

**Evaluating OHS Interventions:
A WorkSafe Victoria
Intervention Evaluation
Framework**

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Contents

What is program evaluation?	4
About this framework	5
What is the rationale of the intervention you want to evaluate?	
What are the specific evaluation questions about this intervention?	
What are the appropriate methods and tools to answer these evaluation questions?	
Summing up	
1 What is the rationale of the intervention you want to evaluate?	8
Problem description	
Outline the intervention strategy	
Determine the activities to be undertaken	
Set the workplace targets	
Identify the desired and expected short term impacts	
Identify the desired and expected long term outcomes	
2 What are the specific evaluation questions about this intervention?	16
Possible evaluation questions	
3 What are the appropriate methods and tools to answer the evaluation questions?	21
Evaluation designs & methods	
Data collection issues	
Appendix A: Improving Occupational Health & Safety Policy Through Intervention Research (available in hard copy only)	25
Appendix B: The Intervention Research Process in Occupational Safety & Health (available in hard copy only)	32
Appendix C: One-Page Summary of OHS Intervention Research Model from (US) National Occupational Research Agenda Intervention Effectiveness Research Team (1999)	40
Appendix D: Examples of OHS Performance Indicators	42

What is program evaluation?

Program evaluation is the systematic collection and analysis of information to allow informed decision making about a program or activity. Evaluation aims to identify the lessons learnt from OHS interventions, in order to establish improved approaches to interventions in the future. This can include changes to the content and structure of interventions themselves as well as improved implementation strategies.

Program evaluation is *not* about appraising the performance of individuals or providing information to inform a performance pay system.

Evaluation can be done at different times of an intervention and to provide different sorts of information. The best types of evaluation provide information that helps improvement – information for action. Evaluation can tell you about:

- How well the intervention was implemented – *process and formative evaluation*. These types of evaluation will answer questions like:
 - How well did we implement the activities?
 - Did we get the right stakeholders involved?
 - How is the intervention affecting the targets?
 - How well did the intervention address the identified problem?

Process evaluation can be done during an intervention or after its completion. Formative evaluation can also be done while the intervention is happening—the distinction here is that whatever is learned is applied in an on-going way to help fine tune the intervention and to ensure reliable data. Process and formative evaluation are relatively less resource intensive than effectiveness evaluation.

- Whether the intervention had the desired outcomes – *effectiveness evaluation*. This type of evaluation will answer questions like:
 - To what extent did the intervention achieve the expected outcomes?
 - Did the intervention meet the identified needs?
 - Did we get value for money from the intervention?

Effectiveness evaluation requires the most time and resources and can only be finished after an intervention has been completed.

For excellent sources on program evaluation in general, see the following:

Weiss CH. *Evaluation: Methods for Studying Programs and Policies*. Upper Saddle River, NJ: Simon & Schuster; 1998.

Patton MQ. *Utilization-Focused Evaluation, 3rd Edition*. Thousand Oaks: Sage Publications; 1997.

Ovretviet J. *Evaluating Health Interventions: An Introduction to Evaluation of Health Treatments, Services, Policies, and Organisational Interventions*. Maidenhead, UK: Open University Press; 1998.

About this framework

This framework lays out a systematic process for evaluating occupational health & safety (OHS) intervention programs. It is designed for use by practicing professionals working in government OHS agencies. To make it most accessible to this audience, there is a particular emphasis on OHS policy interventions (i.e., regulatory standards or other interventions). However, this framework is applicable to any OHS intervention (e.g., worker OHS training programs, medical screening tests for occupational diseases, engineering solutions to reduce hazardous exposures).

In essence, this intervention evaluation framework boils down to answering three questions: (1) what is the rationale of your intervention? Or, put more simply, how is it supposed to work?; (2) What are the questions you want to answer about this intervention?; and (3) What are the appropriate evaluation methods, designs, or tools that can be used to answer your questions? These three questions are outlined briefly over the next two pages. The remainder of the booklet is divided into three sections on each of these key evaluation questions, followed by appendices containing additional resource materials.

What is the rationale of the intervention you want to evaluate?

In order to evaluate an intervention, it is essential to understand why or how it is expected that a given intervention will result in desirable changes in specific outcomes. This involves articulating the rationale or theory and goals of the intervention of interest, or building a rationale or theory for a new intervention: This means answering questions like:

- What is the program or policy or intervention?
- How is it supposed to work?
- Who or what is supposed to change?
- Why?
- Over what time period?

You might be surprised to find that this is the most difficult but most illuminating part of the entire evaluation process.

What are the specific evaluation questions about this intervention?

It is usually impossible to answer all of the evaluation questions you can identify. You will need to identify priority questions that will allow you to improve the intervention in the future or develop more effective interventions – you need information for action. In particular, you will need evaluation questions that are related to the program logic. Think about whether you will conduct a process evaluation or an effectiveness evaluation or a combination of the two. Evaluation questions will cover issues like:

- How well did we implement the activities of the intervention?
- Did we get the right stakeholders involved?

- How is the intervention affecting the targets?
- How well did the intervention address the identified problem?
- To what extent have the objectives of the intervention been attained?
- What changes have occurred in the context of the intervention that have affected and will continue to affect implementation?
- Has the intervention resulted in unanticipated consequences? For better or worse?
- How have the activities of the intervention affected these outcomes?
- How have differences in implementation and internal and external environment affected outcomes?
- Has the intervention met identified needs?

What are the appropriate methods and tools to answer these evaluation questions?

