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IN THIS ISSUE

Featured Topics

"Measuring Non-Economic Loss: Quality-of-Life Values versus Impairment Ratings"

by Sandra Sinclair and John F. Burton, Jr. 1

"Research and Evaluation in Workers' Compensation: An Assessment and An Agenda"

by Glenn M. Shor 18

Digests of Important Publications

Measuring Non-Economic Loss: Quality-of-Life Values versus Impairment Ratings

by Sandra Sinclair and John F. Burton, Jr.

This article summarizes findings from a research project that compared two possible measures of the extent of non-economic loss (sometimes referred to as "nonwork disability") suffered by workers as a permanent consequence of their work injuries: (1) quality-of-life values based on the workers' assessments of the consequences of their injuries, and (2) clinical impairment ratings based on evaluations of the injuries by medical professionals.¹

The impetus for the project, which was conducted by the Workers' Compensation Board (WCB) of Ontario, was the criticisms that began in the mid-

1980s of the permanent partial disability benefits in the Ontario workers' compensation law and that culminated in the enactment (in 1989) of new workers' compensation legislation (Bill 162). Bill 162 replaced the previous singletrack pension award for workers with permanent consequences of their injuries and diseases with a dual-track award system that compensated separately for future wage loss (work disability) and for non-economic loss. The WCB initiated the study we are summarizing in order to provide Ontario policy makers with information on alternative measures of the extent of non-economic loss (that is, clinical



impairment ratings vs. workers' assessments) before the WCB formally adopted a schedule to determine the extent of non-economic losses.

Approximately 12,000 injured workers with permanent impairments were surveyed; their responses regarding the loss of enjoyment of life associated with 78 benchmark conditions were compared to the clinical impairment values derived from the American Medical Association's *Guides to the Evaluation of Permanent Impairment* for each of the 78 conditions.² The study's methodology and findings are discussed in greater detail below, after we first provide an overview of Ontario's approach to compensating permanent impairments.

Background

An Introduction to Permanent Disability Benefits

The consequences of a work-related injury or disease can be categorized as temporary or permanent, a distinction that has an important bearing on the types of benefits pro-

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Second class postage paid at Horsham, PA. Copyright © 1994 by LRP Publications. All rights reserved. vided by any workers' compensation program.³ The temporary disability period refers to the period from the onset of the injury or the disease until maximum medical improvement (MMI) has been achieved; the permanent disability period refers to the period following MMI.

Most workers injured on the job fully recover by the date of MMI and

Approximately 12,000 injured workers with permanent impairments were surveyed....

thus have no permanent consequences of their injuries. For those workers with relatively serious injuries (the concern of this study), several permanent consequences are possible. Of particular interest are the permanent consequences shown in Figure A because they are the focus of most of the debate concerning the optimal design of permanent disability benefits in a workers' compensation program.

A permanent impairment (PI) is any anatomic or functional abnormality or loss that remains after maximum medical improvement has been achieved. Examples of permanent impairments are an amputated limb or an enervated muscle. The impairment probably causes the worker to experience functional limitations (FLI). Physical performance may be limited in such activities as walking, climbing, reaching, and hearing; the worker's emotional and mental performance also may be limited. The distinction between permanent impairment and functional limitations is usually not made in workers' compensation, since most programs simultaneously assess permanent impairment and functional limitations to produce what is termed a "permanent impairment rating." In the balance of this article, we will use the term "permanent impairment" to encompass both the permanent impairment and the resulting functional limitations.

Permanent impairment can lead to two types of disability. Work disability (WD) refers to the loss of earning capacity or loss of actual earnings that results from the permanent impairment, while nonwork disability (ND) — which in Ontario is called non- economic loss (NEL) — includes the loss of the capacities for other, non-workrelated aspects of life, including recreation and the performance of household tasks, for example.

Compensation for the Consequences of Permanent Impairment: The Single-Track Approach

Prior to the passage of Bill 162 in the Ontario legislature in July 1989, the workers' compensation benefits that were intended to compensate workers for the consequences of permanent impairment consisted of a single award whose underlying objective was the compensation of work disability; that is, the purpose of the award was to replace the lost wages suffered due to the ongoing effects of the impairment. The extent of wage loss was estimated from the nature and degree of an injury by reference to a permanent disability rating schedule,4 which consisted of a list of clinical conditions and the percentage of impairment of earning capacity associated with each condition. For example, the total loss of a thumb received a 20 percent permanent disability rating, which meant the worker received a 20 percent impairment of earnings capacity award; ninety percent of the worker's preinjury wage would then be multiplied by 20 percent to determine the actual dollar value of the pension award, which was paid on a regular basis for the rest of the worker's life. Thus, the percentage of impairment (or functional loss) was used as a proxy measure of wage loss and the award was given regardless of the actual impact of the injury on income.

