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## Economic Evaluation Workbook For Workplace Parties in the Healthcare Sector

December 2010

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RS2007-IG32

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Funding for this study was provided by the WorkSafeBC Research Secretariat, the Workers' Compensation Board of Nova Scotia, and the Saskatchewan Workers' Compensation Board, Grant #RS2007-IG32



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## Summary Points

Through a systematic review of health and safety (H&S) interventions with economic analyses, researchers at the Institute for Work & Health (IWH) have found that there are few published economic evaluations of interventions in healthcare and other sectors. Yet H&S managers need information on the resource implications of H&S intervention alternatives in order to make informed resource allocation decisions. In this applied research project we respond to the need for information to inform H&S decision making by developing an economic evaluation software tool. The tool is designed for workplaces to use in-house. Following is a point form summary of the project.

- Researchers at IWH, Occupational Health & Safety Agency for Healthcare in BC (OHSAH), and UBC Centre for Health Services and Policy Research (CHSPR) worked together with partners at Interior Health, Fraser Health, and Alberta Health Services to create an economic evaluation tool for the healthcare sector in British Columbia.
- The tool is designed to provide a means for healthcare decision makers to readily gather financial information on H&S interventions.
- The research team and partners created a framework for the tool and developed it over a one-year time period.
- The tool is entitled “Health & Safety Smart Planner: A Cost-benefit tool for BC healthcare.”
- The tool comprises three economic analysis sections that allow users to compare the costs and consequences of interventions in different ways and save the data in a database.
- The three analysis sections allow users to analyze 1) an intervention before and after it has been implemented, 2) an intervention implemented in one group with another that did not receive it and 3) a potential intervention that the organization is considering implementing.
- The software has an Incident Cost Calculator that tracks costs of injuries, illnesses, general sickness absences and near misses, and stores all data in a database.
- The software contains an extensive help section which includes a glossary, guidance on use of the software, and explanatory pop-up bubbles for cells that need to be filled out in the cost calculator and analysis sections.
- The software will be available to healthcare workplaces in British Columbia in 2011.
- Further development plans include integrating the software into the Workplace Health Indicator Tracking and Evaluation (WHITE) database to allow easy transfer of data and incorporating the worker perspective, and developing an economic evaluation training workshops.
- The researcher team plans to apply for funding to complete the integration of the software into the WHITE database and develop a training workshop on economic evaluation.

## Executive Summary

Organizations regularly face challenging resource allocation decisions in an effort to maximize desired outcomes with scarce resources. With limited time and competing demands on funds, managers are apt to focus on those health and safety (H&S) issues that are required by law, or ones that have been identified as clearly having an impact on the bottom line. Not all organizations focus exclusively on financial concerns, and safety initiatives may not always bring a financial return to an organization. Nonetheless, complete information on the costs and consequences of an occupational H&S intervention is an invaluable input into the decision of whether or not to undertake a particular initiative.

After completing a systematic literature review of workplace interventions with economic evaluations, researchers in this initiative became aware of how underdeveloped the methods are in this literature. Though a fair number of intervention studies with economic evaluations were undertaken in a variety of sectors, many were of low quality. The greatest number of studies was undertaken in the healthcare sector, yet we were unable to make a strong statement about the evidence on the economic merits of interventions in that sector due to the low quality of the studies. We also found that most intervention studies do not undertake an economic evaluation. Consequently, workplace parties are often not provided evidence on the resource implications of work-related injuries and illnesses or the returns from undertaking H&S initiatives to prevent them.

To fill the gap, we developed sector-specific economic evaluation workbook software for workplace parties in the healthcare sector in order to allow them to develop their own evidence on the financial merits of H&S interventions.

To develop the software, we drew upon existing tools, research undertaken on the economic evaluation of H&S interventions, a methods text for occupational H&S researchers, and several economic evaluations of workplace interventions.

At several stages over the one-year time period of the initiative the software was evaluated to ensure usability. Partners worked with the research team to develop preliminary ideas and provide direction for the workbook at two team meetings. At three subsequent team meetings, partners provided feedback on prototypes of the software. A focus groups consisting of workplace parties from the healthcare sector also provided feedback on a prototype of the software. A penultimate version of the software will be field tested at 3-5 healthcare workplaces for a period of 4-6 weeks and evaluations will be undertaken by these workplaces through telephone and email debriefings.

Key features of the software are: a section called “Do your own analysis” that assists users with evaluating the costs and benefits of an intervention, an “Incident cost calculator” that assists users with tracking H&S incidents and examining their costs, and a user support section call “About H&S smart planning”. There is also a database built into this software to allow users to save information on evaluations and incidents and retrieve them at a later date. Analysis and incident reports can be printed out by clicking on the print icon found at the bottom of each step.

Users can access the “Do your own analysis”, “Incident cost calculator”, and “About H&S smart planning” sections from the “Home” page. Clicking on any of these sections will take users into the options found in each of them. Users can also see the sections on tabs at the top of the screen, and can also move between sections by clicking on these tabs without losing their place.

The introduction to the “Do your own analysis” section provides three options—“Before and after” analysis, “Concurrent groups” analysis and “Potential intervention” analysis. Within each of these analysis options users can start a new analysis, review a past analysis, or review an example analysis. Each option takes users through the same series of steps with the last one containing a summary of the analysis. The distinction between the analysis options is primarily in the set up of the evaluation. Help is provided to assist users with selecting the best option for their needs.

Once in the “Incident cost calculator” section users also have three options—“enter a new incident,” “review a past incident,” or “review an example incident.” Each follows the same series of steps with the last one containing a summary of the incident costs. Incident data must be entered into the “Incident cost calculator” for a period of time in order for users to undertake an analysis of an H&S intervention.

In the “About H&S smart planning” section there are three options: “Understanding”, which provides help with using the software; “Examples”, which illustrates several economic evaluation case studies; and a “Glossary”, which provides definitions for terms used in this software. User support is also provided with pop-up bubbles beside most data entry cells within the steps of “Do your own analysis” and “Incident cost calculator” sections.

Release of the software is planned for early 2011 and will be available free of charge from the IWH website. New features will be added to the software in the future, including a short for version for each of the three “Do your own analysis” options, and video training inserts. New releases of the software will also be provided free of charge and will be compatible with databases created with earlier versions of the software.

## 1. Project Context

Organizations regularly face challenging resource allocation decisions in an effort to maximize desired outcomes with scarce resources. With limited time and competing demands on funds, managers are apt to focus on those H&S issues that are required by law, or ones that have been identified as clearly having an impact on the bottom line. Not all organizations focus exclusively on financial concerns, and safety initiatives may not always bring a financial return to an organization. Nonetheless, complete information on the costs and consequences of an OHS intervention is an invaluable input into the decision of whether or not to undertake a particular initiative.

To develop the workbook, we drew on research undertaken on the economic evaluation of workplace interventions, and existing tools developed by others. Research we have undertaken ourselves includes an environmental scan of workplace interventions with economic evaluations (Tompa et al., 2006); a systematic review of workplace interventions with economic evaluations (Tompa et al. 2008a; Tompa et al. 2009a; Tompa et al., forthcoming), a methods text for OHS researchers (Tompa et al., 2008b), and several economic evaluations of workplace interventions that are currently underway (Tompa et al, 2009b; Wells et al., 2004).

Tompa and colleagues' (2009a) systematic literature review of the OHS literature synthesizes the evidence on the financial merits of workplace interventions in a number of sectors. Although the review identified twenty five studies that evaluated OHS interventions in healthcare, only eight were of sufficient quality to be retained in the synthesis (i.e., high or medium quality). The seventeen remaining studies were excluded due to the low quality of the economic evaluation component.

The review identified five occupational disease prevention interventions. Within this group of interventions, there were two main clusters - needlestick injury prevention programs and programs for the conversion from powdered to powder-free latex gloves. Three were of medium quality (Laufer and Chiarello, 1994; Yassi et al., 1995; Orenstein et al., 1995) and two were of low quality. The two types of interventions in this group consisted of needlestick injury prevention programs, and the conversion from powdered latex gloves to powder-free gloves. This stratum provided moderate to limited evidence that such interventions are worth undertaking for their financial merits. The reason for the evidence straddling two levels is that the Yassi et al. (1995) study finds losses or savings due to the intervention depending on the assumptions made. If we focus on the positive findings of this study, then there is a sufficient number and quality of interventions in the cluster to conclude moderate evidence. If we focus on the negative findings, the two other medium quality studies have positive findings, and hence the cluster ultimately provides limited evidence.

The review identified 11 ergonomic and other MSK injury prevention interventions. Four were of medium quality (Collins et al., 2004; Chhokar et al., 2005; Gundewall et al., 1993; Evanoff et al., 1999), and the others were of low quality. Most of the studies in this group evaluated the introduction of mechanical ceiling lifts for moving and transferring patients. Some investigated other approaches to reducing back injuries, such as the introduction of a lifting team, ergonomic training on manual handling techniques for moving and transferring patients, or exercise programs to increase back strength. The review found moderate evidence that ergonomics and other musculoskeletal injury prevention interventions in healthcare were worth undertaking from an economic standpoint. This finding is consistent with others that have focused on the effectiveness component. Hignett (2003) found moderate evidence that single factor interventions, such as hoisting equipment and lifting teams, were successful in reducing risk factors related to handling patients. Similarly, Amick et al. (2006) found a moderate level of

evidence for a positive intervention effect on musculoskeletal symptoms for multi-component patient handling interventions and physical exercise interventions that include aerobic or strength training exercises, or both.

Three other intervention type clusters had only a few studies and so were identified as having insufficient/no evidence. Specifically, the disability management intervention cluster had one medium quality study (Linton and Bradley, 1992) and four low quality ones, multifaceted intervention cluster had three low quality studies, and the violence reduction cluster had only one low quality study.

Most of the economic analyses were based on study designs that assessed the effectiveness before and after the introduction of an intervention, often without a control group (approximately 60% of identified studies). Quite frequently they did not adjust for contextual factors when assessing the impact of the intervention. Such studies often attributed all the changes that occurred after the introduction of an intervention to the intervention itself, and not to other factors that could have also led to changes. A few studies used multivariate regression analyses to control for contextual factors. On one evaluation was based on a randomized controlled trial. The dearth of randomized controlled studies in this area reflects the difficulty of undertaking randomization in workplaces. Factors such as short measurement time frames and small sample sizes are also related to the difficulty of undertaking research in the workplace.