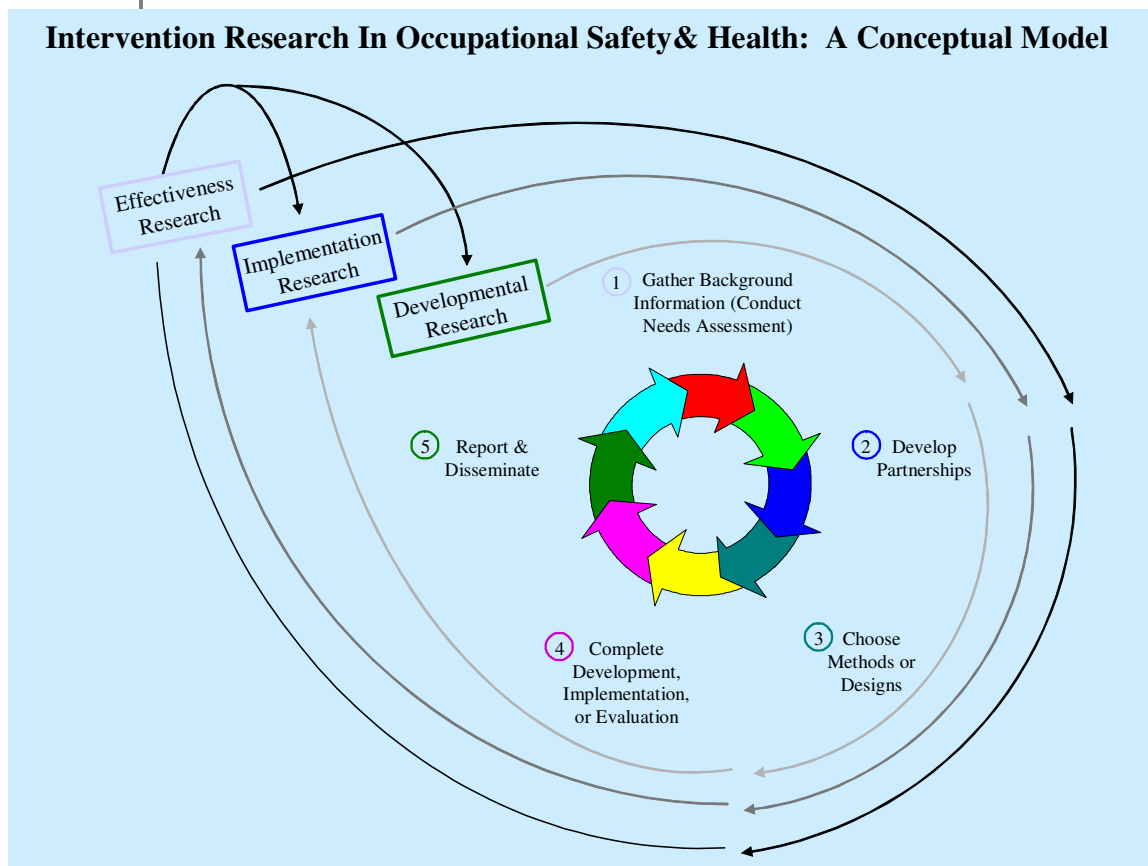
Answering this question requires choosing study designs, methods, and measures that can answer the evaluation questions formulated in the preceding step. For some questions, you will need accident data, for others you might use qualitative methods to collect and analyse in-depth interview narratives from those involved in an intervention.


Different designs provide different levels of causal inference (i.e., the degree to which the changes in outcomes are attributable to the intervention—and not something else). For example, if an effectiveness evaluation study documents a decline over time in a hazardous exposure following a policy intervention on that specific exposure, it *suggests* but does not formally *prove* that the policy *caused* the decline. Ways to improve causal inference include comparing the intervention group to a non-intervention comparison group, combining measures of intervention implementation (process evaluation) and impacts/outcomes (effectiveness evaluation), and combining qualitative and quantitative evaluation.

This third step is where things can start to get technical. In some cases, appropriate designs and methods can be identified and applied by in-house staff. In other cases, this would be the point at which you might engage outside expertise. In any case, a clear understanding on questions 1 and 2 is a necessary precondition for engaging the right outside expertise when you need it.

Summing up

This framework will guide you through each of the three intervention evaluation steps. To situate this work in relation to the broad goal of OHS intervention (improving working conditions and reducing occupational injury and illness), these three steps can be viewed as part of the international OHS intervention research cycle (figure below from Appendix B). Policy-level OHS intervention research can foster the development of policies that are minimally burdensome to employers and maximally effective in reducing hazards, injury, and disease. With an emphasis on generating *information for action*, such research can support the continuing improvement of policy development, implementation, and effectiveness. For interested readers, these themes are developed further and illustrated with numerous examples from the international OHS literature in Appendices A, B, and C.





What is the rationale of the intervention you want to evaluate?

In this step, you will ask yourself how the intervention is supposed to work from start to finish. The greater the clarity and specificity you achieve here, the easier it will be to come up with appropriate questions for evaluation. It is important to be specific. Don't just say that you want to know if a given policy works. This begs further questions on what it would mean for it to work. For example:

- What is/are the outcomes of interest?
- In what ways are you trying to change the behaviour of managers, CEO's, hourly workers, others?
- Is your goal to reduce specific exposures or hazards? Are you trying to change compensation claim patterns?
- How much of a change would constitute success?

And so on. Going through this process will help you to refine, clarify, and articulate what your intervention is, how it is supposed to work, and what it is hoped to achieve. Ideally, this process occurs during the planning of an intervention, whether evaluation is being planned at the time or not. In planning evaluation at any stage of a program (i.e., before, during, or after), it is important to have a clear program logic. Accordingly, some evaluators refer to this activity as “developmental evaluation” (e.g., see chapters 2 and 7 in *Evaluating Health Interventions*, reference provided on page 3).

Problem description

The first step is to describe the problem accurately.

