14

Planning and evaluation of public health interventions

Stuart Wark

Learning objectives

After studying this chapter, you should be able to:

1 describe the roles of planning and evaluation as part of any public health intervention

2 explain the three key concepts that underpin planning and evaluation

3 understand the six-stage model for planning and evaluation

4 determine the most appropriate evaluation approach for different interventions

5 develop a simple plan for a proposed intervention, including an evaluation.

<start box>

Vignette The public health implications of blue-green algae

Blue-green algae, or cyanobacteria, can produce toxins that are dangerous to humans, aquatic animals and livestock and may build up to unsafe levels within freshwater and marine water sources whenever prevailing conditions support this growth (Vu, Nguyen, Zdarta, Nga & Nghiem, 2020). If there is reduced water flow in combination with increased water temperatures and the right mix of light and nutrient levels, a 'bloom' of blue-green surface 'scum' will result (Kaur, Srivastava, Ahluwalia &

Mishra, 2021). If this occurs within a water supply or a recreational area, it can result in serious public health consequences.

The World Health Organization (WHO) has developed guidelines for safe levels of cyanobacteria to address concerns about the potential poisoning of humans and animals. Health issues in the human population can arise from the ingestion of contaminated water, through dermal (skin) exposure or by consuming animals previously affected. The health effects of exposure to cyanobacteria have been reported to include a wide variety of issues including gastrointestinal problems, such as diarrhoea and vomiting, 'flu-like symptoms, skin rashes and eye or ear irritations. Ingestion can result in increased severity of these symptoms, and has been reported as resulting in death (WHO, 2015).

As a consequence of the health problems associated with exposure to cyanobacteria, public health interventions are required to support potentially affected communities. These programs could include a variety of disparate options, from distributing general education material to local residents through to specialist training of paramedics and health practitioners in how to deal with a widespread outbreak. As an example of a current and continuing public health intervention in Australia, rivers and other water sources are regularly checked for blue-green algae levels and, if a bloom is identified, the relevant local or state government department will issue a health warning to the public (e.g. WaterNSW, 2021). However, how do we know whether public health interventions such as these are effective in minimising the effects of a bloom on a community? This is where careful planning and evaluation of public health interventions becomes vital.

<end box>

Introduction

The principles of public health promotion have been outlined in previous chapters within this textbook (see Chapter 3). The importance of planning prior to the development and subsequent implementation of any such public health interventions has been recognised for many decades (e.g. Kok, 1993) and continues to be considered critical to the effectiveness of a program (Thompson, Kent & Lyons, 2014). However, while appropriate evaluation of the intervention is as important as the initial planning, historically it has been an often overlooked aspect of program development (Green & Kreuter, 2005). Planning, implementation and evaluation should be viewed as three equally necessary and complementary components of any **public health program**.

<start definition>

Public health program a planned and structured project, or series of projects, that includes specific intervention/s designed to address one or more identified public health needs of a community.

<end definition>

This chapter provides an introduction to planning and evaluation with respect to public health promotions and interventions. Entire textbooks have been written on healthcare planning and evaluation (for example: Issel, Wells & Williams, 2021), so this chapter focuses primarily on overarching concepts. It identifies a simple, six-stage public health planning model that assists **project teams** to move from the initial identification of a need through implementation to assessment of the outcomes, with the evaluation also identifying any needs that remain partially or completely unmet. The concepts of planning and evaluation should be viewed as being part of an ongoing process; the planning of public health interventions should be informed through reviewing outcomes of relevant previous projects while the evaluation phase should

then provide observations and recommendations for future programs. If evaluations are not carefully planned and undertaken, it may not be possible to establish whether the program actually achieved the desired public health outcomes. Subsequent projects may then not be aligned with the actual needs of the community as valuable knowledge for any follow-up interventions was missed.

<start definition>
Project team usually a group of people who work together to design, implement and evaluate a public health program; for smaller projects, the 'team' may just be one individual.

<end definition>

Why plan? Development of a public health intervention

The United States Institute for Healthcare Improvement identified three key drivers for any public health intervention, which they named the 'triple aim':

1. 'Improving the patient experience of care (including quality and satisfaction);
2. Improving the health of populations; and
3. Reducing the per capita cost of health care' (Institute for Healthcare Improvement, 2021).

If it is able to achieve these three aims, an intervention will likely deliver a program that is effective and efficient, and be perceived by the desired target group as generally beneficial. However, unless appropriate planning and development is undertaken before any intervention commences, there is a high likelihood that the program will not meet all three drivers; or worse, there is the risk of a 'triple fail' in which none of the

factors are achieved. It is acknowledged that the 'triple aim' approach was conceptualised initially for healthcare settings, and all three drivers may not necessarily be applicable to all public health programs. For example, improving the patient experience of care may not be relevant for programs implemented outside of a health system, like the example of monitoring blue-green algae blooms. Nonetheless, the triple aim is a useful lens through which to begin development of potential programs.

Planning is a systematic approach whereby a public health program is conceptualised and developed to allow for future implementation (Glanz & Bishop, 2010). It is often perceived as being just the initial phase; however, it is important to acknowledge that planning must involve careful consideration of the evaluation of the entire program, both during implementation and at its conclusion. A key aspect of the planning phase involves the clear identification of need for the community in question and, by ascertaining these needs, the overall program goals and objectives are able to be defined. This, in turn, allows for an effective **evaluation** of the success of the intervention in achieving the desired health outcomes for the target population and in sustaining any positive changes into the future (Schell et al., 2013).

<start definition>
Planning the process by which a public health intervention is conceptualised, developed, implemented and then evaluated.
Evaluation a systematic approach to assessing the implementation and outcomes of a public health intervention in order to identify problems and/or determine whether the program has met its nominated goals.

<end definition>

Planning for public health programs is based on three key principles:

1. Defining the main, and if appropriate, any secondary outcome/s that the program is trying to achieve

2. Specifying the intervention that is going to be implemented as a mechanism to achieving these outcomes
3. Determining the objective measures that provide evidence to confirm if the program has achieved the nominated outcomes (National Public Health Partnership, 2000).