There was often a disconnect between the effectiveness and economic analysis of studies. In other words, one set of analyses fed into the former, and a separate set of analyses were undertaken for the latter. For many studies the economic analysis component was not the principal focus of the investigation. In some cases, it was a very small component of the overall

analysis. This fact might begin to explain why many studies undertook only a partial analysis that considered only the consequences of the intervention in monetary terms.

Many studies relied on workers' compensation insurance costs as the principle and sometimes only outcome. It was not clear whether these expenses were proxies for human capital, or simply a measure of reduced insurance expenses; it is most likely the latter. If the former, then the measure is poorly chosen, since workers' compensation wage replacement rates are less than 100 per cent of wages, and therefore underestimate the wage value of time lost due to work injury. If the latter, it would appear that the health component of the intervention is missing in the economic analysis. Furthermore, wage replacement and health-care costs incurred by the insurer are generally not an accurate measure of the incremental insurance expense of a firm, since most firms' premiums are not fully experience rated (i.e. a certain portion of expenses incurred by the insurer are pooled across firms). If a firm perspective is taken, the impact of injuries and illnesses on future firm premiums should be considered, rather than the expenses incurred by the compensation insurer.

Less frequently considered were productivity losses associated with time off work due to disability, and almost no studies considered productivity losses while at work due to disability (the latter is sometimes described as presenteeism). In general, few studies considered and measured a broad range of consequences.

In the vast majority of intervention studies in the healthcare sector, the motivation for undertaking the intervention was due to a high number of workplace injuries, a finding confirmed in the literature (Hignett, 2003; Amick et al., 2006). Workers commonly targeted by the programs were nurses, nurses' aides and assistants. Results from the 2005 National Survey of the Work and Health of Nurses (Shields and Wilkins, 2006) provide evidence that Canadian nurses report

higher rates of back problems, depression and workplace physical demands when compared to the general working population. According to Amick et al. (2006), musculoskeletal disorders in healthcare workers have been attributed in large part to patient transfer and lifting activities.

Through the systematic literature review we became aware of the modest amount of published evidence. Consequently, workplace parties in the healthcare sector often do not have information on the resource implications of work-related injuries and illnesses or the returns from undertaking H&S initiatives to prevent them. To fill the gap, we set out to develop a sector-specific economic evaluation workbook for workplace parties in healthcare to provide them with the means to undertake their own analyses of the resource implications of H&S interventions being considered or undertaken at their workplaces. The three primary goals of the workbook are: 1) To improve healthcare managers' understanding of economic evaluation methods for H&S interventions; 2) To enable health authorities to undertake accurate analyses of the costs and consequences of interventions; and 3) to increase the use of economic evaluations in H&S resource decision-making in the healthcare sector.

The project supports WorkSafeBC's mandate by promoting wise use of scarce occupational H&S resources, which is the most efficient way to ensure that primary and secondary prevention efforts of workplace parties are maximized. This is consistent with, and supportive of, three of the four mandates of WorkSafeBC: 1) to promote the prevention of workplace injury, illness, and disease; 2) to rehabilitate those who are injured and provide timely return to work; 3) to ensure sound financial management for a viable workers' compensation system.

## **2. Methodology**

The economic evaluation workbook was developed using an iterative approach. The methodology is outlined below under three headings: Planning and Implementation, Workbook Software Development, and Dissemination.

### ***2.1 Planning and Implementation***

#### *2.1.1 Recruitment of Team Members*

*Project Coordinators:* A research associate was recruited from IWH to be the Ontario project coordinator and work with the principal investigator. A student at the University of British Columbia was hired to work from the Centre of Health and Safety Policy Research (CHSPR) and work with one of the co-investigators based at that centre.

*Partners:* British Columbia co-investigators at the Occupational Health & Safety Agency for Healthcare in BC (OHSAH) and CHSPR along with existing partners at Fraser Health and Interior Health were contacted for assistance in recruiting three more partners to the team. We sought individuals who were interested in economic evaluation and had expertise in H&S issues in the health care sector. Two senior managers from Interior Health and one from Alberta Health Services were recruited.

*Software Developer:* A software developer with expertise in database programming was recruited in month two of the project. The person happened to be working with the accounting team at IWH.

### *2.1.2 Team Meetings*

*Partners' Meetings:* Five teleconference-webinar meetings were held with the entire team: investigators from IWH, the IWH project coordinator, the software developer (at 3 meetings), co-investigators at CHSPR and OHSAH, the BC project coordinator and partners from Interior Health, Fraser Health and Alberta Health Services. Minutes from previous meetings, agendas and software prototypes were reviewed by all parties one week in advance of each meeting. Meeting materials were viewed over a webinar. During each meeting one of the investigators facilitated the session to ensure all partners were able to share their ideas. Decisions were generally reached through consensus. When consensus was not achieved decisions were made by investigators based on the majority rule.

*Research Team Meetings:* Research team meetings with all IWH investigators, the project coordinator and software developer were held prior to each partners' meeting for updates and planning partners' meetings. On three occasions BC co-investigators participated in these meetings.

*Software Development Meetings:* Bi-weekly software development meetings were held between the principal investigator and project coordinator where decisions were made about software development based on partner, research team and focus group feedback. To expedite decision making, on several occasions the software developer and one or more of the research team participated.

### *2.1.3 Roles and Responsibilities*

At the first partners' meeting in December 2008 the entire team agreed upon roles and

responsibilities. It was agreed that the research team at IWH would play the lead role in developing the workbook. During and between each partners' meeting, co-investigators and partners would support the project by providing information and insight on relevant factors needed to create a tool that would meet the needs of the BC Health Authorities. This included the organizational structure of the BC healthcare system, the H&S decision making hierarchy at health authorities, and the mechanics of various insurance programs such as the BC workers' compensation program. The co-investigators and partners would also provide input on all prototypes and make decisions on inclusions and exclusions. A timeline for the project was also approved at this first meeting.

## ***2.2 Workbook Software Development***

### *2.2.1 Pre-prototype Development*

Prior to the start of the project, the principal investigator completed several related products, including a systematic review of OHS interventions with economic evaluations (Tomba et al. 2008a; Tomba et al. 2009a; Tomba et al., forthcoming), a methods text on economic evaluation for H&S researchers (Tomba et al., 2008), and an environment scan of existing economic evaluation tools for H&S. These tools were evaluated in order to identify their strengths and weaknesses.

At the first partners' meeting in December 2008 the methods text, systematic review and environmental scan were presented and discussed. The list of tools and their features was reviewed and each feature evaluated for its usefulness to the health authority partners. Preliminary features of the workbook were determined from this list. The team stressed the importance of rigorous and reliable economic evaluation methods. Consequently, the research

presented at the first meeting provided the foundation for development of the workbook and was re-visited at subsequent partners meetings. The target audience for the workbook was finalized. It would be designed primarily for upper management and program management at health authorities.

### *2.2.2 Workbook Form*

Based on feedback from partners and presentations at two conferences, investigators realized that there was a preference for a software product rather than a printed workbook. Partners and investigators discussed the pros and cons of developing software. Partners indicated a software product would be more practical in their workplaces. Though there were no funds in the grant to pursue this option, the IWH research team determined it would be necessary and recruited a programmer from within the organization who provided programming services in-kind.

At the second partners' meeting the team discussed the merits of different software platforms and the needs of health authorities and facilities. It was decided that the software should have a database that could store all data required for a comprehensive economic evaluation, and that the software would not ride on other database software such as ACCESS.

### *2.2.3 Outline of the Economic Evaluation Tool*

Using the preliminary features chosen at the first partners' meeting, the investigators decided on two main sections for the software: a calculator to enable recording of costs and consequences of incidents, and an analysis section to enable economic evaluation of H&S interventions.

Investigators used existing incident cost calculator tools found in the environmental scan as a template for the first section of the software, focussing primarily on the six-step WorkSafeBC Business Safety Calculator (<http://www2.worksafebc.com/sc/calculator/default.htm>). A prototype was mocked-up in Microsoft Excel and called the Incident Cost Calculator. In the second partners' meeting (January 2009), team members approved the mock-up of the Incident Cost Calculator.

Discussions from the first partners' meeting on the importance of rigour and reliability were considered in developing a framework for the second main section, namely an analysis section for performing economic evaluations. At the second partners' meeting the team brainstormed direction for the content and format of the of the analysis section. An outline was developed by the IWH team and a name was chosen: Do Your Own Analysis.

The outline for the Do Your Own Analysis section was further developed during software development meetings. In-depth discussions on principles of epidemiology guided the initial formation of three different analysis options: an uncontrolled study, a controlled study, and a business case study for potential interventions. Specific economic evaluation methods taken from the previous research on the economic evaluation of H&S interventions guided the principal investigator in creating an outline in Microsoft Excel for the first analysis option which was named "Before & After Analysis." This was reviewed during the third partners' meeting and several iterations were revised by the research team in software development meetings before programming.

The feedback received from partners and the research team on the Before & After Analysis was used to develop outlines for the controlled study which we named Analysis of Concurrent Groups, and the business case which we named Analysis of a Potential Intervention. Both of

these options were outlined first in Microsoft Excel and vetted by members of the research team before programming.

At the first two partners' meetings it became apparent that there was a need to provide guidance to users on how to perform an analysis. Partners suggested that examples would aid the user further in understanding the use of the Incident Cost Calculator and the Do Your Own Analysis sections. In response, the research team outlined a user help section within the software, including a glossary and examples.

#### *2.2.4 Prototype Development Process*

A research team meeting was held to determine the overall visual formatting of the software. One of the investigators with a graphic design and editing background guided the other research team members to develop the layout, colour scheme, formatting and language style. The agreed upon formatting and language style was incorporated into the programming and used as a guide for developing each new section of the software.

Software meetings were held regularly to develop steps, categories and variables of each section of the software from the workbook outline. Many meetings focused on the details to ensure relevance to health authorities and overall usability such as: designing the interface for WorkSafeBC experience rating and other insurance costs, determining how the incidents would be incorporated into the analysis section and adapting injury variables to those used in health authority databases like Workplace Health Indicator Tracking and Evaluation (WHITE).