What is the problem?

Pay particular attention to the context—what is happening and why. Make sure you take account of the following issues:

- Economic context
- Industrial relations
- Organisational context
- Social context
- Political context
- Legal context
- Data – claims and OHS

Example - representation in small workplaces in regional Victoria

- Employees in small businesses are less likely to have health and safety representatives and this is likely to be more of a problem in regional Victoria where the industry and economic structures exacerbate the problems of OHS management.
- Employees in small businesses can be less likely to speak up about OHS issues and limited internal resources in small business can make it harder to establish and maintain OHS systems and consultation.
- Representation improves OHS outcomes so it is important that these barriers to representation in small business are addressed.
- The OHS Act in Victoria specifically precludes a commonly suggested solution to this problem – roving representatives. The structures for representation established in the Act may not be as relevant to small regional workplaces.

What do we know about how we could deal with the problem?

Take account of:

- OHS principles
- Theory and principles from other relevant fields (e.g., education, economics, organisational behaviour)
- Previous research
- Others' experiences
- Resources available
- Check for unintended consequences of particular approaches

Example - representation in small workplaces in regional Victoria

European research demonstrates that the barriers to effective representation can be addressed, if not overcome, by systems of roving representation. In particular, fear of speaking up, lack of resources and information available in small enterprises and employer resistance to representation have all been successfully overcome in various European schemes. However, it is important to emphasise the representational role of roving representatives and not end up merely providing an employer advisory service. It is also important to be clear that representation is a right that is not merely a tool to supporting more effective OHS management.

Who are the stakeholders?

Identify everyone involved in creating and dealing with the situation. In particular, make sure that you identify the key decision makers, both in terms of the most important groups and the individuals within relevant groups.

Example - representation in small workplaces in regional Victoria

- Small business owner/operators
- Employees in small businesses
- Relevant unions (e.g. AWU)

- Relevant employer organisations (e.g., Victorian Farmers Federation)
- Action groups (e.g., LandCare, FarmSafe)
- Community/social networks in regional Victoria (e.g., Country Women’s Association)
- Service providers (e.g., stock agents, agricultural chemical sellers)

You may find at the end of this step that you need more information before you can design the intervention. If so, you should gather further information from the literature, through field work, or from more discussions with stakeholders. Once you are satisfied that you have a clear enough description of the problem, you can move to the next step.

Outline the intervention strategy

In this step, you will create a picture of the intervention – a program logic for what you propose to do. To do this, answer the following three questions:

- What can and will we do about the problem in the circumstances?
- How can we get the intervention implemented (e.g., get the resources needed)?
- Who can we work with? How will we create partnerships?

Example - representation in small workplaces in regional Victoria

- Commitment by WorkSafe Victoria to fund 18 month project in a specific region and industry – shearing proposed.
- Agreement with stakeholders (AWU, VFF) to conduct the pilot and extension of rights and protections to Roving H&S Reps
- Skilled, experienced shearers to be Roving H&S Reps
- Union support structure
- Skilled advisors to advise shearing contractors and farmers
- Choice of defined region for pilot
- WorkSafe Victoria’s existing farm safety programs and initiatives

Determine the activities to be undertaken

From the previous step, you will decide what you are actually going to do in the intervention to create the desired impacts and outcomes.

Example - representation in small workplaces in regional Victoria

- Training for Roving H&S Reps and Advisors (both separate and joint)
- Publicity and marketing for project in selected region to encourage contractors and farmers to enrol themselves in the project

- Joint visits (up to 4 over 12 month period) to sheds with joint and separate activities (inspection, separate meetings with employees and employer, development of improvement plan, ongoing support in implementing the plan)
- Support from inspectorate
- Evaluation of initiative

Set the workplace targets

Precisely what changes are you seeking to achieve in workplaces through the intervention? What changes in working conditions are you seeking?

Example - representation in small workplaces in regional Victoria

- Development of improvement plans in small workplaces that have been involved
- Employee involvement in development and implementation of the plans
- Employee confidence in speaking up about OHS
- Employer capacity to respond appropriately to raised issues

Identify the desired and expected short term impacts

What impact will these changes have (e.g., on levels of risk and working conditions)?

Example - representation in small workplaces in regional Victoria

Employers

- Acceptance of the need for and value of participation and representation
- Establishment of ongoing actions to involve workers, using Roving H&S Reps as appropriate
- Greater awareness of OHS obligations
- Use of advice to strengthen effectiveness of OHS activities

Working environment

- Participative activities to improve risk control, informed by advisors and employees via RHSR

Employees

- Prepared and able to contribute to OHS management
- Greater knowledge of rights and responsibilities in OHS
- Use of Roving H&S Reps to improve employee participation in OHS management

WorkSafe Victoria

- WSV assesses issues and determines that there is a need for legislative change to support RHSR
- Determination of whether policy and program initiatives to encourage RHSR across SMEs are warranted

Identify the desired and expected long term outcomes

What will the impacts lead to in the longer term (e.g., injury and disease outcomes)?