The Ontario approach for permanent partial disability benefits prior to 1989 is thus an example of what Burton termed the "Operational Basis for Work Disability Benefits I (OBWDB1): Benefits Based on the Extent of Impair-

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ment and / or Functional Limitations," which is one variant of a prospective benefits approach.⁵

There are two distinctive features of the prospective benefits approach. First, although the presumed rationale for the permanent disability benefits is the actual loss of wages resulting from the work-related injury or disease, these benefits rely on proxies for that actual wage loss. In the case of Ontario's pre-1990 permanent partial disability benefits, the permanent disability rating (which was a permanent impairment and/or functional limitations rating) was the proxy used for actual wage loss that was presumed to result from the work-related injury. The second feature of the prospective benefit approach is that the decision about the amount of the permanent disability benefits to be paid is made after the worker's medical condition has stabilized but before most or all of the actual wage loss (for which the benefits are intended) occurs.

Disability rating schedules that are part of the prospective benefit approach have been used by workers' compensation programs for many years to facilitate and standardize the process of determining the amount of permanent partial disability benefits that will be paid for work disability. Although the prospective benefits approach thus is relatively efficient, unfortunately this approach is also inequitable: workers with similar degrees of impairment and similar pre-injury wages receive similar permanent disability benefits, even if their post-injury wage losses due to their injuries are very different.

In Ontario, this prospective benefit approach could potentially (and, in fact, did) lead to situations where some workers returned to work at their preinjury wage levels but nonetheless still received a lifetime pension for the permanent impairment in addition to their regular earned income, while other workers (who had the same impairments as the first group) were unable to return to gainful employment and thus had only their permanent impairment pension as income. Temporary pension supplements were used in Ontario to redress the most serious cases of inequity, where the actual loss of earnings was significantly greater than otherwise predicted from the nature and degree of injury. However, the supplements were not permanent and the approach was never fully satisfactory to either the affected workers or policy makers in Ontario.

Use of a rating schedule and the single-award approach to determining permanent impairment awards were not unique to Ontario; indeed, most states in the United States still use the approach. The approach probably originated from the assumption that, within the relatively narrow spectrum of occupations covered by workers' compensation earlier in the century, a reasonably high correlation existed between the degree of physi-

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This article is a revised version of an article that Sandra and I co-authored for a forthcoming volume entitled *Research in Canadian Workers' Compensation* (IRC Press, Richard Chaykowski and Terry Thomason, editors). Sandra



Sandra Sinclair

had primary responsibility for the research project discussed in this article; I served on the Advisory Committee and was a consultant to the project. I appreciate the assistance that Sandra provided in producing this article for the *Monitor*. The findings from the research project are provocative; I invite comments from *Monitor* readers.

cal impairment or functional loss and the extent of earnings lost. Recent studies have demonstrated that, even if such a high correlation might have existed in the past, there is no longer a close relationship between the amounts of actual wage loss due to work-related injuries and the permanent disability ratings based on the extent of permanent impairment and/ or functional limitations.⁶

Another major flaw with the singlebenefits approach relied on in Ontario prior to the 1989 legislation is that the sole (or at least dominant) purpose of the permanent disability benefits was to compensate for work disability. There was no explicit consideration of nonwork disability (non-economic loss). Thus, even if arguably the singlebenefit approach did a reasonably good job of matching the amount of permanent partial disability benefits to the extent of work disability, the approach made no effort to vary benefits among workers according to the degree of their non-economic losses (nonwork disability). Thus, there was also an equity problem for the nonwork disability consequences of work-related injuries, since, in effect, workers without a work disability were compensated for nonwork disability while those with a work disability were not.

Compensation for Permanent Impairment: The Dual-Award Approach

One reason for Bill 162, formally entitled An Act to Amend The Workers' Compensation Act (Act), was to attempt to rectify the equity problem for nonwork disability by replacing a single-award benefit system with a dual-award approach for the permanent consequences of work-related injuries and diseases. The Ontario legislature thus explicitly acknowledged that permanent impairment caused by workplace injury or illness creates the two types of harm shown in Figure A: first, workers' capacity to enjoy their usual everyday life (non-economic loss or nonwork disability); and second, their capacity to earn their usual income from work (work disability).

The single-benefit approach based on a clinical rating was ill-fitted to compensate for either of these types of harm. Thus, a dual-award system was introduced in Ontario with a future economic loss (FEL) award specifically designed to compensate injured workers for their loss of earning capacity and a non-economic loss (NEL) award to compensate for the loss of enjoyment of non-working life.

The dual-award approach ... was expected to result in a redistribution of benefits.