The first principle, *Defining the Outcomes*, requires the project team to consider the specific needs of the population, normally by identifying priority health areas (Sansoni, 2016). The team has to determine the needs of the population through either gathering new information or reviewing existing information. Desirably, this information is sourced through a variety of methodologies, such as epidemiological or socio-economic data from questionnaires, focus groups and/or interviews with key stakeholders, including health practitioners, members of the public, police, social workers, teachers and so forth. This data can then be used to identify and prioritise the needs of the stakeholders and, from that point, the desired outcomes that will address the need can be defined.

The second principle, *Specifying the Intervention*, is where the team matches the project goals with an intervention designed to achieve the nominated outcomes (MacDonald et al., 2016). This stage requires the team to nominate the project methodology after evaluating a variety of approaches to the problem at hand. Once the optimal approach has been identified, it is then possible to nominate the resources that are required for the project, develop a working budget, and set out a clearly defined list of responsibilities within an action plan. Inherent to the action plan is an overall timeline for the project, from planning to implementation, evaluation and final reporting.

The third principle, *Validating the Outcomes*, has the team determine the objective measures that allow the evaluation phase to answer the key question: "Has this intervention been successful?" It is vital to ensure that the project outcomes are directly aligned with mechanisms that will allow for accurate evaluation. While evaluation is a distinct phase of the project and separate to planning, how the project will be evaluated must be considered in advance and cannot be included as an afterthought or following commencement of the project (Rychetnik, Frommer, Hawe & Shiell, 2002).

Reflection questions

For many decades Governments around the world have struggled to address the public health impacts of drug usage. Do you think that government decisions relating to the legality, or illegality, of specific substances is derived from carefully developed, planned and evaluated research? Why are some drugs, such as alcohol, caffeine and tobacco, considered to be legal in many countries, while others such as marijuana are often prohibited? How about naturally occurring hormones such as testosterone? What factors, other than public health concerns, could potentially play a role in government decision making? Could these additional issues impact your implementation of a public health intervention aimed at assisting people with drug addiction?

The six-stage model of public health planning

The three key principles, as discussed above, lead to a six-stage model for planning smaller public health interventions, and these stages are outlined in Figure 14.1. This simple model has been developed using the concepts and principles outlined in

planning documents and reports including: *A Framework for Environmental Health Risk Management: The US Presidential Congressional Commission on Risk Management 1997* (United States Environment Protection Agency, 1997), the *Framework for Program Evaluation in Public Health* (US Department of Health & Human Services, 1999), *A Planning Framework for Public Health Practice* (National Public Health Partnership, 2000), *Health 2020. A European Policy Framework and Strategy for the 21st Century* (WHO, 2013) and *A Framework for Program Evaluation* (Centre for Disease Control and Prevention, 2017). This model is aimed primarily at local interventions, and may not necessarily be appropriate for large-scale, multifaceted public health programs. For national and international-level interventions, there is often a need for additional and extensive legislative and policy changes that are reliant on social or political advocacy and government support, and a more comprehensive planning model may be required to address all of these aspects.

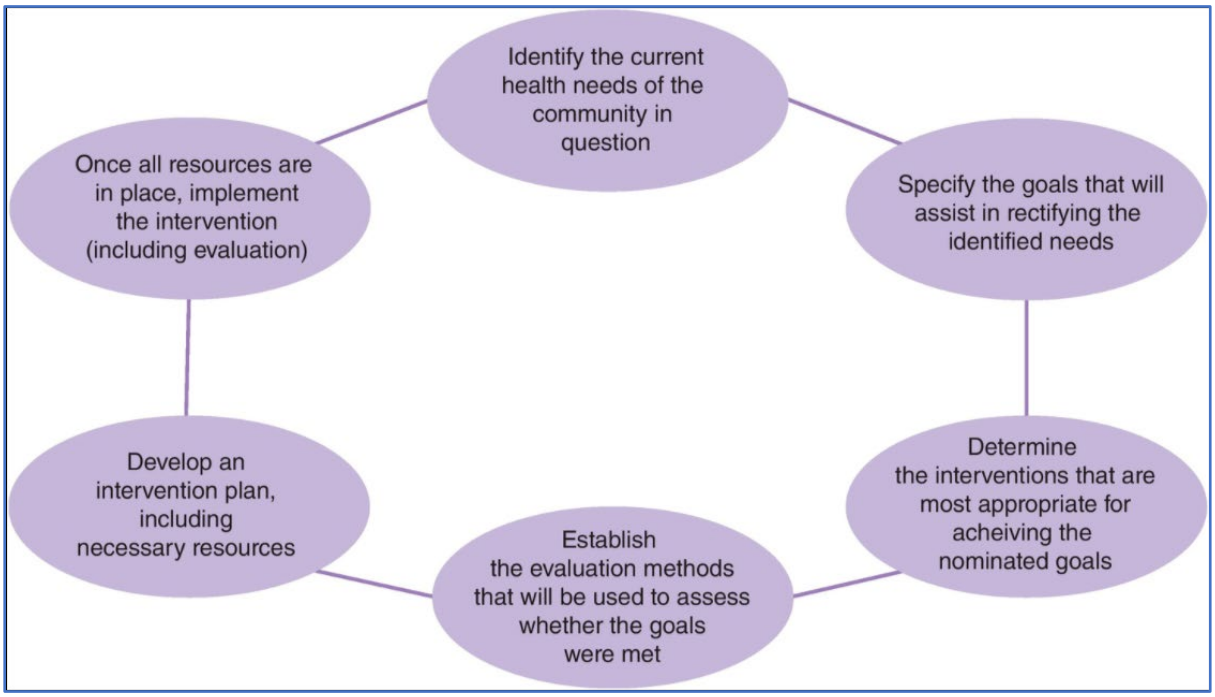

Figure 14.1 The six-stage model of public health planning

While the stages of the model nominally commence at the top and progress clockwise, it is important to recognise that it does not have to proceed forward solely in a linear fashion. In fact, it is ideal for previous stages to be reconsidered a number of times before the implementation commences. As the plan is developed through each of the stages, questions often arise that require previous decisions to be re-conceptualised. However, if the project team does return to a previous stage, it is important that the subsequent stages are completed again in light of the changing information or knowledge.