Example - representation in small workplaces in regional Victoria


- Strong participative processes and improved risk control in participating enterprises; relevant legislative change and policy/program initiatives by WorkSafe if warranted by pilot outcomes
- Roving H&S Reps operating effectively wherever necessary
- Strong systems of representation and effective risk control in small business workplaces

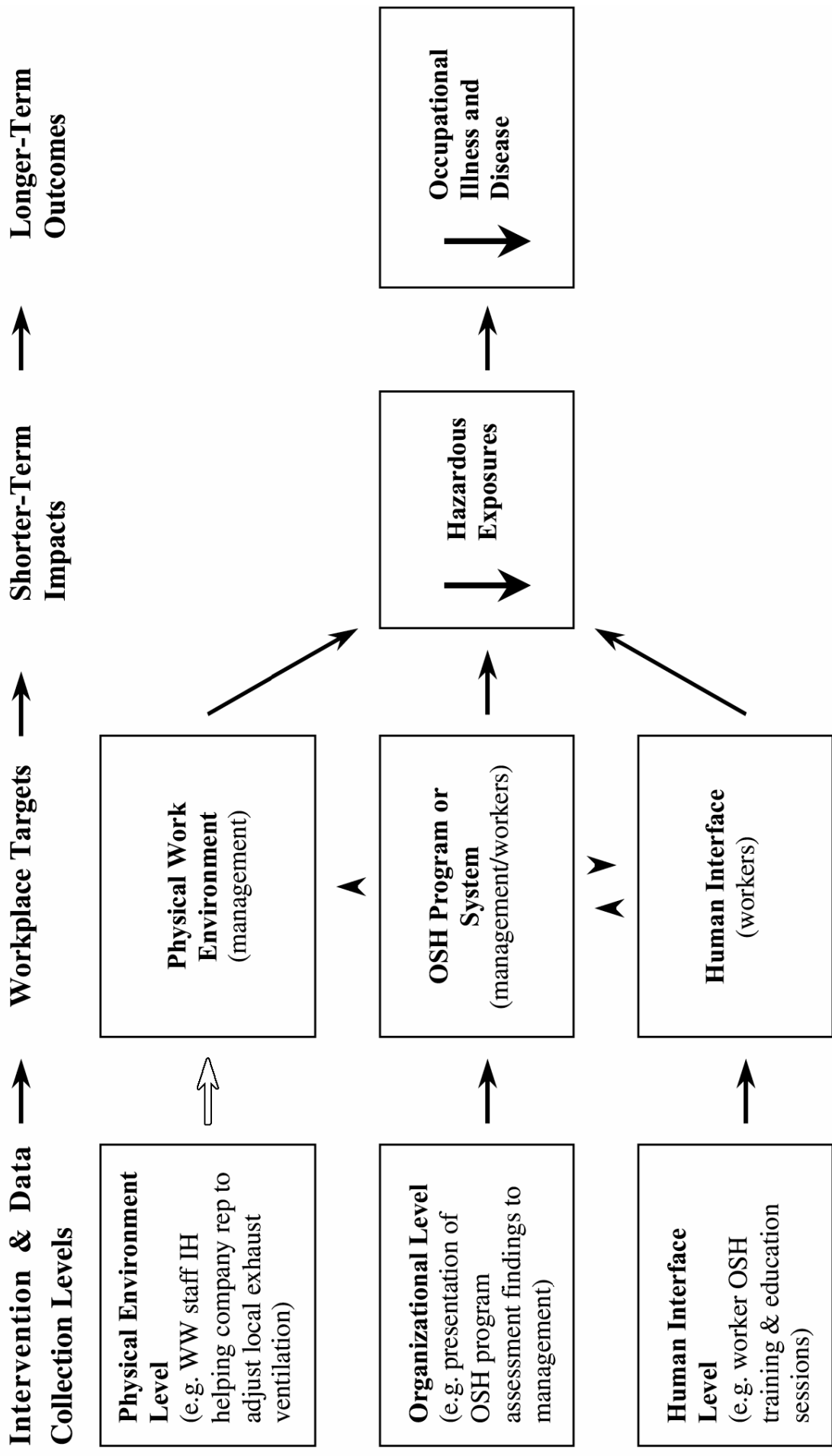
From your answers to these questions, you will develop a picture of the intervention. This can be presented in narrative form, but may be easier to do pictorially. To do it pictorially, start on the left side of a page with program or policy inputs, which then are expected to have some effect on intervening variables. When you finish the picture, then make your best educated guess about how long this process will take from start to finish, this will help you enormously in the subsequent two steps, wherein you're trying to sort out what sorts of evaluation questions you could ask at what points in time using what sorts of measures.

Refer to the examples on the next pages of:

- A schematic summary on articulating the logic of your program or policy
- An example of a simplified program logic of an OHS management system's desired effects on hazardous substance exposures and associated risks of work-related illness and disease. The timeline here was at least 2 years to see changes in workplace targets (particularly physical work environment) and associated changes in hazardous exposures. This would then take years to decades to result in decreases in chronic occupational diseases (e.g., cancers, respiratory diseases, nervous system disorders). Because of timeline and other reasons, measuring disease as an outcome measure, and changes in exposures or workplace targets were used to assess effectiveness.
- A schematic summary of the program logic of the Roving H&S Rep pilot program developed as an example throughout this chapter.

Program logic

Describe the problem	Design the intervention	Activities	Targets	Short term impacts	Long term outcomes
<ul style="list-style-type: none"> ■ What is the problem? ■ What do we know about how we could deal with it? ■ Who are the stakeholders? <p>Do we know enough to design the intervention? Yes – go to next step No – do more research</p>	<ul style="list-style-type: none"> ■ What can we do about the problem in the circumstances? ■ How can we get it implemented? ■ Who can we work with? 	<p>What are you going to do?</p>	<p>How will the activities change things in workplaces?</p>	<p>What impact will these changes have?</p>	<p>What long term outcomes will these impacts lead to?</p>
<p>TIME </p>					