The dual-award approach to compensating the consequences of permanent impairment was expected to result in a redistribution of benefits. Workers would receive a similar amount of non-economic loss compensation for similar levels of impairment. In addition, workers with income loss, regardless of the degree of impairment, would receive an economic (future economic loss, FEL) award commensurate with the loss of earning capacity. The operation of the FEL benefits in Ontario, while an important topic, is outside the scope of the present article.

Determining Non-Economic Loss

In reports for the Ontario Ministry of Labour and the Ontario Workers' Compensation Board, both Weiler⁷ and Burton⁸ supported the continued use of the rating schedule approach for determining non-economic loss awards under the then proposed dualaward system for Ontario, rather than assessing the extent of non-economic loss in each case by examining the actual consequences on the particular worker. At that time, Burton also recommended the American Medical Association's Guides to the Evaluation of Permanent Impairment (AMA Guides) in preference to other schedules he had

reviewed because of the superior operational characteristics of the AMA schedule.⁹ However, both Weiler and Burton agreed that there was a need for careful studies to examine the degree of correlation between the clinical impairment rating values from the AMA *Guides* and the actual non-work disability or loss of enjoyment of life typically experienced by workers with particular impairments.

The introduction of legislation in Ontario that included provision for a non-economic loss award thus created the impetus for the non-economic loss research project undertaken by the Workers' Compensation Board. The non-economic loss research study was designed to examine the relationship between the clinical measurement of impairment and the measurement of loss of enjoyment of life. The intent was to complete the research prior to the Workers' Compensation Board adopting a permanent schedule for the purpose of determining non-economic loss.10

The specific purposes of the research commenced by the Workers' Compensation Board in September 1988 were twofold: first, to determine the appropriateness of using the AMA Guides' permanent impairment values as proxy measures of the loss of enjoyment of life for non-economic loss awards under the Workers' Compensation Act (Bill 162); and, second, to use the research results in refining a schedule to measure more accurately the loss of enjoyment of life if important differences were found between the AMA Guides' permanent impairment ratings and the loss of enjoyment of life or quality-of-life (Q of L) values.

Non-Economic Loss Research Methodology

Role of the Methodological Advisory Committee

A research undertaking of this nature required the expertise of a panel of external authorities on an ongoing basis. Thus, a Methodological Advisory Committee (Committee) of inter-

national experts in the fields of workers' compensation, health economics, quality of life measurement, and medicine was formed in late 1988. (See Appendix A.) The Committee met frequently during the course of this study to provide consultation and advice to the Workers' Compensation Board research staff. Representatives of the Committee also participated in the presentation of the final research results to the Board of Directors of the Ontario Workers' Compensation Board in June 1991.

Quality of Life Approach

The concept of an non-economic loss award to compensate for the loss of enjoyment of life associated with permanent impairment was proposed in the United States by the National Commission on State Workmen's Compensation Laws in 197211 and in Canada by Harvard Law School Professor Paul Weiler in 1980,12 and has subsequently been adopted in several jurisdictions.13 However, this study is, to the best of our knowledge, the first that investigates the relationship between clinical impairment ratings for non-economic loss and quality-of-life values. All other jurisdictions that have adopted the dual-benefit approach have implicitly assumed that the impairment rating schedules provide appropriate values for the loss of quality of life.

While the measurement of quality of life thus has no precedent in the development of a workers' compensation benefits schedule per se, the impact of an injury on the quality of life has been studied in a number of other areas where monetary valuation for a loss is the ultimate outcome. For example, the concept of quality of life is an important factor in determining pain and suffering or general damages awards in the tort system. The measurement of the quality of life is also frequently employed in economists' evaluations of the costs and benefits (or utility) associated with various treatment programs or health care interventions.14

The measurement of the quality of life frequently involves the valuation

of specific medical conditions, or levels of disability, by ascertaining the preferences of individuals or groups for living with particular medical conditions or treatment outcomes. Surveys of opinions or preferences of relevant populations for alternative levels of disability is a measurement technique that has been used extensively in the development of quality-of-life standards in health care, economic, and social sciences research over the past twenty years.

The question of whose values to consider in measuring the loss of quality of life is an important research issue. The health care research literature has argued that the preferences or values of consumers of health care services should be considered in making health care decisions that will potentially affect them.

The question of whose values to consider ... is an important research issue.

In Ontario, the Workmen's Compensation Board's Permanent Disability Rating Schedule,¹⁵ which was previously used by the Workers' Compensation Board as a proxy measure of the impairment of earning capacity for permanent disability awards, had repeatedly been criticized by the injured worker community for a number of reasons, including the schedule's failure to take into consideration the views of injured workers. It was thus deemed appropriate, in undertaking this research on the relative values of loss of enjoyment of life for different impairment conditions associated with workplace injury and disease, to survey injured workers with permanent impairments. However, since members of this population might also be the recipients of non-economic loss awards for future injuries or diseases, a potential for bias did exist.¹⁶ Thus, a control group representative of the working age general population of Ontario was also surveyed.¹⁷ Excluded from the general population sample were individuals who were currently or who had recently been workers' compensation claimants or who had an immediate family member in that situation.