After each meeting the principal investigator entered the categories, variables and formulas in Microsoft Excel. The Excel version was tested and edited by the project coordinator and then

sent to the software programmer. After programming, each test version of the software was reviewed by IWH investigators who checked the appearance, layout, and functionality. Two investigators focussed expressly on vocabulary and layout. The project coordinator and principal investigator tested the function and calculations. All necessary changes were tracked by the project coordinator and prioritized. Two or three test versions were created before the prototype was released to partners. This process was followed for each subsequent prototype.

Each prototype was sent to all team members for review prior to the third, fourth and fifth partners' meetings. The second prototype was prepared and presented to participants in at the focus group held in May 2009 in Vancouver. Partner, focus group and investigator suggestions were noted by the project coordinator at each meeting and incorporated into subsequent prototypes following the process above.

### *2.2.5 Focus Groups*

With the assistance of partners, participants for the focus group were recruited over a two month period in the spring of 2009. Characteristics of potential participants included having some decision making authority, experience working in H&S at a health authority or a facility, and an interest in economic evaluation. The BC project coordinator recruited participants after receiving contact information from partners. Arrangements were made for some participants to meet in person in Vancouver. Others in more remote health authorities joined the session by teleconference. This eliminated the need for a second focus group. In advance of the session, participants were sent the software with instructions and a description of what to expect at the focus group (see the Appendix for focus group instructions).

The focus group consisted of five health authority OHS specialists who had direct contact with

healthcare facilities. Two team members — one knowledge transfer associate and a co-investigator— facilitated the session. Specifically, they solicited feedback on the concept, content, format, language, presentation, organization, ease of use, overall relevance and usefulness, and other aspects of the workbook (see the Appendix for the focus group moderator guide). Both project coordinators, one in person and the other on the phone, took notes during the session. An evaluation form was distributed to participants at the end of the session. The form allowed participants to rate the session and provide additional comments/suggestions for improvement of the workbook (see Appendix for details on the focus group evaluation form). Participants were also asked to choose a title from five options.

Focus group feedback was compiled and categorized. A list of suggestions for improvement was sent to partners and investigators in BC prior to the fourth partners' meeting (June 2009). Decisions on focus group feedback were made at the fourth meeting including the addition of “pop-up” fields that would explain the meaning of each category to users. Some changes were integrated into the third prototype while others were created in an Excel worksheet for future consideration.

At the fifth meeting (December 2009) partners provided feedback on the third prototype of the software. The feedback was incorporated into the Excel version and is currently being integrated into the next prototype of the software.

### *2.2.6 Field Testing*

Field testing began in November 2009 with BC partners and co-investigators. They were asked to provide feedback on the software's functionality, layout & language, specifically the usefulness/clarity of variables in the steps of all three analyses, logic of layout, the ease of

navigation & general software performance. Feedback was discussed at the final partners' meeting and incorporated into the software. Feedback was also provided by participants in a BC healthcare conference workshop held in the fall of 2009.

Field testing was also undertaken in Ontario with workplaces of varying sizes. This testing continued until April 2010. Part of this testing was also relevant for the BC software, since much of the functionality is common to both versions. Individuals responsible for H&S resource allocation decisions at the Ontario field testing worksites were asked to test the software using real or mock data over a period of 4-6 weeks. They were asked to use the software for three different types of analyses and note all ideas for improvement, whether on function, content or design. At the end of the testing period participants provided feedback in a telephone interview with the Ontario research coordinator. See the interview guide attached. Feedback from the BC and Ontario field testing was incorporated into a final version of the workbook after review by the research team.

### *2.2.7 Dissemination*

Once the final version of the workbook is completed, it will be linked to Institute for Work & Health (IWH) website, available free of charge as a download. Links to the software on the IWH website will be established on the websites of partner organizations. Those downloading the software will be asked to provide contact information so that we may inform them of new versions. The number of downloads will be tracked by the IWH system. Introductory information about the tool and how to download it will be provided on all websites beside the link.

Information about the tool and where to get a copy will also be disseminated through existing channels in each partner organization, as well as other avenues identified by the team (e.g., on the websites of other safety organizations and at conference booths).

## Project Findings

### ***3.1 Environmental Scan***

The environmental scan uncovered several tools. Many focus exclusively on measuring the burden of occupational injury and illness, rather than how to undertake a full-fledged economic evaluation. These tools are often described as incident cost calculators. For example, the Health & Safety Executive (HSE) in the United Kingdom has developed such a calculator, available on their Ready Reckoner website (Health and Safety Executive: [www.hse.gov.uk/costs](http://www.hse.gov.uk/costs)). It provides a quick and easy way to estimate the costs associated with a workplace accident. WorkSafeBC, WorkSafeNB, the Ontario Industrial Accident Prevention Association, and the Ontario Service Safety Alliance all have incident cost calculators similar to the HSE tool developed for their client base. The United States' Occupational Health and Safety Administration has also developed a calculator called the "\$AFETY PAYS Program."

(<http://www.osha.gov/dcsp/smallbusiness/safetypays/index.html>). This interactive software tool enables employers to assess the impact of occupational injuries and illnesses on their profitability. In Ontario, system partners have developed a guidebook entitled "Business Results through Health & Safety" (Workplace Safety & Insurance Board, Canadian Manufacturers & Exporters: [www.wsib.on.ca/wsib/wsibsite.nsf/Public/BusinessResultsHealthSafety](http://www.wsib.on.ca/wsib/wsibsite.nsf/Public/BusinessResultsHealthSafety)) to assist firms in determining the costs of occupational injury and illness.

In 2004, the United States National Institute for Occupational Health and Safety (NIOSH) and the World Health Organization (WHO) sponsored a conference entitled "Economic Evaluation of Occupational Health and Safety Interventions at the Company Level" (see Eijkemans and Fingerhut, 2005). The conference was a platform to present existing tools and research findings

and to discuss appropriate methods for economic evaluation. Researchers and consultants at the NIOSH/WHO conference presented a variety of models and applications, ranging from a structured method for use at garment factories in Central America to a computerized system used in various corporate settings in the United States. We summarize several of the key presentations from this conference in what follows.

Lahiri et al. (2005) present the Net-Cost Model developed by WHO to measure the savings from ergonomic interventions associated with primary prevention of low-back pain. The authors tested the model with data provided by three American companies in the manufacturing sector.

Bergström (2005) presents the Potential method developed in Finland and Sweden. This is an instrument used to develop the business case for H&S. It includes consideration of changes in working conditions that can lead to lower employee turnover, reduced absenteeism due to illness, and/or increased efficiency.

Amador-Redezno (2005) also presents a computer-based cost-benefit tool used in Central American garment factories. It integrates epidemiologic, risk assessment, clinical, engineering, and accountability issues. One feature of this tool is that it requires little or no professional background. The tool is used to provide information on the cost-benefit of an intervention and also to provide charts for daily use in an OHS program.

Oxenburgh and Marlow (2005) presented a computer-based cost-benefit tool called the Productivity Assessment Tool (PAT) designed for the service and manufacturing sector that evaluates the incremental benefit associated with the introduction of an intervention. A version of the tool, known as ProductAbilityBasic, is available as a book and companion software (Oxenburgh et al. 2004).

Linhard (2005) presented the results of ORC task force efforts to find a way to use traditional finance methods in health, safety and environmental investment decisions. The result of its efforts is a software tool called the Return on Health, Safety and Environmental Investments (ROHSEI).

The American College of Occupational and Environmental Medicine has also produced a product called the Health and Productivity Toolkit (see <http://www.acoem.org/publication.aspx?id=48#>). The toolkit is designed as a resource for workplaces to access in order to better understand the concepts of health and productivity. It consists of video, audio, and written content.

Other methods guidelines have also been developed, including the Strategy to Demonstrate the Value of Industrial Hygiene Strategy by the American Industrial Hygiene Association ([www.ihvalue.org](http://www.ihvalue.org)), the Centre for Disease Control and Prevention's guidelines entitled "Framing an Economic Evaluation" ([www.cdc.gov/owcd/eet/Framing3/Fixed/1.html](http://www.cdc.gov/owcd/eet/Framing3/Fixed/1.html)), and several other similar efforts (e.g. Barefoot Economics, 2002; Mossink, 2002).

Many of the above noted tools are limited in scope (e.g., cost calculators that assess the burden of injuries and illnesses but not the impacts of efforts to avert them) or are not readily accessible to workplaces for a variety of reasons (e.g., up front purchase costs, designed for different target audiences, need for training, not in a software format). Having a user friendly software, requiring little to no economics training, and designed for a particular jurisdiction and sector provides a greater likelihood of uptake.

### ***3.2 First, Second and Third Partners' Meetings***

At the first partners' meeting (held in December 2008) we reviewed the findings from our environmental scan. Particular focus was given to the WorkSafeBC incident cost calculator tool and ProductAbilityBasic. Partners were not familiar with these tools but found many of the features interesting. At the meeting, a substantial amount of time was spent discussing Health Authority needs in the area of OHS economic evaluation. Partners felt that a tool developed for them needed to be in software form rather than a printed manual or workbook. It was felt that a tool in paper form would be onerous to complete and would make it difficult to ensure the accuracy of calculations. With regards to software, partners felt that it had to stand alone, i.e., did not require other software such as ACCESS, or installation of executable files by a systems person. Systems integrity was also an important issue as was confidentiality. Hence, web-based software would not be acceptable; users would feel uncomfortable with inputting data stored off site.

At the second meeting (held in January 2009) we discussed plans for evaluating prototypes of the workbook with a focus group and through field testing. We also reviewed outcome metrics to include in the workbook for the evaluation of effectiveness and cost-effectiveness that resonated with partners. Lastly, we discussed measures of success of the tool. Suggestions included producing a final version of the workbook in software form, ease of use of the workbook, target audience's requests for the workbook, usefulness of the tool for a wide range of interventions, ability of the tool to demonstrate savings, and the ongoing consideration of economic evaluation outcomes in health authority decisions.

At the third partners' meeting (held in March 2009) we discussed and reviewed in detail key features required of the workbook. The incident cost calculator would need to consider a broad

range of H&S issues, not just occupational injuries and illnesses, e.g., short- and long-term disability, general sickness absences, and first aid incidents. Similarly, the economic analysis section would need to accommodate a range of H&S interventions, not just workplace injury prevention ones. We then reviewed the information needs required to identify the burden of incidents and undertake an economic analysis to determine the kinds of costs that are relevant and retrievable. There was a long discussion about at-work productivity effects of interventions, particularly as they relate to non-injured workers exposed to the intervention (e.g., at-work productivity implications of ceiling lifts). Partners felt strongly that such productivity implications would be difficult to estimate and are generally not considered as an outcome in H&S decision making by the health authorities. Although partners recognized that productivity issues may also result in staffing changes, they felt strongly about not including this in the analysis. Another section that was deemed unnecessary in the documentation of incidents costs was the cost of inspections. Partners' stated that inspections were generally unrelated to incidents, and the group felt that we should assume that workbook users were compliant with regulations.