This process of review is not an indication that the intervention has a fundamental problem, but instead allows for continuous quality improvement to increase the likelihood of achieving the nominated project goals. The circular model allows for the evaluation to identify unaddressed issues, which in turn can then be recommended for examination in future interventions. Each of the six stages are discussed in detail in the following section.

<start box>

Spotlight 14.1 Gun control

In 1996, the small Tasmanian town of Port Arthur was the site of Australia's worst mass shooting, with 35 people killed and another 18 seriously injured. This massacre led the Australian Government to introduce the *National Firearms Program Implementation Act 1996* (Commonwealth Government of Australia, 1996), and this legislation and associated public campaigns resulted in the almost-complete elimination of mass shootings in Australia over the following ten years (Chapman, Alpers, Agho & Jones, 2006). In contrast, in the United States there have been ongoing incidents with

lone and multiple shooters; in the decade from 2011–20 there were 72 different mass shootings (Statista, 2021).

Question

Do you think that the interventions implemented in Australia **to minimise gun-related deaths would be successful in the United States?**

Suggested response

While it is likely that some of the Australian measures may be effective in the United States, there are dramatically different historical, legal, political and social factors that mean attempts to implement them encountered significant barriers that have, so far, proved difficult to overcome.

Question

The number of mass shootings in the US was 11 in 2017, 12 in 2018 and 10 in 2019. It then dropped to just 2 in 2020 (Statista, 2021). **Was this the result of an effective public health intervention, or could other factors be responsible?**

Suggested response

While the Covid-19 pandemic was a public health disaster in the United States, there were some interesting changes in other areas, such as this reduction in mass shootings. It is worth noting that in 2021, following the general relaxation of government mandated restrictions, mass shootings returned towards pre-2020 levels (Statista, 2021).

<end box>

Stage 1 – Identify the current health needs of the community in question

A public health intervention should not commence without an explicit understanding of the community issues the project is hoping to address. Without this knowledge, it is not possible for any program to reliably achieve outcomes that improve the health of the target population. As such, the first stage in a public health intervention is to clearly identify the needs of the community or population, and to prioritise which of these needs are to be the focus of the intervention.

Attempting to determine the health needs of a population can be highly complex, and it is worth recognising that there are many approaches that can be used to gather information, and which may each result in different but equally correct answers (see Bryman, 2016; Creswell and Plano Clark, 2018; Liamputtong, 2017, 2019). In other chapters within this book, there are examples of methodologies designed to measure the frequency of diseases and patterns of illness among large populations (see Chapter 13), while also recognising the contribution that the views of individuals can play in determining health priorities (see Chapter 12). Different approaches can be used to obtain information that will facilitate the assessment of the health needs in a community; however, the variation in data may result in very different priorities being identified.

It is also worth considering different types of 'need' when determining health priorities. Need can be conceptualised on the basis of an identified discrepancy between two or more comparison groups (for example, residents of a town in central Australia reliant on water supplied through a pipeline, compared to people in another remote location but who can access a consistent local water source). However, need can also be

seen in the light of a failure to conform to nominated standards, such as when either of these water sources are affected by levels of blue-green algae that exceed government guidelines. Individuals can also identify their own needs, and these will vary according to the perspective of either the person or their wider cohort. In considering the case study example of a blue-green algae outbreak, it may be that local council workers desire updated training in the use of water treatments to alleviate both the current crisis and prevent future occurrences, while health practitioners may instead prioritise additional knowledge of how to best assist individuals who have experienced poisoning. Both are equally valid needs, but providing the council workers with training in how to provide specialist medical support would not necessarily result in any improvements in health outcomes.

Reviewing the evaluations of previous similar public health interventions is also vital in Stage 1. A well-conducted evaluation should specifically identify what was successfully achieved, but equally it should acknowledge what issues remained either partially or completely unresolved. It is possible for a new project to therefore build on progress achieved in a previous program, but also to address needs of the community that may have only emerged during the implementation of a previous intervention and were therefore not addressed at that time.

Stage 2 – Specify the goals that will assist in rectifying the identified needs

Once the needs of the community have been identified and priorities determined, the second stage is to define exactly what goals will assist to improve the current situation. The goal of a project may not be to eradicate a problem, but instead may be aimed at

alleviating or reducing the effects of a current health issue that cannot be completely removed.

The setting of clear goals serves a number of purposes. Firstly, they assist in understanding the fundamental question of why the project is occurring, and not merely what is going to happen. In Stage 1, the needs of the community are identified and the goals of the project now have to be developed to directly address these needs (the 'why'). At the same time, the goals should also reflect the intervention that is to be attempted (the 'what'), as this facilitates appropriate evaluation of whether the project achieved the desired outcomes for the community. However, goals should not be designed to be easily met purely in order to argue for the success of the project. Goals should be aspirational but attainable; they should be sufficiently challenging to ensure that real progression occurs and the target population sees an improvement in their health outcomes.

In setting goals, there may be one or more overarching goals, and then sub-goals. An overarching goal is a general statement of what the project is aiming to achieve. The sub-goals are specific statements of outcomes that are proposed to be achieved within the timeframe of the project. Using the case example of blue-green algae, a public health intervention goal could be to 'reduce the number of people hospitalised after exposure', and the sub-goals then nominate very specific outcomes, such as 'provide specialist first-responder training to 10 paramedics in the local area'.

It is worth noting that there are numerous different terms that are often used synonymously with the word 'goal'. Depending upon the model, goals may be referred to as aims, objectives, targets and so forth. In principle though, the purpose is the same;

to nominate clearly what is hoped to be achieved and to allow for future evaluation of whether the project has been successful.

Stage 3 – Determine the interventions that are most appropriate for achieving the nominated goals

Intervention approaches can be extremely varied, and may include such disparate methods as national media campaigns, local school education sessions, household pamphlet drops, individual or group onsite training sessions, online courses, physical treatments (such as chemicals or prophylactic medications), and so on. It is important to recognise that while differing approaches may each nominally meet the project goals, the level of success may vary. Therefore, failure to consider all possible approaches may result in less-than-optimal outcomes. Many public health projects will be conceptualised initially with a desired intervention already in mind. This may reflect what the project team is comfortable in organising, is familiar with from previous projects, or even simply the interventions that have been successful in the past. Stage 3 is where the team needs to carefully consider the options that may be available, and remain open to alternative approaches.

