing a problem and reviewing the linkages or relationships among these factors. Determinant analysis recognises that problems have causes and that identification of causal relationships is important strategy section and prioritisation in PHN intervention management.
- Various models, based on the socio-ecological approach to health, exist to assist with determinant identification and classification, such as the preceed-procede model. The use of classification models that characterises determinants by their effect, level and causal link is another logical approach that enables intervention points to be selected based on analysis of determinant sequencing and causal flows
- The interaction between determinants and how they operate in context of the setting where the nutrition-related health problem occurs is also an important component of determinant analysis. Identification of determinant sequencing and interaction, and diagrammatic illustration of the determinant analysis is important to focus intervention points and strategies.





Additional Resources and Readings

Conducting a determinant analysis

- National Public Health Partnership. *A Planning Framework for Public Health Practice*. 2001. National Public Health Partnership: Victoria.
- Zenk, S., Schultz, A., Hollis-Neely, T., Campbell, R., Holmes, N., Watkins, G., Nwanko, R. and Odoms-Young, A. Fruit and vegetable intake in African-Americans - income and store characteristics. 2005. 29 (1): 1-9.
- Bentley, M. and Laraia, B. Food security and feeding strategies. *Unpublished*. Chapel Hill.

Precede-Proceed Model

- Tones, K. and Green, J. *Health Promotion - planning and strategies*. 2004. SAGE Publications: London. p. 111-112
- Green, L. and Kreuter, M. 1991. *Health Promotion Planning: An educational and environmental approach*. 1991. Mountain View: Mayfield.



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1. National Public Health Partnership. *A Planning Framework for Public Health Practice*. 2001. National Public Health Partnership: Victoria.
2. Miilunpalo, S. Evidence and theory based promotion of health-enhancing physical activity. *Public Health Nutrition*. 2001. 4 (2G): 725-728
3. M. Miller, S.H., *Framework trial to develop an intervention portfolio to promote fruit and vegetables-summary report to the National Public Health Partnership*. 2000. National Public Health Partnership: Victoria.
4. Zenk, S., Schultz, A., Hollis-Neely, T., Campbell, R., Holmes, N., Watkins, G., Nwanko, R. and Odoms-Young, A. Fruit and vegetable intake in African-Americans - income and store characteristics. 2005. 29 (1): 1-9.