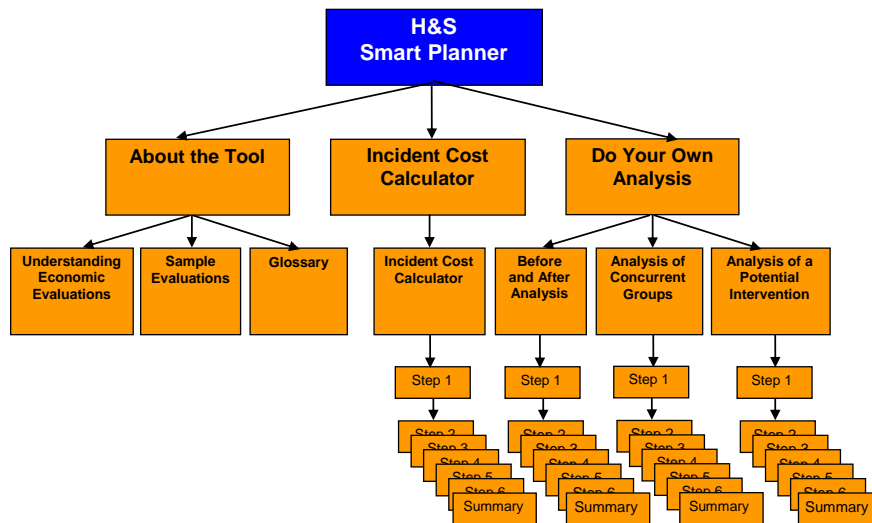
### ***3.3 Identification of the Tool Platform and Development of its Structure***

The researchers decided that the tool would need to be in software form if it was to be useful for health authorities. Software program costs were not considered in our original budget, but we were able to receive in-kind support for this from IWH due to the good fortune of having an existing staff member who had software programming skills. Consistent with our partners' suggestion, the programmer identified a platform for developing the software that would allow it to be stand alone, i.e., not dependent on other software.

Drawing on our collective epidemiologic and economic expertise, as well as the environmental scan and feedback from the first partners' meeting, the project research team developed the

structure of the software over a series of meetings. The structure agreed upon has three principal paths that the user takes upon opening the workbook. They are: 1) a user support section which we called “About the Tool” (About); 2) a section for documenting and storing incidents and their costs which we called the “Incident Cost Calculator” (ICC); and 3) an economic evaluation section we called “Do Your Own Analysis” (DYOA). Following is a flow chart depicting the structure.

*Diagram of Software Structure*



The About section is designed to provide assistance to users with varying levels of economics knowledge, definitions and explanations of key terms and constructs, and examples of economic evaluations that are sector specific. The ICC provides a template for users to document the financial burden of injuries and illnesses, and also store the incidents in a database that could be retrieved for future reference. In particular, the Step database can be drawn upon by the user to undertake an economic evaluation. The DYOA section has three options that reflect different study designs: 1) Before and after analysis; 2) Analysis of concurrent groups, and 3) Analysis of a potential intervention. These correspond to an uncontrolled study, a controlled study, and a

business case analysis, respectively. Each of the analysis options provides a template with multiple steps to document the costs and consequences of the intervention being evaluated. Analyses can also be saved to a database for future reference. Summary reports of incidents and analyses can be printed for meetings and presentations.

### ***3.4 Name and Visual Identity for the Software***

At a meeting with several IWH Knowledge Transfer and Exchange specialists, we brainstormed ideas for a software name. Several possibilities were identified and presented to participants at a focus group and to partners. After much discussion the final title decided upon was the “Health and Safety Smart Evaluator: a cost-benefit tool for healthcare”. Since then, we have revised the name slightly to “Health and Safety Smart Planner: a cost-benefit tool for healthcare” in order to be consistent with the name chosen for related software products being developed for other jurisdictions and sectors.

Two communications staff members at IWH with experience in visual design were given the task of designing a layout and colour scheme for the software. They drew on the WorkSafeBC Business Safety Calculator layout for the counterpart in our software. Similar layouts were adopted for the “Do Your Own Analysis” section of the software. Some elements of the IWH website were incorporated into the visual design. The selected colour scheme consisted of blue, orange, and grey. Following is the front page of the software, which includes the theme colours and website-like layout.

## Screen Print of Software Front Page

Health & Safety Smart Planner British Columbia - Version 1.2 © Institute for Work & Health, 2010

**Institute for Work & Health**

# Health & Safety Smart Planner:

A cost-benefit tool for BC healthcare




<b>DO YOUR OWN ANALYSIS</b>	Measure the costs and benefits of your health & safety interventions.
<b>INCIDENT COST CALCULATOR</b>	Calculate the costs of your health & safety incidents. Retrieve past incidents from your database.
<b>ABOUT H&amp;S SMART PLANNING</b>	Learn how to use this tool, search the glossary of terms, review examples and get contact information.

Funding provided by the WorkSafeBC Research Secretariat, the Workers' Compensation Board of Nova Scotia, and the Saskatchewan Workers' Compensation Board.

Developed in partnership with Fraser Health, Interior Health, Occupational Health & Safety Agency for Healthcare in British Columbia, UBC Centre for Health Services and Policy Research

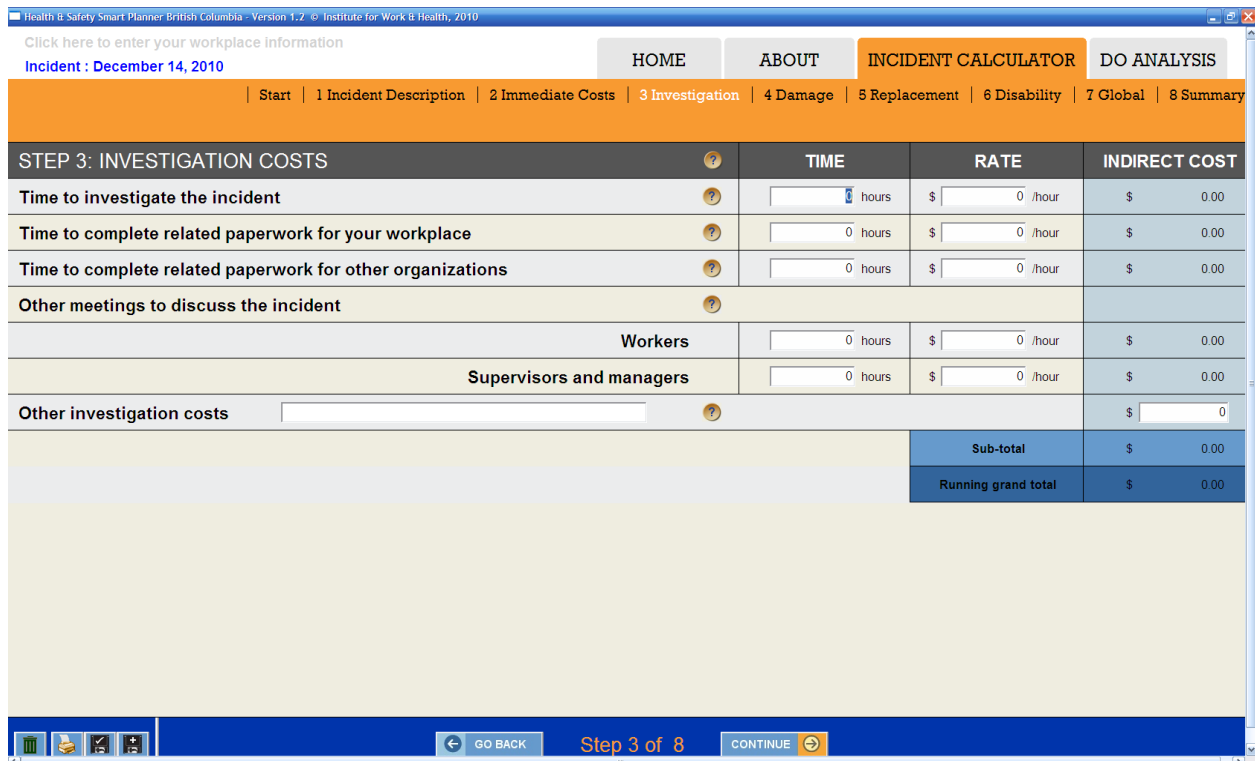
### 3.5 Structure of the Software & Navigation

To facilitate navigation, users have several options to move through the software pages. As is apparent in the above screen print, the three options on the front page are “Do Your Own Analysis” (DYOA), “Incident Cost Calculator” (ICC) and “About H&S Smart Planning” (About). A similar layout is used for the front pages of each of these three sections. Clicking on any of these sections will take the user into the options found in each of them.

Once past the front page, particular steps within the DYOA and ICC can be selected at the top of the page, similar to the WorkSafeBC calculator (see the *screen print of “Step 3 Investigation” below*). The current step that a user entered is evident in the ICC and DYOA by the location of the orange tab and the step within it that is highlighted in white lettering. In the example the user

is in Step 3: Investigation of the Incident Calculator. The user also has the option of going into other sections of the software by selecting a file folder tab (Home, About, Incident Calculator, and Do Analysis) located at the very top of the page. The user can move between sections by clicking on these tabs without losing the page they are currently on. To move from step to step sequentially within the ICC and DYOA, icons are also found at the bottom of each page, again much like the WorkSafeBC calculator.