Overall cost is naturally an important factor to take into account, and is often thought to be the first point of consideration. However, the intervention methods should not be determined primarily by what is the cheapest option. It is important to start any consideration of proposed intervention methods with identifying and viewing all possible approaches and then rating them in terms of their effectiveness in addressing the identified needs (Stage 1) and goals (Stage 2). It is a better outcome for the project team to consider scaling back the overall project goals than to implement a

less expensive intervention that is likely to be ineffective. If two approaches are viewed as being equal in effectiveness, appropriate consideration of the overall project cost may then assist in ranking one method as being the preferred option.

Time is also a critical component; both in terms of how long it will take to develop the intervention and with respect to when and for how long the program will run. An intervention that is likely to be effective in terms of both cost and outcomes may not be feasible if it does not occur within a desired timeframe. For example, it may be possible to provide a cheap and effective public health advertisement on public television regarding the dangers of swimming in blue-green algae-affected water. However, if the only time this program ran was during winter, any potential effect may well have largely dissipated by the time it was actually needed in summer. Further, it is vital to have clearly nominated the target audience to ensure the approach can be tailored any known demographic preferences. For example, there is a clear demographic shift occurring in television viewing habits, with people under the age of 45 increasingly watching less commercial television and instead choosing to watch streamed content (Poggi, 2017). Any public health intervention based on television advertising may therefore be less effective if people in this age bracket are the key audience.

The final component of Stage 3 is documentation of all resources that would be required. This requires identification of both the existing and any additional resources that are necessary. This review process should consider the following factors:

- *Human resources*. This will include the project team itself, members of the local community, subject matter experts and local/national/international advisors. People are able to assist the development, implementation and

evaluation of the program through contributing their knowledge, skills, experiences and labour. Influential individuals, such as family members, local community leaders and even popular social media figures may be able to assist in guiding public opinion on important public health issues.

- *Knowledge resources*. There are often a variety of useful existing information sources that can assist in the development of a program. These can include government or an industry body's guidelines and recommendations, such as the *Australian Drinking Water Guidelines* (Water Quality Australia, 2018) for the blue-green algae example. Both state and local governments may also have policies and procedures for dealing with situations unique to their location. The 'internet' is also a source of information, but caution must be exercised whenever reviewing content that is potentially unreliable and based on personal opinion rather than the available scientific evidence. This is not to say that individual viewpoints should not be considered, as expert opinion and personal experiences can be important in understanding potential barriers that limit a program's effectiveness, but such information should be carefully evaluated in light of the wider knowledge base.
- *Physical resources*. This can include existing assets, information and communication technologies (ICT), rooms for the provision of training, and resources to be purposively developed for the intervention. Examples of resources that may need to be designed could include information brochures, websites or training materials, and even chemicals or physical barriers such as fencing, netting or cages. A thorough investigation of the

local physical resources that are available may assist in reducing the costs of the project, as there may be no need to replicate items that are already either under-utilised or able to be hired rather than purchased outright.

Establishing the necessary resources prior to commencement is vital so that potential pitfalls, such as unavailable personnel or expensive items, can be recognised. If it is clear that there may be problems with resource allocation in this planning stage, the intervention approach must be re-considered. The best-intentioned project will fail if the necessary resources are not available at the right time.

Stage 4 – Establish the evaluation methods that will be used to assess whether the goals were met

As noted earlier, evaluation is one of the most important but overlooked aspects of any public health intervention. An effective evaluation allows the project team to accurately identify what worked, what did not work, and what knowledge may be useful for any future interventions. The proposed evaluation methods should always be mapped in advance against each of the goals and sub-goals to ensure that accurate assessment of the outcomes, both desired and undesired, can occur without limitation. The importance of ensuring that the evaluation methods are established in advance of commencing the intervention cannot be too strongly emphasised. Attempting to retrospectively 'fit' an evaluation into a project that has already begun can potentially discredit any of the achievements made.

Evaluation methods must be objective and free from any actual or perceived biases. While it is naturally desirable for an intervention to be considered 'successful', it is crucial that the evaluation methods are robust and independent of undue influence

from the project team. This does not mean that the evaluation must always be undertaken by a third party, but there is the need for the evaluation to clearly demonstrate that the project team has not attempted to skew the findings to make outcomes appear overly beneficial.

The general principles and methods used in evaluation are covered in greater detail later in this chapter. Using the blue-green algae scenario, exemplar evaluations could include pre-testing and post-testing of the knowledge of workers, a review of the number of blooms across a defined location over a set period of time, or an appraisal of any changes in the severity and/or duration of symptoms in exposed individuals.

Stage 5 – Develop an intervention plan, including necessary resources

Continuous review of the proposed project allows emerging issues to be identified as early as possible. As such, prior to finalisaing the intervention plan, the project team should review the previous stages to ensure that no new problems are evident. This is part of the circular nature of the model; it may be that the project team will recognise a major flaw in the planning process at this point, and will therefore need to return to Stage 1 to ensure that the entire intervention is not compromised.

Once the team is satisfied that no additional actions are necessary, the actual intervention plan can be developed. By this time, the team should be very clear on the public health need the intervention is going to address, the best way to address this need, the evaluation methods that will determine whether the need has been addressed and the resources required to achieve all of these steps.

The intervention plan must outline exactly:

- Who is going to do each action

- What resources are required to support the nominated person/s to implement the action, and
- The timeframe for each of the actions.

A matrix that specifies each action, the person who is responsible for the action, any necessary resources and the proposed timeframe for completion, is a common structure for intervention plans. An example of a very simple plan to provide an information brochure on blue-green algae to local residents in a small town is included in Table 14.1.