Program logic – Roving H&S Representatives Pilot Project

Intervention development	Intervention/implementation activities	Targets	Short term impacts	Long term outcomes
<ul style="list-style-type: none"> ■ Commitment by WorkSafe Victoria to fund 18 month project ■ Agreement with stakeholders (AWU, VFF) to conduct the pilot and extension of rights and protections to Roving H&S Reps ■ Skilled, experienced shearers to be Roving H&S Reps ■ Union support structure ■ Skilled advisors to advise shearing contractors and farmers ■ Choice of defined region for pilot ■ WorkSafe Victoria's existing farm safety programs and initiatives 	<ul style="list-style-type: none"> ■ Training for Roving H&S Reps and Advisors (both separate and joint) ■ Publicity and marketing for project in selected region to encourage contractors and farmers to enrol themselves in the project ■ Joint visits (up to 4 over 12 month period) to sheds with joint and separate activities (inspection, separate meetings with employees and employer, development of improvement plan, ongoing support in implementing the plan) ■ Support from inspectorate ■ Evaluation of initiative 	<ul style="list-style-type: none"> ■ Development of improvement plans in small workplaces that have been involved ■ Employee involvement in development and implementation of the plans ■ Employee confidence in speaking up about OHS ■ Employer capacity to respond appropriately to raised issues 	<p style="text-align: center;">→</p> <p><i>Employers</i></p> <ul style="list-style-type: none"> ■ Acceptance of the need for and value of participation and representation ■ Establishment of ongoing actions to involve workers, using Roving H&S Reps as appropriate ■ Greater awareness of OHS obligations ■ Use of advice to strengthen effectiveness of OHS activities <p><i>Working environment</i></p> <ul style="list-style-type: none"> ■ Participative activities to improve risk control, informed by advisors and employees via RHSR <p><i>Employees</i></p> <ul style="list-style-type: none"> ■ Prepared and able to contribute to OHS management ■ Greater knowledge of rights and responsibilities in OHS ■ Use of Roving H&S Reps to improve employee participation in OHS management <p><i>WorkSafe Victoria</i></p> <ul style="list-style-type: none"> ■ Determination of need for legislative change to support RHSR ■ Determination of whether policy and program initiatives to encourage RHSR across SMEs are warranted 	<p style="text-align: center;">→</p> <p>Strong participative processes and improved risk control in participating enterprises; relevant legislative change and policy/program initiatives by WorkSafe if warranted by pilot outcomes →</p> <p>Roving H&S Reps operating effectively wherever necessary →</p> <p>Strong systems of representation and effective risk control in small business workplaces</p>

2

What are the specific evaluation questions about this intervention?

Once your program logic is clear, it is possible to formulate evaluation questions that are answerable with reasonable time and material expenditure. Your evaluation questions will follow from your program logic, but you will not be able to address all of the questions you might like to ask. You will need to choose the most important and most useful questions, being guided first and foremost by the principle that your questions should yield *information for action*. To do this, many issues need to be considered. These include:

- What you need to learn

This will depend upon the type of evaluation you are undertaking. Process evaluation answers questions like *How well is the intervention being implemented?* Effectiveness evaluation leads to questions like *What effect is the intervention having on long term outcomes?* Examples of possible evaluation questions are provided on the next pages.

- Timeframe

When evaluating policy interventions, process or implementation evaluation is valuable in the shorter term, and effectiveness evaluation is usually only sensible in the longer term. Six months into an 18 month policy or other intervention will be too early to ask effectiveness questions. Instead, you could ask implementation questions, e.g., *Are employers implementing regulatory requirements as anticipated? Or: Have stakeholders been involved in the ways we anticipated they would be?* Look at your picture of program logic and the timeline along the bottom—process evaluation is appropriate when you are at the stages of program ‘activities’ and ‘targets’, effectiveness evaluation comes into play when you are at the stages when you expect your intervention to be having ‘short-term impacts’ and ‘longer-term outcomes’.

- Your available resources

There is no point asking evaluation questions that will require a major epidemiological study if you have limited resources. Choose questions that can be answered accurately and with validity using the resources at your disposal. This may mean that some evaluation questions are not able to be covered.

- The nature of the intervention being evaluated

Is it a risk management initiative? If so, ask questions about risk control.

Is it an initiative dealing with organisational factors? Ask questions about organisational change and about attitudes to OHS.

- Why are you doing evaluation?

Evaluation never answers all the questions you might like to ask about your program or policy. Being aware of why you are evaluating is one guide to prioritising evaluation questions. This means more than simply evaluating ‘to learn how to do this better’. More specifically, who is requesting or requiring this evaluation? What is their agenda? Who are the other stakeholders in

this context—and are their agendas compatible or in conflict with the agenda of the stakeholder that initiated or is dominating the evaluation process? In developing your evaluation questions, an awareness of political, economic, and other contextual considerations is crucial (there are always some, though they can vary greatly in intensity).

- The audience for the evaluation

Think about who could or will use the findings of the evaluation and for what purpose. What will they want to know? What do they need to know? The needs of the minister seeking to justify budgetary expenditure will be quite different to the needs of a group leader wanting guidance on how best to implement an intervention.

- Reliability and validity

There is no point asking questions that cannot be answered reliably (i.e., you'd get the same answer if you repeated the evaluation over and over) or validly (i.e., the answers you get are true/accurate). This does not mean that you cannot ask about opinions or perceptions. However, the tools you use to answer these questions must collect data reliably and with validity. It is often possible to use or adapt measures or questionnaires that have been tested and validated in similar contexts (e.g., by looking in published OHS literature). It is important to consider validity and reliability in the use of “key performance indicators”, or KPIs. What is the evidence that such KPIs measure what they are purported to measure? Have such KPIs been linked to specific OHS outcomes (e.g., has a specific measure of “management commitment to OHS” been shown to correspond with or predict better hazard prevention, lower exposures, or lower injury rates?). Though it can be hard work, at least briefly reviewing the research literature on such questions is an investment worth making.