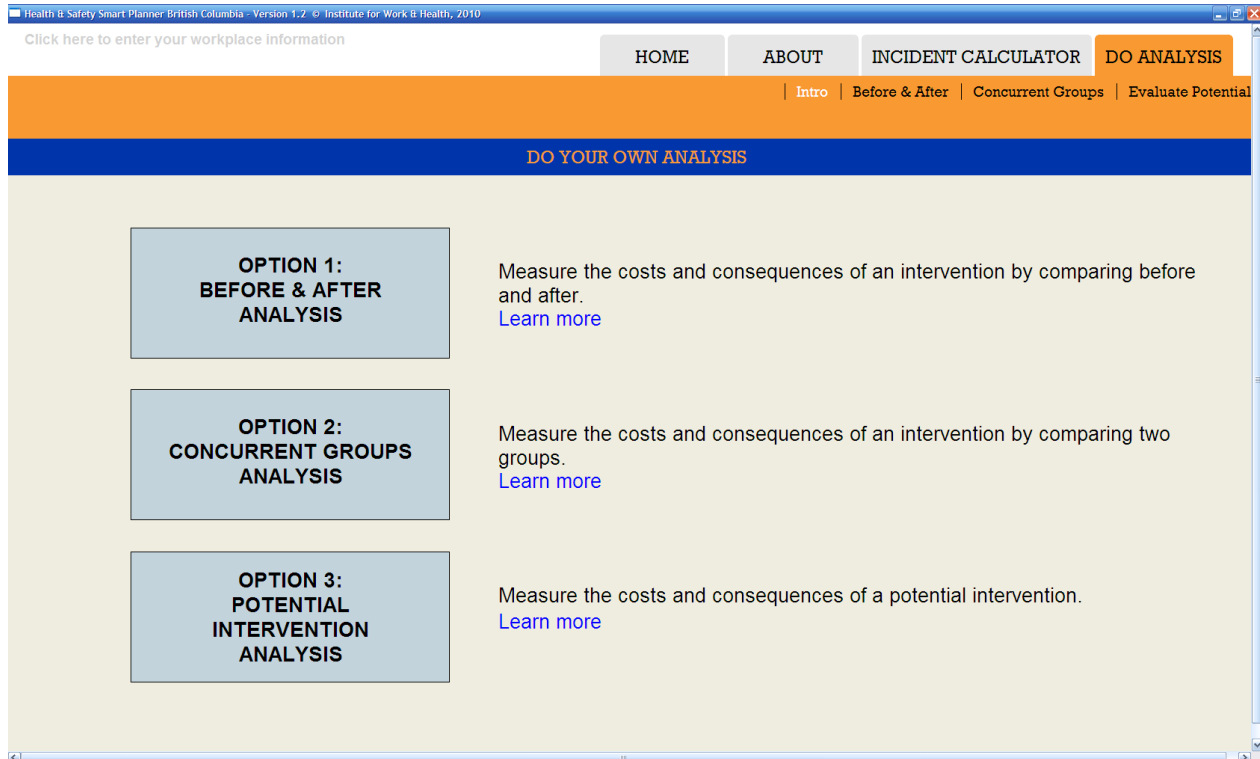
*Screen Print of “Step 3 Investigation” of the Incident Calculator*



The introduction to the “Do your own analysis” section provides three options—“Before and after” analysis, “Concurrent groups” analysis and “Potential intervention” analysis (see the screen print below). Within each of these analysis options the user can start a new analysis, review a past analysis, or review an example analysis. Each option takes the user through the same series of eight steps with the last one containing a summary of the analysis. The specific

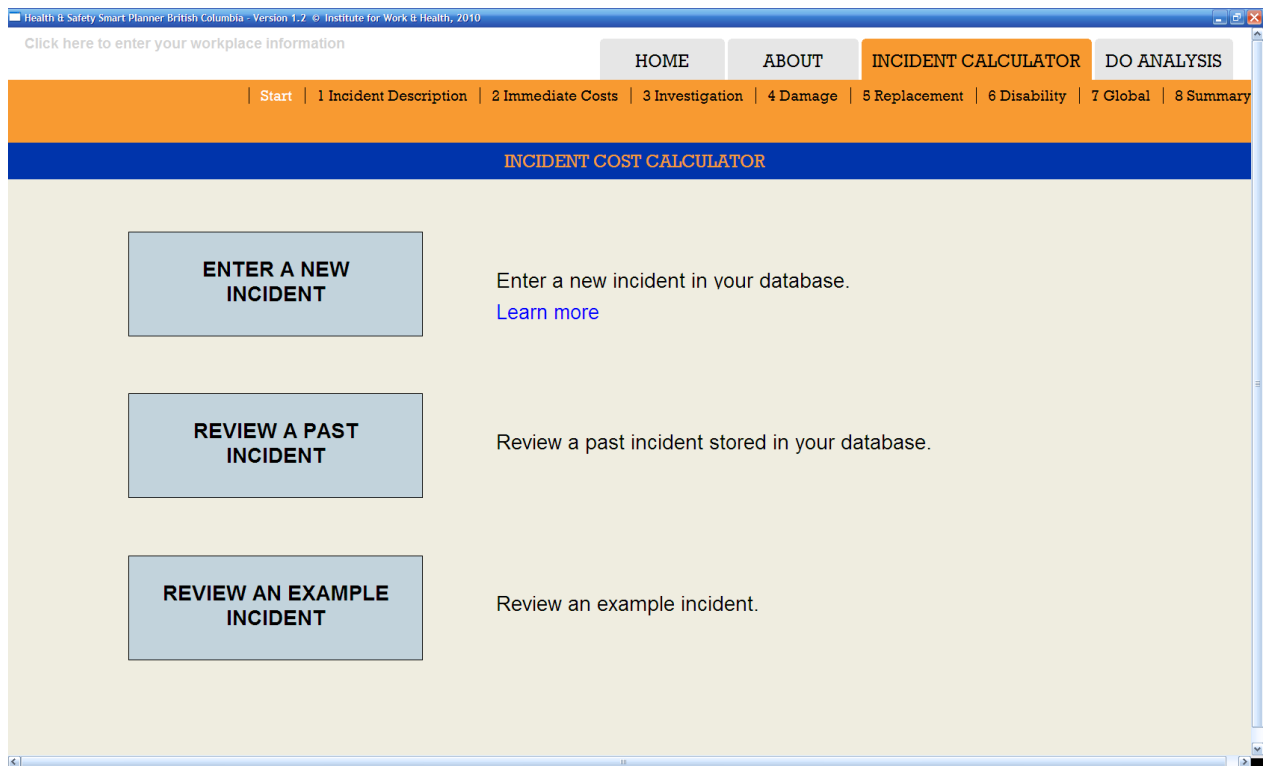
steps are as follows: Step 1) intervention description, Step 2) labour, Step 3) incidents, Step 4) intervention, Step 5) productivity, Step 6) turnover, Step 7) insurance, Step 8) summary.

### Screen Print of DYOA Front Page



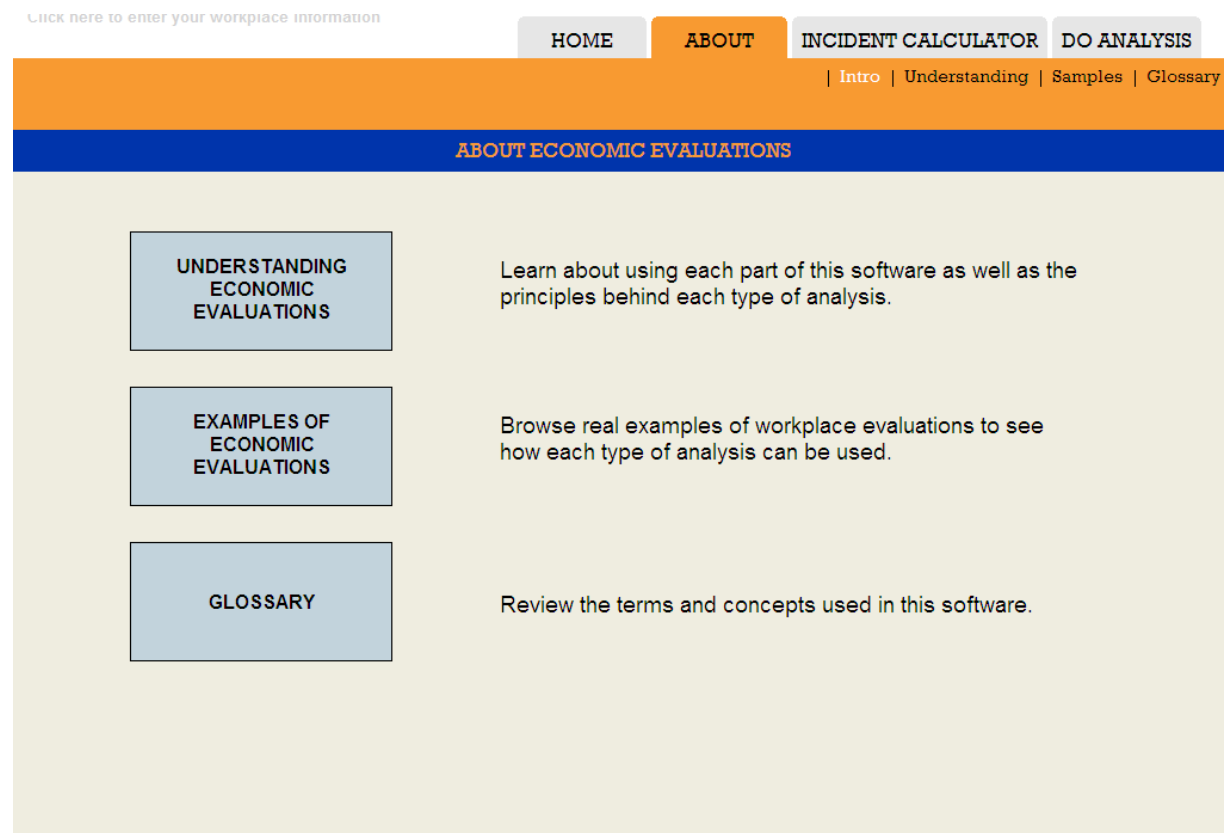
Once in the “Incident cost calculator” section there are also three options—“enter a new incident,” “review a past incident,” or “review an example incident” (see the screen print below) Each follows the same series of eight steps with the last one containing a summary of the incident costs. Steps reflect broad categories of information and costs. Details are as follows: Step 1) incident description, Step 2) immediate costs, Step 3) investigation, Step4) damage, Step 5) replacement, Step6) disability, Step 7) global, and Step 8) summary. Incident data must be entered into the “Incident cost calculator” for a period of time in order to undertake an analysis of an H&S intervention.

## Screen Print of ICC Front Page



In the “About H&S smart planning” section there are three options: “Understanding”, which provides help with using the software; “Examples”, which illustrates several economic evaluation case studies; and a “Glossary”, which provides definitions for terms used in this software.