Table 14.1 Matrix of a sample intervention plan

Intervention Plan – Blue-green Algae Brochure Mail-out			
Action	**Person/s responsible**	**Resources required**	**Timeframe**
Develop brochure content with focus on effects of blue-green algae through exposure while swimming	• **Team Leader** • Content developer • Public health doctor	• Information from health guidelines (Water Quality Australia, 2018) • Advice from doctor • Computer program for brochure design	3 months: commencing 1 July
Print brochure for distribution	• Team Leader	• Final approved version of electronic copy of brochure • $500 for printing costs (to be paid	2 weeks: commencing 1 September

Intervention Plan – Blue-green Algae Brochure Mail-out			
Action	**Person/s responsible**	**Resources required**	**Timeframe**
		from government grant)	
Distribute brochure to all households in town	• Team Leader • Manager, Disability Employment Service	• 500 brochures • $2500 to pay for household distribution by local disability employment program	1 week: commencing 15 September

<start definition>
Team leader a project team will normally have a designated team leader who is responsible for overseeing the implementation of the entire project and delegating tasks to appropriate team members.

<end definition>

This matrix is simplistic, but more detailed plans could use the same structure with additional detail. Each of the actions (for example, develop brochure) can be divided up into specific sub-activities with more nuanced allocations of responsibilities, delegations and approvals.

A number of specialist software solutions are available, both commercially and free, to assist teams with planning for public health interventions. If the project is complex and requires substantial resources, occurs over a long or multiple time periods, or includes a large number of locations, a dedicated software package may be beneficial to the planning and implementation processes. However, the time involved for key

personnel to learn how to use new software may ultimately delay the project. In the event that there is not a computer program mandated by either the employer or funding body, it is feasible to map out simple intervention plans in any mainstream spreadsheet or free web-based program. If an individual can foresee that they are going to be planning a number of interventions over the following months or years, it is recommended that they trial some different packages to see which ones best meet their need. In contrast, if a person is involved in planning a simple, one-off intervention, it is suggested that specialist software may not be necessary. It is possible to move a project to a more complex package if necessary, but the money and time lost in purchasing and learning a program that is not actually required cannot be regained.

Stage 6 – Once all resources are in place, implement the intervention (including evaluation)

The final stage in the model is where the actual implementation of the intervention occurs. If the planning stages have been rigorous and comprehensive, the intervention will have an increased chance of achieving the nominated outcomes. However, it is worth remembering that there is never a guarantee that the goals will be met; it is impossible to accurately predict in advance exactly how an individual or community may react to an intervention, and there may be adverse circumstances that cannot be predicted.

Once the program has commenced, it is important to continually review the progress of the intervention plan. It is likely that unforeseen issues will arise through the duration of this implementation stage, and if appropriate surveillance of the program is occurring, these issues can be predicted and rectified before they impact the

project. When a problem is identified, it is important to then return to Stage 5 and update the intervention plan to incorporate any new actions, responsibilities and timeframes. Similarly, a review of the nominated evaluation methods (Stage 4) may be required to ensure that any issues are not inadvertently overlooked or missed.

Finally, once the actual intervention has finished, it is easy to not focus sufficiently on ensuring the evaluation phase. Comprehensive evaluation allows the project team to understand whether the intervention was effective in addressing the initial needs of the community, and also can identify where there are remaining areas of improvement or continuing gaps that require follow-up. Any evaluation of a project should include observations of what did and did not work as planned and provide specific recommendations for future interventions to consider. While evaluation is conceptualised and incorporated into the planning of a project, it requires a specific focus, and any project must have a comprehensive understanding of what constitutes an appropriate evaluation.

<start box>

Spotlight 14.2 Public health interventions: Smoking versus obesity

Smoking remains a major public health issue around the world. It has been reported to cause the death of approximately 21 000 Australians annually and cost the health system billions of dollars, but positively the past few decades have seen significant decreases in the number of smokers (AIHW, 2019). However, it is not clear how much of the reduction in smoking is due to government regulations, such as bans on smoking in public areas and the increased taxes on cigarettes, as opposed to the widespread health behavioural change programs (Sammut, 2008). Like smoking,

obesity has emerged as a major public health issue and there is similar need to address this problem (World Health Organization, 2021).

Questions

1. **With regard to the obesity epidemic, do you think that there are any lessons to be learnt from previous public health interventions aimed at reducing smoking?**

2. **Is government regulation of nutrition likely to be more successful than providing information about healthy eating and exercise to the general community through television advertising?**

3. Should the recommendations from other interventions be considered when developing a new program, even if it is in a different area of health?

<end box>

The role of evaluation

Evaluation is the systematic and structured review of a public health program, with a focus on the use of objective measures that allow for the identification of strengths and areas for improvement (Dawson, 2019). Without appropriate evaluations being conducted during and following the conclusion of a public health program, any future interventions will not be in a position to build upon the strengths of the previous program, and may struggle to avoid making similar mistakes.

Evaluations are based on a combination of assessing the processes, effects and key outcome indicators. Without this knowledge, it may be impossible to determine whether the goals of the project have been achieved. The evidence gained from evaluations can then assist with the identification of what has been successful, what has

not worked as predicted, and what improvements for future programs may be appropriate. When future projects then similarly undergo evaluation, this iterative approach allows for constant refinement and better targeting of programs.

The purpose of evaluation within a public health context is to examine how effective the project in question has been in achieving the desired outcomes identified within the planning phase (Dawson, 2019). Evaluations should be measured against these nominated goals, and highlight how well the intervention managed to improve health outcomes for the individuals or populations in question. It considers the overall success of a program, with specific consideration of factors including cost-effectiveness and efficiency of delivery vital for determining the final outcome. However, evaluations are not limited just to consideration of how well the goals and objectives are met, but also should examine whether the implementation of the actual intervention was effective (United States Environment Protection Agency, 1997; WHO, 2001). If the project did not meet its goals and objectives, the failure may have been due to the way in which the intervention was implemented, rather than because there was a problem with the structure of the proposed intervention.

Reflection questions

The ‘Grim Reaper’ public health campaign was shown on mainstream television in Australia for only three weeks in 1987, before being followed up with hard copy advertisements in newspapers. Commissioned by the National Advisory Committee on AIDS, the purpose of the intervention was to raise awareness regarding of the potential spread of AIDS. The

campaign was considered at the time to have been effective in achieving this goal (Morlet, Guinan, Diefenthaler & Gold, 1987).