Sometimes you need to develop and use new measures. This is justified when there are no measures available for the outcome of interest. However, you will need to develop arguments carefully justifying the need for and basis of your new measures, or you will need to conduct validity and reliability studies yourself. To guide you in determining how much effort is needed in this regard, it will generally correspond to the degree to which you would anticipate certain actions based on findings using such measures.

- Expected and unexpected outcomes

It may be useful to ask questions that allow identification of unexpected outcomes. These may be positive or negative. For example, an evaluation of a meat industry intervention found that both positive and negative unintended outcomes resulted from the implementation of a continuous improvement model in meat plants. Positively, the project led to greater involvement by senior management in OHS management, even though this was not explicitly a target of the intervention. For example, the project caught the attention of a previously uninvolved but influential senior manager who joined one enterprise's OHS committee and started to play a positive role in OHS management for the enterprise. Negatively, the highly bureaucratic approach taken by the consultant engaged to support implementation of the model led to a degree of cynicism and frustration at sites which were not able to use this model successfully given their organisational culture. As this suggests, answers to such questions can be critical to fine tuning interventions and improving implementation.

Possible evaluation questions

- Process evaluation questions

- Were the activities implemented as anticipated?
- Did the intervention reach the industry sectors most in need of improvement?

- Did we get the right stakeholders involved?
- How is the intervention affecting the targets?
- What changes have occurred in the context of the intervention that have affected and will continue to affect implementation? (e.g., organisational restructuring, retrenchments)
- Effectiveness evaluation questions
 - To what extent did the intervention achieve the expected outcomes?
 - Did the intervention meet the identified needs?
 - Did we get value for money from the intervention?
 - What have been the intended and unintended outcomes of the intervention?
 - How have the activities of the intervention affected these outcomes?
 - How have differences in implementation and internal and external environment affected outcomes?
- Risk management evaluation questions
 - How many enterprises improved their risk control strategies?
 - To what extent have enterprises used control measures that act on the source of the hazard (i.e., from higher up the hierarchy of control)?
 - To what extent were health and safety representatives and the workforce involved in developing and implementing risk control measures?
 - How have risk exposures changed as a result of the intervention?

Example – Falls protection

- What percentages of surveyed employers, employees and health and safety representatives are aware of the new regulations?
- How effectively were relevant stakeholders involved in outreach activities about the new regulations?
- How many employers understand their obligations under the regulations?
- How many workplaces have procedures in place to manage risks of falls from heights?
- How has the balance of control measures changed over the intervention – from administrative and PPE controls to control at source?
- What percentage of worksites have implemented engineering controls for falls risks?
- How many notices have been issued of what types?
- How has the percentage of compliant workplaces changed over time in relation to what was anticipated from program logic and anticipated timeline?
- How many injuries and fatalities are related to falls from heights?
- Organisational factors evaluation questions
 - To what extent have workplaces implemented relevant and effective policies?
 - How did stakeholders contribute to impacts and outcomes and which stakeholders made the biggest impact?

- How were employees and health and safety representatives involved?
- Did the intervention address the factors with the biggest impact and how were these identified?
- What aspects of the organisational context had the biggest impact on implementation?
- To what extent did the implementation or effectiveness of the intervention vary in relation to varying contexts?
- To what extent have improvements in organisational factors been achieved?

Example – stress

- How many employers, employees and health and safety representatives are aware of the factors that create work organisation risks?
- How effectively were relevant stakeholders involved in outreach activities about the stress intervention?
- How many employers understand their obligations to control work organisation risks?
- What percentage of workplaces have undertaken risk management?
- What percentage of workplaces have implemented appropriate policies?
- What percentage of workplaces are achieving the required standards of satisfaction with demand, control and support (e.g., as per HSE management standard)?
- How many injuries and disease cases are related to stress? (You might expect this to increase over the intervention as more accurate identification of stress injuries and illnesses occurs).
- Management approaches evaluation questions
 - How were employees and health and safety representatives involved?
 - What impact did outreach activities achieve?
 - How many employers, employees and representatives are aware of the management issues targeted?
 - What contribution did employer organisations and unions make?
 - How many targeted workplaces have implemented the management approach?
 - What effect did the activities have on the targets?
 - To what extent did the management approach lead to achievement of the long term outcomes?

Example – Roving H&S Representatives Pilot

- How effectively was the selection process for roving representatives implemented?
- How effective was the training?
- How aware were contractors and farmers in the selected region of the project? Of their OHS obligations, especially regarding consultation?
- How aware were employees in the region of the project? Of their rights and responsibilities for OHS?
- What were the attitudes of employers and employees to the project, and to the need for and value of participation and representation?

- What role did stakeholders play (including the inspectorate)?
- How effective were the visits to workplaces (e.g., in identifying hazards and developing intervention strategies)?
- What did visited employers and employees gain from the visits?
- How effectively did the improvement plans address key risks?
- To what extent were employees involved in preparing and implementing the improvement plans?
- How confident were employees in speaking up about OHS?
- To what extent were employers able to respond to raised issues and implement the improvement plans?
- What ongoing actions to involve employees have been implemented?
- How effectively do roving representatives contribute to internal processes of representation and risk control?
- How did features of the selected region and industry affect impacts and outcomes?
- Is legislative change warranted?

3

What are the appropriate methods and tools to answer the evaluation questions?

With clear program logic and evaluation questions, study designs, methods, and measures can be identified that are capable of answering your evaluation questions. Different methods and tools will be useful to answer different kinds of questions; likewise, different methods will have varying implications for cost and resourcing. Rather than one design or method being “the best”, it is more the case of certain designs and methods being best suited to answer certain types of questions. In short, it’s a matter of “horses for courses”. For examples, questions on program delivery or how well a policy has been received by a specific groups of industries or employers can be answered adequately using qualitative research or surveys; whereas evaluating the effectiveness of an intervention is optimally done using experimental or quasi-experimental designs (i.e., including some sort of comparison or control group).