## Screen Print of About Front Page



User support is also provided with pop-up bubbles beside most data entry cells within the steps of “Do your own analysis” and “Incident cost calculator” sections as seen in the screen print below.

Screen Print of “Step 4 Intervention Costs” page of the DYOA

Health & Safety Smart Planner British Columbia - Version 1.2 © Institute for Work & Health, 2010

Click here to enter your workplace information

Intervention: Ceiling Lift

HOME ABOUT INCIDENT CALCULATOR DO ANALYSIS

Intro Before & After Concurrent Groups Evaluate Potential

Start 1 Intervention Description 2 Labour 3 Incidents 4 Intervention 5 Productivity 6 Turnover 7 Insurance 8 Summary

STEP 4: INTERVENTION COSTS

	Details	Amount
<b>Equipment, material costs and operating costs</b>		
Equipment costs	Ceiling Lift	\$ 10200
Installation costs	workstation modifications	\$ 5250
Material costs	miscellaneous materials	\$ 500
	power	\$ 500
Maintenance costs	lift	\$ 500
Disposal costs	drywall materials etc.	\$ 150
Other costs		\$ 0
<b>Intervention training costs</b>		
Time spent training workers (trainer time)		\$ 2000

Consider increases or decreases in material costs associated with the intervention. Give increased costs a positive sign and decreased costs a negative sign.

GO BACK Step 4 of 8 CONTINUE

More details about the ICC, DYOA and specific aspects of the DYOA computations are provided in the appendix under the following headings:

- Details about the ICC
- Detail about DYOA
- Details of Examples
- How Workers Compensation Insurance Costs are Integrated into DYOA
- How Productivity is Integrated into DYOA
- How Turnover is Integrated into DYOA

### ***3.6 Information Requirement for Using the Software***

The DYOA and ICC sections require information from different sources. Users are prompted to gather some of this information before starting to enter data in these sections.

If a data entry cell is not relevant for a particular incident or analysis, the user can leave it blank or enter zero. Numeric cells with no information entered into them are assumed to be zero.

Information needed to use in the ICC is listed in the Understanding section of the software. This includes:

- wage and benefits information such as Canada Pension Plan and Employment Insurance expenses for workers, supervisors and managers affected by the incident or involved in follow-up investigations;
- repair or clean-up costs;
- costs of hiring a replacement workers;
- wages of the injured worker;
- injured worker time absent from work and on modified work;
- proportion of absence and modified work time covered by insurance;
- the total cost of the claim from your workers' compensation report.

Other information require in the ICC (to determine how long it will take to recover the cost of an incident) are:

- the organization's profit margin;
- the organization's average daily revenue or
- the daily departmental budget (if you are a not-for-profit organization)

Incidents must be tracked within the ICC for a certain period of time before any of the DYOA options can be used

For each of the DYOA options the user will need information on all the workers involved in the intervention. Specifically, it includes:

- the number of workers in each occupational group;
- the total regular and overtime hours worked per week for each group (excluding vacation, statutory holidays and any other absences).

If there are productivity implications from the intervention, the user will also need:

- the regular and overtime wage rate per hour for all occupational groups;
- the benefit expenses such as CPP and EI paid per hour for all groups.

The user will also need information on the cost of the intervention. These might include:

- cost of staff time used in planning and executing the intervention;
- equipment purchase, installation and maintenance costs;
- purchase costs of supplies;
- disposal cost of old equipment;
- cost of planning and dissemination meetings;
- intervention training costs;
- external consultant and other external costs.

For the “Potential intervention” analysis the user will also need an external source of information to estimate the expected impact of the H&S intervention at your organization.

### ***3.7 Focus Groups Feedback***

Our partners helped recruit participants for a focus group that was held in Vancouver in May of 2009. The participants were individuals from the health authorities that worked on OHS issues. As such, they were able to provide “real-world” feedback on the workbook, in terms of the content, language, presentation, organization, ease of use and overall relevance and usefulness.

At the meeting, the group noted the need for evidence-based information with “hard numbers” to justify prevention activities. One of the first issues that arose in the discussion was the volume of data that existed in some health authorities. For example, Fraser Health has 27,000 employees and 4,500 incidents in a year. The group suggested integrating the workbook with existing databases to facilitate data entry. In particular, they felt it would be useful to have the tool as part of the WHITE database portal, which acts as a surveillance system for OHS concerns and is used by several health authorities to house incident data. They also suggested tweaking the vocabulary to be similar to that used in WHITE. The bulk of the time during the focus group was spent discussing participants’ needs, economic evaluation skills, and how the workbook might fit into their current work demands. It became clear from the discussion that some participants were not familiar with economic evaluation methods and how such a tool might assist them with better understanding the financial implications of H&S interventions. At the end of the meeting, the facilitator presented several names for the tool and asked participants their preference. The group liked the name “Smart Planner”. For the tag line, a number of suggestions were forwarded that we planned to bring to the next partners’ meeting for discussion.

### **3.8 Fourth and Fifth Partners' Meetings**

At the fourth partners' meeting (held in May 2009) we reviewed the focus group feedback. At the forefront of our discussion was the focus group's concern about the volume of data needed for an economic analysis, and their suggestion that it would facilitate analysis if the workbook was integrated with WHITE. Partners agreed that the tool should accommodate import of WHITE incident data. The current research grant funding will not cover the cost of doing this, but partners and the research team agree that it should be a future development. There are also other databases used by the health authorities that have information needed to perform an analysis, e.g., Meditext houses payroll information. The group agreed that the guidebook vocabulary should be harmonized with WHITE in anticipation of future integration.

The focus group's suggestion for the workbook name was rejected by the partners. They felt that calling the tool a "Planner" would misrepresent it as it is not about all kinds of decision making but about economic evaluation, specifically cost-benefit analysis. The partners felt that "Smart Evaluator" would be a more appropriate name.

Another issue discussed at the fourth meeting was the possibility of having a short-form version of the ICC that would allow for the use of multipliers to determine the indirect costs. This would relieve some of the data entry burden about which the focus group participants were concerned.

At the fifth partners' meeting (held in December 2010) we reviewed partner and co-investigator feedback as well as preliminary feedback from other field testing that was underway.. Also discussed at length was the planned design for the WorkSafeBC premium setting aspect of the DYOAs section of the workbook. The group reviewed the types of information needed to estimate

the impact on premiums of changes in workers' compensation costs. Partners' confirmed that data needed to make these estimates were available to them.

The group wrapped up the last meeting with a discussion about the integration of field testing feedback into a final version of the workbook and the planned dissemination strategy. Also discussed were future plans for this tool development initiative, which are outlined in the section entitled "Implications for Future Research".

### ***3.9 Field Testing***

Field testing began in November 2009 and continued through mid 2010. The research team and partners, including upper level and program managers at the health authorities were asked to review the software's functionality, layout & language. They identified technical glitches, reviewed wording of the text for clarity, ensuring vocabulary was consistent with that used in WHITE database and in the BC healthcare sector, and assessed usability of the software from a non-specialist's perspective. Further field testing was done by 14 individuals with H&S decision making responsibilities at workplaces in Ontario. They provided input on content, function and layout while using the software for analysis of real or mock H&S interventions. Feedback from the field testing was reviewed by the research team and incorporated into a new version of the software. Feedback from field testing in BC and Ontario resulted in:

- Print ability for all Incident Cost Calculator and DOYA pages
- Ability to see the full screen of the software regardless of a users' computer settings.
- Explanation of the function of sections linked from the front page and section pages
- Expansion of Understanding section to include further explanation of Do Your Own Analysis
- Incorporation of BC workers' compensation language into insurance costs sections of the

## ICC and DOYA.

- More detailed information on how to estimate productivity and turnover changes
- Addition of several pop-up bubbles to clarify concepts in some fields, for example, the need to consider only changes in costs, details on calculating wage costs and explanations of summary page results
- Creation of a prominent incident retrieval button to ensure incident costs are included in each analysis
- Creation of a “body part” category in the Incident Cost Calculator to further match WHITE database categories.

### 3. Implications for Future Research

Ongoing activities for the economic evaluation methods initiative include: 1) the development of instructional video inserts, funded by Manitoba, that began in February 2010 (plans are to include the video in new releases of the Ontario and BC software in addition to the Manitoba software); 2) the exploration of tools and training needs for the economic evaluation of OHS interventions in the Ontario healthcare sector (funded by the Ontario Workplace Safety and Insurance Board's Research Advisory Committee in 2010); and 3) the development of a short form version of each of the DYOA options that used aggregate incidents data (plans are to include this feature in new releases of the Ontario, Manitoba and BC software). Throughout 2010, the research team has also provided workshops and training sessions to promote the use of the Ontario version of the software (which was released in June), as well provider user support through email.

Future developments for the software may include 1) adding layers to the BC healthcare software that consider perspectives other than the employer (two projects currently underway at OSHAH are designed to support this layering by considering healthcare injured worker out of pocket costs, and the development of methods for accounting for all the benefits of interventions in healthcare); 2) integrating the software into the WHITE database to allow easy transfer of data from WHITE; and 3) the development of training workshops on economic analysis for H&S decision makers in both the private and public sectors (funding protocol submitted to the Ontario Workplace Safety and Insurance Board's Research Advisory Committee in 2010).

## **4. Relevant User Groups and their Immediate and Long-term Benefits**

Complete information on the costs and consequences of interventions is an invaluable input into the H&S decision making process. Our objective with the workbook was to make reliable information about the resource implications of H&S interventions readily available to decision makers in the healthcare sector in British Columbia. At the first meeting with partners, the team established that the target audience for the workbook would be upper management and program management at health authorities, since most decisions on H&S interventions are made centrally in the BC healthcare system. Operations management at facilities may initiate their own projects, but would likely be working with the health authority decision makers. Therefore facilities managers would be a secondary target audience. The group decided not to include private care facilities in the current workbook project, since they sometimes have different priorities and different levels of complexity. We would consider adapting the workbook for private sector facilities at a later date.