Would this approach be effective for all public health issues? Do you think a 'scare' campaign would be as effective now? Have there been changes within society that mean this style of intervention may now be obsolete?

Evaluation methods

In general, planning and evaluation can be seen as two interrelated elements that both inform and assist in the development of each other. The planning phase involves the development of specific goals and sub-goals, while the evaluation phase attempts to assess how well these nominated goals were met (WHO, 2001; Dawson, 2019). As noted earlier in the six-stage planning model (see Stage 4), how the evaluation of a public health project will occur should be determined during the planning phase and well prior to commencement of any intervention. Evaluations of public health interventions should, whenever appropriate and feasible, measure short, medium and long-term effects, both in terms of health outcomes for individuals and for determinants of health within a population (National Public Health Partnership, 2000; Green & Kreuter, 2005).

The evaluation plan should specifically consider and nominate responses for each of the following questions:

- What is the purpose of the evaluations (for example, what are the goals and objectives being measured)?
- What evaluations are to be conducted, and when are these evaluations proposed to occur?

- What indicators must be defined to allow any changes to be accurately measured?
- What questions are required to be answered in each evaluation, to allow for the correct data to be collected?
- Which key stakeholders are responsible for each of the steps of the proposed evaluations?
- What methodology is going to be used for the evaluations?

While there are a variety of different types of evaluations, the following section will focus on four key types. Two occur generally during the planning and implementation stages of the intervention, while the other two normally take place either during or after the intervention has been completed. These four types of evaluation are:

- **Formative evaluation**, which allows the project team to examine whether the intervention is likely to achieve the desired results and to identify any barriers that can be overcome before the intervention is finalised (Stetler et al., 2006).
- **Process evaluation** measures how well the intervention itself is being implemented (Moore et al., 2015).
- **Outcome (or summative) evaluation** determines whether the overall goals of the project, as defined in the planning phase, have been met (WHO, 2000).
- **Impact evaluation** considers how effective the project was in achieving the nominated goals, and whether the outcomes were sustained or not (Department of Foreign Affairs and Trade, 2012).

<start definition>

Formative evaluation a type of evaluation undertaken in order to assess whether the implementation of the program is/has progressed appropriately and to identify any impediments that may limit the intervention's success.
Process evaluation a type of evaluation that examines the program while it is being developed or implemented in order to identify any barriers or impediments.
Outcome evaluation a type of evaluation that is undertaken following the conclusion of a project, to assess whether the nominated goals were met, and what issues may remain.
Impact evaluation a type of evaluation that attempts to measure not just whether the goals were met, but also how effectively they were met and whether there were any short, medium or long-term benefits.

<end definition>

Examples of each of these four types of evaluation are included in Table 14.2, along with some reasons when and why they could be used in a public health intervention, and example questions for each type of evaluation.

Table 14.2 Evaluation Types

Evaluation type	Stage of intervention	Reason for using this type of evaluation	Example questions for this type of evaluation
Formative	During the development of an intervention	Formative evaluations allow the project team to identify changes that may be required before the intervention commences to ensure the greatest chances of success.	• Are the key stakeholders happy with the proposed plan? • Are there any obvious impediments to implementation that haven't been considered?

Evaluation type	Stage of intervention	Reason for using this type of evaluation	Example questions for this type of evaluation
			• Is there a mismatch between the overall budget for the project and the proposed resources?
Process	During the actual implementation of the intervention	Process evaluation is in effect a monitoring process and occurs during the actual implementation. It allows the project team to assess whether the intervention is progressing as planned, and to identify any problems that may be able to be overcome without fundamentally changing the project at this late point.	• Are the methods and resources appropriate? • Is the budget on track, or is it costing more than expected? • Are the nominated timeframes being met? • Does the target group already appear to be benefitting from the intervention? • Are the proposed number of participants actually

Evaluation type	Stage of intervention	Reason for using this type of evaluation	Example questions for this type of evaluation
			receiving the intervention? • Is there capacity for additional interventions?
Outcome	During the actual implementation of the intervention and/or at the conclusion of the intervention and subsequent months	Outcome evaluations are used to objectively assess whether the intervention is having any impact on the community in question. It allows the project team to determine whether the nominated goals have been achieved.	• Has there been measurable change in the target's knowledge, attitudes and/or behaviours? • Has there been measurable change in physical characteristics (individual, community or environment)? • Did the entire project come in on budget?
Impact	At the conclusion of the intervention and in subsequent months/years	Impact evaluation is also used to see whether the nominated goals of the intervention were achieved, but may take place over a longer	• What changes arose from the intervention?

Evaluation type	Stage of intervention	Reason for using this type of evaluation	Example questions for this type of evaluation
		timeframe to more accurately measure the extent of the intervention's impact, and whether any identified outcomes were sustained over a period of time.	• Where any observed changes sustained over time? • Were there any secondary changes that may not have been expected? • Does the cost of the project reflect good value for money when considering any short and longer-term changes?

It is worth noting that economic evaluation is sometimes considered to be a completely separate category to the above four (see, for example, Drummond, Sculpher, Claxton, Stoddart & Torrance, 2015). However, it is often possible to incorporate economic considerations (for example, a cost–benefit evaluation) into another evaluation. If it is identified that there is a need for a strong focus on the financial impact or cost benefits of an intervention, it may be worthwhile to consider including a specific sub-category on economic analysis into the outcome or impact evaluations. This

may be particularly applicable for larger projects reliant on government funding and where clear evidence of value for money is required.

<start box>

Spotlight 14.3 The vaccination debate

In 1998, a study was published in *The Lancet*, a highly reputable medical journal, titled 'Ileal-lymphoid-nodular hyperplasia, non-specific colitis, and pervasive developmental disorder in children' (Wakefield et al., 1998). Although this paper did not report a causal relationship between the measles, mumps and rubella (MMR) vaccination and autism, it was a catalyst for a widespread drop in vaccination rates in many countries due to concerns about MMR causing autism in children. Widespread misconceptions about vaccinations and autism continue to persist (Zerbo et al., 2018), and the emergence of COVID-19 was associated with a further rise in 'vaccination hesitancy ' (BMJ, 2021)

Question

If you were asked to lead a team to design a public health social media campaign aimed at combatting community misunderstandings about vaccinations, what factors do you think would be important to consider when developing a plan for this intervention?