As outlined in the table below, different study designs and methods provide different levels of causal inference (i.e., the degree to which the changes in outcomes are attributable to the intervention—and not something else). For example, if an effectiveness evaluation study documents a decline over time in a hazardous exposure following a policy intervention on that specific exposure, it *suggests* but does not formally *prove* that the policy *caused* the decline. Ways to improve causal inference include comparing the intervention group to a non-intervention comparison group, combining measures of intervention implementation (process evaluation) and impacts/outcomes (effectiveness evaluation), and combining qualitative and quantitative evaluation.

Evaluation designs & methods

	Study designs & methods	Description
↓ Increasing cost and difficulty, alongside increasing causal inference ↓	Case study	Looking in-depth at one case or a small set of cases and qualitatively analysing what happened and why (e.g., the implementation and effectiveness of new falls protection regulations in 6 workplaces).
	Cross-sectional	Collecting data on a sample of the intervention population at one point in time (e.g., how many workplace in the service sector are aware of existence of Anti-Bullying Guidelines?)
	Before and after	Comparing data from before and after the intervention in the same group or population (e.g., use of carcinogenic solvents in dry cleaning establishments before and after passage of Hazardous Substance Regulations)

	Longitudinal	Following a group over time and collecting data on the same measures at two or more points in time
	Pseudo-experimental	Two groups receive different interventions but are not randomly allocated (e.g., based on location)
	Experimental	Start with a single group and randomly assign individuals or workplaces to different intervention conditions (end up with intervention and control groups that should be comparable in all respects EXCEPT the intervention received)

Choosing appropriate study designs, methods, and measures can be technically challenging. In some cases, appropriate designs and methods can be identified and applied by in-house staff. In other cases, this would be the point at which you would engage outside expertise. These matters are the subject of entire textbooks; detailed explanation is beyond the scope of this Framework. Some key points are outlined below, but other sources will need to be consulted to go further. Some OHS-specific sources on choosing designs, methods, and measures are detailed at the end of Appendices A and B. The most developed in this regard is a free (web-based) book entitled *Guide to Evaluating the Effectiveness of Strategies for Preventing Work Injuries: How to Show Whether a Safety Intervention Really Works*, by Robson, et al (see http://www.iwh.on.ca/archive/pdfs/eval_gde.pdf). Some excerpts from this source are quoted below.

Note that the Robson *Guide* provides guidance for conducting evaluation at the level of *publishable peer-reviewed research*. This is not always the necessary or appropriate level for your evaluation projects. This is where the guideline of generating enough information to justify action is useful—what is it that you really want or need to know? You may find yourself at this point rethinking why you’re doing this evaluation (look back to previous chapter)—for whom? What level of causal inference is optimal, preferable, or absolutely required? Rethinking these points will help you in this final phase of selecting methods and designs—particularly for balancing available time and resources with your needs and wants.

Data collection issues

- Considerations
 - Establishing a study sample

You will need to determine the study sample you will use for the evaluation. Depending upon the nature and scope of the intervention, this could be the entire population targeted by an intervention or a sample of the population (e.g., worksites in a specific region, industry category or a random sample of either). The following questions will help identify your study sample.

Identifying a study sample

- To what target population will the results be generalized?
- How many participating individuals, workgroups or workplaces are potentially available for the intervention and evaluation?
- What sample size will give sufficient statistical power?
- What is the marginal cost per participant of data collection?

- Will a control or comparison group be used?
- Will the sample be stratified (e.g., by industry sector, by survey respondent age and gender)?

Source: p. 45, Robson et al 2001.

– Controlling for error

Regardless of whether you use quantitative or qualitative data, different sorts of errors are likely to be an issue. In particular, you should optimize the validity and reliability of your measures. This can be an issue with accident and compensation data because of reporting issues, for example. See Robson et al (2001) for a detailed discussion of possible errors and data collection strategies to control them.

– Use quantitative and qualitative data collection tools

Qualitative data is essential to understanding how and why interventions have worked the way they do. If you want to improve interventions, you will need qualitative data. Qualitative data also adds validity to quantitative data – if interviewees report that employees are strongly discouraged from reporting accidents, you should be concerned that any reduction in accident rates does not reflect increased control of risk. Similarly, if your observations of the workplace reveal active and vigorous following up of incidents, you can be confident that an increase in incident rates does not indicate decreased control over risk. Goldenhar provides a brief overview of the use of qualitative methods in OSH intervention evaluation in Robson et al (2001).

■ Quantitative measures and data collection methods

- Injury and compensation data
- Observations of conditions and behaviour rated according to a standard scale
- Surveys using scales of different types
- Equipment measures (e.g., noise levels, hazardous substances exposure measures)
- Audit scores according to a standard rating scale

■ Qualitative data collection methods

- Interviews, both individual and focus groups
- Questionnaires with open ended questions
- Observations
- Document analysis

Choosing data collection tools

Evaluation design and outcome measures

1. Which measures should be included to address the objectives of the safety intervention (final outcome)?
2. Which, if any, measures should be included to provide an understanding of how the intervention works or bolster the strength of the design (intermediate and implementation outcomes)?

Measuring unintended outcomes

3. Which measures should be included to detect possible unintended outcomes of the intervention?

Characteristics of measurement

4. Do the methods really measure the outcomes they are intended to measure, from a conceptual point of view (construct validity)?
5. Is the outcome measurement method free of systematic biases (validity)?
6. Is the measurement method reliable?
7. Have the measurement methods been used on a group similar to the one under study before?