Over the short run, use of the software is intended to increase H&S decision makers' comfort with economic analysis. The workbook has been designed to be approachable by non-specialists, i.e., individuals with little to no training in economic evaluation. The user support built into the software is intended to facilitate inquiries into methods issues to varying degrees, through a glossary of terms, instructions on how to get the most out of analyses, sector specific examples, and pop up bubbles within the ICC and DYOA sections. Analyses of the resource implications of interventions will help support evidence informed decision making at facilities and within Health Authorities. The software can be used to support decisions to adopt a new H&S intervention by showing the H&S and financial impact of potential alternatives. The software can also support decision making for continued funding of existing H&S interventions by showing H&S and financial improvements over time or between groups. Over the long-run, the systematic

consideration of the resource implications of interventions will ensure that health authorities get the most out of scarce resources. Key benefits include a reduced H&S burden, a healthier more productive workforce, possibly higher staff retention, and lower recruitment and turnover costs. Analyses of the resource implications of interventions will help support evidence informed policy decision making.

## 5. Knowledge Transfer

As is apparent through the methods and results section, the target audience of the workbook was involved in all stages of its development to ensure that the final product was relevant and useful. We involved partners who were directly charged with oversight of H&S issues at the health authorities in five meetings over the course of the one year time frame of the project. Once a first draft of the workbook was complete, we solicited feedback from a broader representation of end users through a focus group. The workbook was also presented to a broad range of potential users at a healthcare conference held in Kelowna in September 2009. Once the final version is complete, the workbook will be distributed to the health authorities and will be available as a download, free of charge, on the IWH website. Introductory information will be provided to users on the website explaining what the tool can offer for workplace decision-makers, how the tool works and how to download it. The Ontario version of the tool was profiled in a cover story of the IWH newsletter *AtWork* in early 2010 and the BC version will likely be highlighted in the newsletter in 2011.

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## Appendix

### Details about the ICC

The ICC is used to calculate the full cost of health and safety incidents occurring at the user's organization. All incidents that the user enters into the calculator are stored in a database so that they can be retrieved at a later date. The incidents database is also linked to the DYOA section of the software. Incidents data are a critical component of an analysis.

There are three options within the ICC. The user can "Enter a new incident," "Review a past incident" already entered into the database, or "Review an example incident."

There are 8 steps in the Incident cost calculator. The user can access each step by clicking on the tabs above, or using the "continue" and "go back" buttons on the bottom of the screen.

As the user moves from step to step the software calculates and saves the information. The user can also save information by clicking on the "Save current" icon at the bottom of the screen of each step. If the user saves the incident using the "Save current" icon the data is saved under the current incident number. The "Save as new" icon also at the bottom of each screen allows the user to save an example incident or an incident previously entered by the user as the basis for a new incident. The user can do this by retrieving an incident from "Review a past incident" or "See an example incident" on the Start" page, and save the incident using the "Save as new" icon. In this case, the user would not want to "Save as current because it would overwrite the existing data.

In Step 1, "Incident description," the user enters details like the nature, cause and type of incident. Note that the "Incident cost calculator" can be used to calculate the cost of near misses or even general sickness absences.

The question marks beside each data entry cell are pop-up bubbles that provide details on the type of information to enter into the cell.

In Step 2, "Immediate costs," the user fills in the costs of an incident that occur right after the incident happens. For example, if there is a work stoppage because of the incident, the user enters that time under "Other non-productive time due to the work incident".

If a step does not explicitly identify all the relevant costs for a particular incident, the user can enter information in the "other" cell usually found as the last item of every step.

Step 6, is used to calculate disability costs, including insurance costs and the cost of worker time while off work or in modified work. If the incident becomes a workers' compensation claim the user enters the cost of the claim, as written on your claim statement. Since workers' compensation claims costs are not paid directly by the user's organization, the amount the user enters here will not be included in the total cost on the summary page. Rather, workers' compensation claim cost information is used in the DYOA section of the software to estimate the impact of claims costs on the organization's workers' compensation insurance costs.

One of the costs calculated in Step 6 is the wage replacement costs paid directly by the organization while the worker is absent from work. This might be the case for general sickness absences. In many cases this will be zero if the wage replacement is paid by workers' compensation or another insurance program.

Step 6 also calculates the cost of the workers' time in modified work. If the organization pays the worker their full wage but values the worker's time at less than 100% of their regular activities, the difference is calculated as a cost to the organization.

In Step 7, three key pieces of organizational information are required-- profit margin, sales or revenue per day, and number of hours worked by a full-time equivalent worker. The user only needs to enter this information once and the values will remain in the database as a default until it is changed. This information is used to calculate summary measures provided in Step 8.

Step 8, provides a summary of all the costs of the incident. Once the user has completed entering the data for an incident, the user may want to print a detailed report of the incident. The "Print detailed report" icon is at the bottom of every step.

### **Details about DYOA**

Once the user has identified a promising H&S intervention, they will want to set up an analysis. The three DYOA options—"Before and after" analysis, "Concurrent groups" analysis, and "Potential intervention" analysis—provide three ways to evaluate the cost and benefits of an intervention. Each requires that the user to enter data into the ICC for a period of time.

The "Before & after" option requires that the user record incidents at their organization in ICC for a period of time before introducing the H&S intervention. This incidents data is used to evaluate the impact of the H&S intervention. The user will also need to record incidents in ICC for a period of time after the H&S intervention is introduced.

The "Concurrent groups" option does not require the user to record incidents before introducing the H&S intervention. This analysis option is selected if the H&S intervention is introduced in only part of an organization such as a department or a particular work group. The user will need to identify another group in their organization that will not receive the H&S intervention to serve as a comparison. The user will need to record incidents in the ICC from the "non-intervention department or group" and the "intervention department or group" for a period of time after introducing the intervention.

If the user wants to evaluate the merits of an H&S intervention before going forward with it, they will want to use the "Potential intervention" option. It will help the user develop a business case. The user will need to record incidents in ICC for a period of time. This incidents data will be used for comparison with the potential H&S intervention.

### **Details about Examples**

Within the ICC and DYOA sections, examples have been entered into each step to illustrate some typical incident costs as well as some costs and consequences of interventions. The incident examples show the user how incident costs can be much greater than changes in insurance costs. The examples in each of the three DYOA sections have been stylized from real life examples and show the user example costs and resulting costs and benefits of an intervention.

To provide further guidance to the user on setting up their own analysis there are several economic evaluation case studies available as “Examples” within the Understanding section. These Examples each describe a scenario of an intervention using the different DYOA options. The user is led through the process of decision-making leading to the set up of an analysis. The examples also show the costs involved in each intervention and the outcomes of the analysis.

### **How Workers Compensation Insurance Costs are Integrated into DYOA**

An organization’s workers’ compensation insurance costs are partly determined by the cost of claims from that organization.

The software will estimate the impact of the intervention on the organization’s workers’ compensation insurance costs from changes in the number and cost of claims due to the H&S intervention. The estimate is based on information the user enters in the ICC and DYOA sections of the software.

In Step 6 of the ICC the user is asked to enter the total cost of a workers’ compensation claim from their organization’s claim statement. This total cost consists of wage replacement, health care and other expenses for the claim.

In each of the DYOA options, all incidents for the selected analysis time periods are “pulled” into your analysis in Step 3 when the user click on the “Retrieve” button.

The total workers’ compensation claims costs for all incidents during these time periods are also pulled into the analysis. This total will appear in Step 7. The user will need to enter incremental information on their workers’ compensation program in this step.

Changes in your workers’ compensation insurance costs due to the intervention will appear on the summary in Step 8.

### **How Productivity is Integrated into DYOA**

An H&S intervention may have an impact on the productivity of affected workers. For example, ergonomics improvements may reduce the time it takes to complete tasks.

All three DYOA options allow the user to record the productivity impact of an intervention in Step 5. This productivity impact is not about productivity losses directly linked to an incident. Incident related productivity losses are calculated within the steps of the Incident cost calculator. Step 5 provides three guidelines to help users identify what to look for in order to estimate productivity impacts.

A percentage productivity impact is entered in Step 5 which is used in conjunction with the “at work time” and “labour costs” entered in Step 2 to estimate the value of the productivity impact. The salary information in Step 2 is only required in an analysis if there are productivity impacts from the intervention.

### **How Turnover is Integrated into DYOA**

An H&S intervention may have an impact on turnover at an organization. For example, an ergonomics intervention may result in fewer senior staff leaving for early retirement.

Step 6 of all three DYOA options allows the user to record changes in turnover costs due to the intervention. Turnover costs may include management, supervisory and human resources costs for recruitment and training of new workers. The organization may also have other costs associated with turnover like advertising a job or commission paid to human resources recruitment companies. The costs the user enters in Step 6 should be associated with the groups and time period related to the intervention. The training costs considered here should not include training of replacement workers when a worker is off work due to injury and illness. Such costs are captured in Step 5 of the ICC.

If there are no turnover costs the cells in Step 6 are left blank or a zero is entered.

## Letter to Candidate Focus Group Participants

Dear [insert name here],

I am looking forward to meeting you on Monday May 4<sup>th</sup> and getting your input on the Economic Evaluation Software!

Here is the information you will need for the focus group: The purpose of the focus group is to get your input on how user friendly the software is and how we can improve it to best suit the needs of your workplace. You will be providing your input in a discussion with 7 to 8 other people from the other health authorities.

So that we can have a productive discussion, we would like you to trial the software in advance. A copy of this software is attached. Please note that the software is in draft form only and is not suitable for distribution.

*To open the software file, save it to a folder of your choice and then rename it to include ".exe" at the end (EEWDraft.exe). The .exe may disappear depending on your computer settings but that is OK. Now you should be able to open it (double click) and start exploring. If you have any problems call me at 604-822-0200.*

Once you open the Economic Evaluation Software please review the information on the tool under the "About" tab. This will provide information on what economic evaluations can be used for and give some examples of completed economic evaluations.

After familiarizing yourself with this information please enter some details for a new incident using the incident calculator to see how that section works.

Under the "Do analysis" tab there are three alternatives. Please review and test out the steps of the "Before and after" analysis. **Note: The software is not fully functional at this stage. You will not be able to save anything you enter once you close the program and some tabs and links will not work when clicked.**

Please take note of any questions or ideas you have about the software, and bring them to the session. You will be given an honorarium of \$50.00 for your participation.

### Focus group details

**Date:** Monday May 4<sup>th</sup>, 2009

**Time:** 9:30 a.m. – 12:30 p.m.

**Location:** Live from the Occupational Health and Safety Agency for Healthcare in BC

By **webex** :

1. Please click the link below to join the meeting.

<https://msfhr.webex.com/msfhr/j.php?ED=116649342&UID=1105629882&PW=892d8d2029267d032f1e1a0754>

2. Enter your name and email address.

3. Enter the meeting password: EEWFgroup1

4. Click "Join Now".

5. To join the teleconference:

Call-in toll-free number: 866-469-3239 Meeting Number: 926 569 006

**To contact me on focus group day:** Please call me (Kim) at 778 235 2209.

See you on Monday!