<end box>

Summary

Planning and evaluation are key components underpinning the success of any public health program. Appropriate planning prior to implementation is vital if the target

community is to achieve any short, medium or long-term health benefits, while rigorous evaluations will also provide valuable insights for future interventions. This chapter introduced the key concepts of planning and evaluation, and provided a six-stage model that can guide the development, implementation and review of a public health program.

Learning objective 1: Describe the roles of planning and evaluation as part of any public health intervention.

Planning and evaluation are integral components of any program that is aiming to improve a public health issue. The ideas underpinning both planning and evaluation are examined across the chapter, with a particular focus in the first section on the generic concepts.

Learning objective 2: Explain the three key concepts that underpin planning and evaluation.

Three key principles of *Defining the Outcomes, Specifying the Intervention* and *Validating the Outcomes* underpin the development of successful public health programs. If these three concepts are not carefully considered prior to commencement, the chances of a program achieving optimal results are greatly diminished.

Learning objective 3: Understand the six-stage model for planning and evaluation.

There are a number of alternative models for planning a health intervention. A simple six-stage model was proposed that outlines a circular approach, moving from identification of community need through to evaluation of the intervention and recommendations for future programs.

Learning objective 4: Determine the most appropriate evaluation approach for different interventions.

The final section of the chapter examined the concept of evaluating an intervention. It discussed four different evaluation types (formative, process, outcome and impact) and outlined when these evaluations types should be undertaken and what information they could provide.

Learning objective 5: Develop a simple plan for a proposed intervention, including an evaluation.

The chapter introduced to the concepts of planning and evaluation. The six-stage model provides a framework for developing a public health intervention, and a possible template for planning is provided.

Tutorial exercises

1 Imagine that you are employed at a local council and are responsible for ensuring the health of the community in relation to local water quality. What public health issues would you need to consider, and what types of

skills, knowledge and attitudes might you need to focus on improving to avoid issues with blue-green algae blooms?

2 Critically analyse your own capacity to implement a public health intervention to address concerns relating to a blue-green algae bloom in the local water source. What strengths would you bring, but equally, in what areas would you require advice and input from other experts?

3 Using the six-stage model and the intervention plan template, develop a simple intervention to address one concern relating to blue-green algae blooms.

4 Find an existing evaluation of a public health intervention. Read your chosen report, and consider whether the planning processes undertaken by the project team were appropriate. Nominate why the report did or did not effectively evaluate the program, and identify what possible intervention could now build on knowledge gained through the completed project.

Further reading

Centers for Disease Control and Prevention. (2017). *A framework for program evaluation*. Retrieved https://www.cdc.gov/eval/framework/index.htm

Drummond, M., Sculpher, M., Claxton, K., Stoddart, G. & Torrance, G. (2015). *Methods for the economic evaluation of health care programmes*. Oxford: Oxford University Press.

Issel, L. M., Wells, R. & Williams, M. (2021). *Health program planning and evaluation: A practical, systematic approach for community health* (5th ed.). Burlington, MA: Jones and Bartlett Publishing.

World Health Organization. (2016). *Planning, monitoring and evaluation*. Retrieved http://www.who.int/tdr/publications/essence-framework-2016/en/

References

AIHW (Australian Institute of Health & Welfare). (2019). Burden of tobacco use in Australia. Retrieved https://www.aihw.gov.au/reports/burden-of-disease/burden-of-tobacco-use-in-australia/summary

BMJ (British Medical Journal). (2021). *Practice Pointer: Covid-19 vaccination hesitancy*. 373:n1138. doi: https://doi.org/10.1136/bmj.n1138

Bryman, A. (2016). *Social research methods* (5th ed.). Oxford: Oxford University Press.

Centers for Disease Control and Prevention. (2017). A framework for program evaluation. Retrieved https://www.cdc.gov/eval/framework/index.htm

Chapman, S., Alpers, P., Agho, K. & Jones, M. (2006). Australia's 1996 gun law reforms: Faster falls in firearm deaths, firearm suicides, and a decade without mass shootings. *Injury Prevention*, *12*(6), 365–372. doi:10.1136/ip.2006.013714

Commonwealth Government of Australia. (1996). *National Firearms Program Implementation Act* 1996. Retrieved https://www.legislation.gov.au/Details/C2004A05054

Creswell, J. W. & Plano Clark, V. (2018). *Designing and conducting mixed methods research*. Thousand Oaks, CA: Sage.

Dawson, A. (2019). Evaluation research in public health. In P. Liamputtong (Ed.) *Handbook of research methods in health social sciences*. Singapore: Springer.

Department of Foreign Affairs and Trade. (2012). Impact evaluation. Retrieved https://dfat.gov.au/aid/how-we-measure-performance/ode/Documents/impact-evaluation-discussion-paper.pdf

Drummond, M., Sculpher, M., Claxton, K., Stoddart, G. & Torrance, G. (2015). *Methods for the economic evaluation of health care programmes*. Oxford: Oxford University Press.

Glanz, K. & Bishop, D. B. (2010). The role of behavioral science theory in development and implementation of public health interventions. *Annual Review of Public Health*, *31*(1), 399–418. doi:10.1146/annurev.publhealth.012809.103604

Green, L. & Kreuter, M. (2005). *Health program planning: An educational and ecological approach* (4th ed.). New York: McGraw Hill.

Institute for Healthcare Improvement. (2021). The Triple Aim for populations. Retrieved http://www.ihi.org/Topics/TripleAim/Pages/Overview.aspx

Intergovernmental Committee on Drugs. (2013). *National tobacco strategy 2012–2018*. Canberra: Department of Health and Ageing.

Issel, L. M., Wells, R. & Williams, M. (2021). *Health program planning and evaluation: A practical, systematic approach for community health* (5th ed.). Burlington, MA: Jones and Bartlett Publishing.