Statistical power and measurement method

8. Will there be sufficient statistical power during analysis with the method chosen and the number of evaluation participants?

Practical considerations

9. Is the measurement method feasible (i.e., cost, administrative requirements)?

Ethical aspects

10. Can the measurements be carried out in an ethical manner (i.e., fully informed consent)?

Source: p. 63, Robson et al 2001.

Reviewing data collection plan

- Will the data collected give a comprehensive picture of what is being evaluated?
- Does the data management plan make effective use of existing data?
- Will the cost of data collection be justified, given the amount and kind of information it will provide?
- Will the information be reliable?
- Can the data collection be carried out without unduly disrupting the intervention and taking too much time from the intervention?
- Are the data collection procedures legal and ethical?
- Can the data be collected and analysed within the time constraints of the intervention?
- Is a pilot study necessary to address some of the questions identified above?

Adapted from: p. 115, *A Guide to Program Evaluation*, 1992 Lambert, F., John Owen, Sharon Coates and Julie McQueen, Department of Employment, Education and Training

Appendix A

Improving Occupational Health & Safety Policy Through Intervention Research

A reprint of LaMontagne AD (2004): Improving OHS policy through intervention research. *J Occup Health Safety – Aust NZ* 20;2:107-113.

Appendix B

The Intervention Research Process in Occupational Safety & Health

A reprint of Goldenhar LM, LaMontagne AD, Katz T, Heaney C, and Landsbergis P (2001): The intervention research process in OSH: an overview from the NORA Intervention Effectiveness Team. *J Occup Environ Medicine* 43;7:616-622.

Appendix C

One-Page Summary of OHS Intervention Research Model from (US) National Occupational Research Agenda Intervention Effectiveness Research Team (1999)

Intervention Research in Occupational Safety & Health: A Conceptual Model

Why a Model?

- Provide an integrating framework for otherwise diverse OSH research activities
- Articulate relationships between various types of intervention research
- Enable an assessment of the current state of the field
- Develop common language to facilitate communication

What is the Model?

- Intervention research is cyclical and progressive (see figure)
- Intervention research phases: development, implementation, and effectiveness
- *Developmental research* describes the de novo development or selection/adoption of an appropriate intervention for a specific work context
- *Developmental research* draws from OSH principles (e.g., hierarchy of controls, “the 4 E’s”) as well as theory from other fields (e.g., education, economics, organisational development)
- *Implementation research* qualitatively and/or quantitatively characterises how interventions are implemented, as well as barriers and facilitators to implementation
- *Implementation research* is also known as process evaluation or program monitoring
- *Effectiveness research* assesses the degree to which the intervention achieves its intended goals
- Common *effectiveness* measures include changes in knowledge, behaviors, exposure levels, injuries, or illnesses
- Common *tasks* are involved in all phases of intervention research, starting with needs assessment and concluding with communication of findings
- Intervention research can be conducted at a wide range of *levels*, ranging from small worksite programs to national or international standards
- Intervention research inventories can be constructed using 3xN tables of intervention *phase* versus *level* (e.g., worksite program, industry-wide, national policy)

How can the Model be used?

- Retrospective Assessment: Where have we been?
 - How much OSH intervention research has there been? What kind? In what areas?
 - How much on developmental, implementation, effectiveness studies?
 - How much at various levels: worksite programs to national policies?
- Prospective Planning: Where are we going?
 - Are funding patterns working to fill existing gaps?
 - Which areas of intervention research should be prioritised?
 - Recommend calls for papers, priorities for research and funding

Appendix D

Examples of OHS Performance Indicators

Levels:	Performance Indicators: Examples from Various Policy/Intervention Contexts				
	Noise	Falls Protection	Job Stress	Hazardous Substances	
Work Environment	<ul style="list-style-type: none"> ■ % of worksites below noise limits ■ % of worksites addressing noise with upstream solutions ■ Time taken to implement identified control measures 	<ul style="list-style-type: none"> ■ % of worksites implementing risk control measures for falls from heights ■ % of worksites addressing falls risks with upstream (engineering) solutions ■ Time taken to implement identified control measures 	<ul style="list-style-type: none"> ■ % of worksites that have implemented strategies to address demand, control and support factors as a result of risk assessment 	<ul style="list-style-type: none"> ■ % of worksites below NOHSC National Exposure Standards (e.g., for perchlorethylene in SME performing dry cleaning) ■ % of worksites addressing risks with upstream solutions 	
Organisation	<ul style="list-style-type: none"> ■ % of employers aware of new regulations ■ % of worksites with required policies ■ % of worksites with OHS Representatives involved in noise management 	<ul style="list-style-type: none"> ■ % of employers aware of new regulations ■ % of worksites with required policies ■ % of worksites with OHS Representatives involved in falls risk management 	<ul style="list-style-type: none"> ■ % of worksites with recommended or required policies ■ % of worksites in which more than 85% of employees satisfied with Demands, Control, and Support (new UK HSE Stress Mgt Standard) 	<ul style="list-style-type: none"> ■ % of worksites that have performed and documented risk assessment ■ % of worksites that have Hazardous Substance Registers 	
Employee/Individual	<ul style="list-style-type: none"> ■ % of employees aware of new regulations ■ % of employees who have received training on new regulations 	<ul style="list-style-type: none"> ■ % of employees aware of new regulations ■ % of employees who have received training on new regulations 	<ul style="list-style-type: none"> ■ % of employees aware of WSV information campaign ■ % of worksites where employees are actively involved in risk management for psychosocial risks ■ level of satisfaction by employees with stress risk management strategies 	<ul style="list-style-type: none"> ■ % of employees able to correctly order source, path, and in terms of most effective loci of control ■ % of employees who have received training required by regulations 	