Kim McLeod

## **Focus Group Moderator Guide**

### ***1. Warm-up and explanation (5 minutes)***

#### A. Introduction

1. Hello everyone, thank you for coming. We are now ready to begin.
2. My name is Kiera Keown and I work at the Institute for Work & Health. I will be the moderator for today's session. The goal of today's session is to get your feedback on the economic evaluation workbook that we sent you last week. My role today is to guide the discussion of the economic evaluation workbook. Sara Macdonald is the project coordinator for this economic evaluation workbook and will be taking notes to capture the information we need to improve the tool based on your feedback. Emile Tompa is the principal investigator for this project and is here to listen to your ideas and feedback.
3. Your presence is important and we thank you very much for your interest in this tool.
4. Before we start today's focus group I just want to give you a quick intro about what a focus group is. A focus group is a way for researchers to get feedback, in this case about a new product, from the people the product is being developed for. We are here to learn from you and we encourage you to share your ideas openly with one another. I am interested in all of your ideas, comments and suggestions; there is no such thing as a wrong answer.
5. I don't expect you all to agree – people have different opinions. The important thing is that we listen to one another and respect each other's points of view. Please wait until someone is finished speaking before offering your opinion.
6. All your comments are confidential and anonymous, used for feedback purposes only.
7. We will not have a formal break in the meeting but bathrooms are down the hall etc. Please help yourselves to coffee and muffins.
8. At the end of the session there will be an opportunity to fill in a short feedback survey which will help us to improve these sessions in future and will allow you to add any last minute feedback you may have forgotten to mention.

#### B. Purpose of the Software

1. As you know, we sent you the software last week and asked you to try the different components of it. We hope you were all able to do so. [PAUSE AND LOOK AROUND THE ROOM AND SEE IF ANYONE INDICATES THEY WERE NOT ABLE TO. THEN ASK – was everyone able to do the exercise?]. The workbook has been developed to assist workplaces in their decision-making related to OHS interventions. The workbook is designed to assist you in deciding whether a specific workplace intervention is either right for your company or to see if the intervention achieved the desired effect when you implemented it.
2. This workbook is still in the development phase and there will be much more content and detail added to it in the coming weeks and months. Also, over the summer we will be pilot testing this tool in workplaces and are currently seeking workplaces interested in participating in the initial testing phase of the full workbook. If you are interested in participating please talk to Sara at the end of the session.
4. So let's begin.

## ***II. Self-Introductions (10 minutes-20 minutes)***

### **A. Ask Each Participant to Introduce His/Herself.**

1. To begin our discussion let's take a few minutes to go around the room and have everyone introduce themselves. Perhaps you could state your name, your organization and how you would use this tool within your organization.

*Probe if necessary: Why do you think this tool is important?*

2. Great ... Thank you ... Now I think we each know a little about each other.

## ***III. Exploring the Economic Evaluation Workbook (90 Minutes)***

### **A. Specific Discussion about Workbook**

**Note to Moderator:** Provide printouts of the workbook pages.

1. As mentioned we sent you a prototype of the economic evaluation workbook and asked you to go through it.

2. Based on your experiences using the workbook in your workplace we would like your help in understanding what parts of the workbook work well and what parts can be improved.

3. We also have one version of the workbook here on the overhead if you'd like to direct us to certain pages for feedback or to show where you may have had difficulties or suggestions.

### **General**

- Would you use this tool in your workplace?
  - How would you use this tool in your workplace? For what purposes?
  - How could we improve the tool to assist you to use it in your workplace?
  - Would an accompanying training session increase the likelihood if you using this software?
  - Does your workplace currently undertake economic evaluations? If not, why? And how can we encourage you to do so?
- What are the characteristics of this tool that make it easy to use?
  - Did you find the "background" info helpful for getting started?
  - What other details would you like to see included in that section?
- What are the characteristics of this tool that make it difficult to use?
  - If you were unable to understand how it worked during the trial, why not?
- Is the workbook organized in a way that makes sense to you?
  - How can the layout be improved?
  - Is it too long?
- Is the output from this workbook presented in a way that is useful to you?
  - Do you have any suggestions to improve the summary page?
  - What pieces of information are important to you for decision-making?

### **Specific**

- Is it clear what we are asking for in the required fields?
- Do you have access to the required information?
- Was it clear how the different types of analyses varied and when you would use each one?
- Is there any information that we have not asked for that you think is relevant?
- What would you add or take away?
- Which terms/concepts have you noted that require further explanation?

- Was there anything additional you noted during the trial that you would like to mention now?
- Thanks so much for this great discussion. Now we would like to ask your help in a very different way. We want to come up with a name for the tool. We have 5 proposed names and would like to get your view of the best names and the worst names. The five names are on the flipchart. Each of you has 5 sticky notes with 1 being the best and 5 being the worst. Please use all 5 and place them next to your choices. We also have another flip chart and if you have another name that you think we should consider please write it.

#### ***IV. Closing (Allow 10 minutes)***

1. Thank you so much for participating.
2. Your time is very much appreciated and your insights have been very helpful.
3. We have a short survey we would like you to fill out to provide us with feedback on today's session. Please take a few minutes to answer these questions.
4. Before leaving please get your honorarium cheque from Sara.
5. Also, if you are interested in participating in the pilot testing phase of this project please sign up with Sara.

**Economic evaluation workbook focus group evaluation form**

	<b>5</b>	<b>4</b>	<b>3</b>	<b>2</b>	<b>1</b>
<b>Evaluating the workshop</b>	<b>Strongly agree</b>	<b>Agree</b>	<b>Neutral</b>	<b>Disagree</b>	<b>Strongly Disagree</b>
The objectives of the focus group were clear.					
The focus group was well organized.					
I was able to provide feedback.					
My views were taken seriously.					
There was adequate time to provide feedback on the workbook.					
Feedback was solicited from participants in a balanced way – everyone’s input was welcome.					
Comments or suggestions for improvement					
<b>Evaluating the Workbook</b>	<b>Strongly agree</b>	<b>Agree</b>	<b>Neutral</b>	<b>Disagree</b>	<b>Strongly Disagree</b>
The workbook meets at work.					
The workbook meets the needs of my workplace					
Main ideas and points are clearly identified.					
The workbook is laid out and organized logically.					
Important information is summarized.					
The workbook provides useful economic guidance and principles.					
I could use the workbook to help me in OHS decision making.					
The information included has a clear purpose.					
The workbook is “user-friendly”.					
How can any of these be improved?					

Date	Tester Name	Organization details	Operating System
<b>START</b>			<b>Comments</b>
<ol style="list-style-type: none"> <li>1. How did you find uploading the software?</li> <li>2. How much time did it take you to test the tool?</li> <li>3. How many incidents did you enter?</li> <li>4. Which analyses did you use? How many interventions did you enter?</li> <li>5. Did you use mock or real data for incidents/intervention?</li> <li>6. Where did you get the information necessary to use the tool?</li> <li>7. Did you notice a .dat file?</li> </ol>			
<b>GENERAL</b>			
<p>Do you have any general comments?</p> <ul style="list-style-type: none"> <li>- What was your first impression?</li> <li>- How do you think will be useful to your workplace?</li> <li>- What makes the tool easy to use?</li> <li>- Are there any sections that would make it hard for a new user to understand? Which?</li> </ul>			
<p>Design</p> <ol style="list-style-type: none"> <li>1. Do you have any comments on how the software pages look? How can the design be improved?</li> </ol>			
<p>Function</p> <ol style="list-style-type: none"> <li>2. What do you think of how the software functions?</li> <li>3. Moving between steps- tabbing between fields?</li> <li>4. What do you think of the number of steps required in the ICC/Analysis? 8 is not a lot.</li> <li>5. Did you know you could skip some?</li> <li>6. Does the sequence of steps/ items seem logical to you?</li> <li>7. Are there some sections that are better than others?</li> <li>8. How could we improve the tool generally to assist you to use it in your workplace?</li> <li>9. Would an accompanying training session increase the likelihood of you using this software?</li> </ol>			
<b>ABOUT</b>			
<p>Did you find the Understanding economic evaluations section helpful?          Did you find the sample helpful?          Did you find the glossary helpful?</p>			

<b>ICC</b>	
<p>Does your organization track incidents in a database now? How? What costs do you track? Do you have a database storing incidents now. Costs?  What are you interested in tracking in this database? Do you have access to the required information?</p>	
Did all the steps make sense to you?	
<p>Let's look at Step 1 for a moment. Do you find these categories and the choices helpful ... How the accident happened?-e.g. struck by, repetitive, fire, falls AND/OR What body part was affected? Head, arm... How the body part was affected. Broken, strain, sprain, Categories of worker? FT PT ?</p>	
<p>Let's look at Step 2 Is it clear what we are asking for in the required fields of the other steps?</p>	
<p>Are your benefit expenses different for different employees? How many rates do you have? Would you prefer to enter it each time you enter an incident or include it in the wages as you are to do here?</p>	
Were pop-ups helpful along the way?	
Is the summary sheet useful to you?	
Do you have any suggestions to improve the summary page?	
<b>DYOA</b>	
<p>Does your workplace currently undertake economic evaluations of interventions? How do you do them? How would you use this tool? Other general comments</p>	
<p><b>INTRO:</b> Is it clear on the buttons how the different types of analyses vary and when you would use each one? Learn more link?</p> <p><b>START PAGES:</b> Clear what the three options are? Did you review the example? Were you able to save the intervention? Is it here now? Did you test the What other details would you like to see included in that About/help section?</p>	

<p>General and Questions for sections below.</p> <p>Did all of the fields make sense?                  Did the cells function?                  Is there any information that we have not asked for that you think is relevant?                  Do you have any suggestions to improve the summary page?                  Were pop-ups helpful along the way?</p>	
Step 1 Description	
Step 2 Labour	
Step 3 Is it clear what role the incident cost calculator (ICC) database plays in the analysis sections?	
Step 4 Intervention	
Step 5 Productivity	
Step 6 Turnover	
Step 7 Insurance	
Step 8 How is the summary sheet useful to you?	

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