Kaur S., Srivastava A., Ahluwalia A.S., Mishra Y. (2021) Cyanobacterial blooms and Cyanotoxins: Occurrence and Detection. In: Mandotra S.K., Upadhyay A.K., Ahluwalia A.S. (eds) Algae. Springer, Singapore. https://doi.org/10.1007/978-981-15-7518-1_15

Kok, G. (1993). Why are so many health promotion programs ineffective. *Health Promotion Journal of Australia*, *3*(2), 12–17.

Liamputtong, P. (2017) The science of words and the science of numbers. In Liamputtong, P. (Ed.), *Research methods in health: Foundations for evidence-based practice* (3rd ed.) (pp. 3–28). Melbourne: Oxford University Press.

Liamputtong, P. (2019). Qualitative inquiry. In P. Liamputtong (Ed.) *Handbook of research methods in health social sciences*. Singapore: Springer Nature. doi: https://doi.org/10.1007/978-981-10-2779-6_53-1

MacDonald, M., Pauly, B., Wong, G., Schick-Makaroff, K., van Roode, T., Strosher, H. W. … Ward, M. (2016). Supporting successful implementation of public health interventions: protocol for a realist synthesis. *Systematic Reviews*, *5*, 54. doi:10.1186/s13643-016-0229-1

Moore, G. F., Audrey, S., Barker, M., Bond, L., Bonell, C., Hardeman, W. … Baird, J. (2015). Process evaluation of complex interventions: Medical Research Council guidance. *BMJ: British Medical Journal*, *350*. doi:10.1136/bmj.h1258

Morlet, A., Guinan, J., Diefenthaler, I. & Gold J. (1988). The impact of the "grim reaper" national AIDS educational campaign on the Albion Street (AIDS) Centre and the AIDS Hotline. *Medical Journal of Australia*, 148(6), 282-287.

National Public Health Partnership. (2000). *A planning framework for public health practice*. Retrieved www.health.nsw.gov.au/research/Documents/planning-framework.pdf

Poggi, J. (2017). Nearly half of millennials and gen xers don't watch any traditional TV. *AdAge*. Retrieved http://adage.com/article/media/half-young-consumers-watching-content-traditional-tv-study/310564/

Rychetnik, L., Frommer, M., Hawe, P. & Shiell, A. (2002). Criteria for evaluating evidence on public health interventions. *Journal of Epidemiology and Community Health*, *56*(2), 119–127. doi:10.1136/jech.56.2.119

Sammut, J. (2008). *The false promise of GP super Clinics. Part 1: Preventive care*. Sydney: The Centre for Independent Studies.

Sansoni, J. (2016). *Health outcomes: An overview from an Australian perspective*. University of Wollongong: Australian Health Outcomes Collaboration, Australian Health Services Research Institute.

Schell, S. F., Luke, D. A., Schooley, M. W., Elliott, M. B., Herbers, S. H., Mueller, N. B. & Bunger, A. C. (2013). Public health program capacity for sustainability: a new framework. *Implementation Science*, *8*(1), 15. doi:10.1186/1748-5908-8-15

Statista. (2021). Number of mass shootings in the United States between 1982 and May 2021. Retrieved https://www.statista.com/statistics/811487/number-of-mass-shootings-in-the-us/

Stetler, C. B., Legro, M. W., Wallace, C. M., Bowman, C., Guihan, M., Hagedorn, H. … Smith, J. L. (2006). The role of formative evaluation in implementation research and the QUERI experience. *Journal of General Internal Medicine*, *21*(Suppl 2), S1–S8. doi:10.1111/j.1525-1497.2006.00355.x

Thompson, S., Kent, J. & Lyons, C. (2014). Building partnerships for healthy environments: research, leadership and education. *Health Promotion Journal of Australia*, *25*(3), 202–208. doi:10.1071/HE14039

United States Environment Protection Agency. (1997). *A framework for environmental health risk management. The US Presidential Congressional Commission on Risk*

Management 1997. Retrieved https://cfpub.epa.gov/ncea/risk/recordisplay.cfm?deid=55006

US Department of Health & Human Services. (1999). Framework for program evaluation in public health. *Morbidity and Mortality Weekly Report (MMWR)*, *48*(RR-11), 1–35.

Vu, H. P., Nguyen, L. N., Zdarta, J., Nga, T. T. V., & Nghiem, L. D. (2020). Blue-Green Algae in Surface Water: Problems and Opportunities. *Current Pollution Reports*, *6*(2), 105-122. doi:10.1007/s40726-020-00140-w

Wakefield, A. J., Murch, S. H., Anthony, A., Linnell, J., Casson, D. M., Malik, M., … Walker-Smith, J. A. (1998). RETRACTED: Ileal-lymphoid-nodular hyperplasia, non-specific colitis, and pervasive developmental disorder in children. *The Lancet*, *351*(9103), 637–641. doi:10.1016/S0140-6736(97)11096-0

WaterNSW. (2021). Water quality: Algae. Retrieved https://www.waternsw.com.au/water-quality/algae#:~:text=Blue%2Dgreen%20algae%20may%20be,from%20Red%20Alert%20warning%20areas.

Water Quality Australia. (2018). Australian drinking water guidelines (2011) – updated November 2018. Retrieved https://www.waterquality.gov.au/guidelines/drinking-water

World Health Organization (WHO). (2000). Outcome evaluations. Retrieved www.emcdda.europa.eu/attachements.cfm/att_5869_EN_7_outcome_evaluations.pdf

World Health Organization (WHO). (2001). *Evaluation in health promotion: Principles and perspectives*. Copenhagen: Author.

World Health Organization (WHO). (2013). Health 2020. A European policy framework and strategy for the 21st century. Retrieved http://www.thehealthwell.info/node/583943

World Health Organization (WHO). (2015). Guidelines for safe recreational water environments. Retrieved https://www.who.int/publications/i/item/WHO-FWC-WSH-15.03

World Health Organization (WHO). (2021). Obesity and overweight. Retrieved https://www.who.int/news-room/fact-sheets/detail/obesity-and-overweight

Zerbo, O., Modaressi, S., Goddard, K., Lewis, E., Fireman, B., Daley, M. … Klein, N. (2018). Vaccination patterns in children after autism spectrum disorder diagnosis and in their younger siblings. *JAMA Pediatrics*, *172*(5), 469–475. doi:10.1001/jamapediatrics.2018.0082