The Non-Economic Loss Survey

The non-economic loss survey, which was conducted between August 1988 and January 1991, involved the voluntary participation of approximately 12,000 injured workers, plus 300 individuals from the general population of Ontario who were matched to a subset of injured workers.18 Seventyeight medical conditions covering a wide range of impairments were selected, with the assistance of Workers' Compensation Board physicians, as subjects for videos. The videos portrayed the limitations and adaptations to lifestyle required of actual injured workers (a minimum of two workers per condition)19 as a result of the permanent impairment condition experienced. A neutral commentator provided a voice-over description as the workers both discussed their condition with a therapist and demonstrated various aspects of daily living now that they had been acclimatized to their impairment.

Each survey respondent participated in a half-hour interview, which included viewing 4 or 6 randomly assigned videos (from the total of 78 possible benchmark conditions); respondents did not view a video of their own condition. After watching a video, respondents were asked to rate, on a visual analogue scale, the loss of enjoyment of life (absent any economic impact) they believed they would suffer if they sustained a similar impairment, given the circumstances portrayed in the video they had viewed. These ratings were on a scale of 0 to 100, with 0 representing normal health and 100 representing death.

The end points of normal health ("for a person of your age") and death were selected for two reasons. The primary reason was to ensure comparability of the quality-of-life values derived in this research with those of other researchers. These end points

(healthy and dead) are those most commonly used by health care researchers to measure the health-related quality of life.

The second reason was to ensure that there were well-defined, as well as commonly and easily understood, end points. Respondents readily identified individuals of their own age who enjoy good health - the positive end point of normal health. The negative end point of death is considered by many researchers as a more similarly conceptualized and more consistently valued end point than other serious medical conditions such as quadriplegia or coma, for example. Respondents' knowledge of, and their evaluations of, the latter conditions may vary considerably, which would result in an end point for the rating scale which was not clearly understood.

During the development of the final interview protocol, a number of specific methodological issues, including the impact on the quality-of-life values scale of a video case study approach vs. the written case profile normally used in quality-of-life research, were examined in pilot studies. There were no statistically significant differences between the values elicited using the videos²⁰ and those resulting

Notes for Table 1

- ** Statistically significant difference exists between AMA PI and Q of L value at 1% level of significance.
- Statistically significant difference exists between AMA PI and Q of L value at 5% level of significance.
- 1 These conditions would have received a 0.4% PD award under the Ontario Permanent Disability Rating Schedule in use prior to Bill 162. The impairment is, however, not of significant clinical consequence to warrant a rating under the AMA Guides.
- 2 Mean Injured Worker (IW) values shown here are based on the total sample of injured workers, not the sub-set matched to the general population (CG).
- 3 Blank values for conditions in the CG column indicate that these videos were not viewed by the general population sample.
- 4 Body system groupings: ULE is upper and lower extremity (MSK); SS is sensory systems; PS is pelvis and spine (MSK); NS is nervous system and chronic pain; and CR is cardiovascular and respiratory. N.I. means not included.

PAGE 6

Table 1. Comparisons of AMA PI Ratings with Mean Q of L Values fromInjured Workers (IW) and Control Group (CG) for Various Videos

Video Title	AMA PI	Mean Q of L Values		Body System⁴
Amp of part of tip of finger '	0	10 **		N.I.
Crusning to the tinger '	0	12 **	15 **	
Single broken finger, Dom	1	13 **	11 **	ULE
Vibr induced white finger A	2	23 **		SS
Elbow injury - Dom	3	30 **	25 **	ULE
Elbow injury - Non-Dom	· 3	25 **	23 **	ULE
Broken wrist B, Non-Dom	3	22 **		ULE
Broken wrist B, Dom	4	25 **	20 **	ULE
Shoulder injury B, Non-Dom	4	28 **	25 **	ULE
Injuncto wrist B. Dom	5	29	20	ULE
Amp of thumb Non-Dom	5	20 **	23 **	ULE
Amp of part of finger B. Dom	5	21 **	23 **	ULE
Dermatitis A	5	35 **		SS
Amp of thumb, Dom	5	25 **	30 **	ULE
Broken pelvis	5	57 **	70 **	PS
Amp of part of finger B, Non-Dom	5	19 **	22 **	ULE
Broken heel bone	5	28 **	40 **	ULE
Injury to lower back - D	6	52 **		PS
Amp of part of finger A, Non-Dom	6	21 **	25 **	ULE
Amp of part of finger A, Dom	7	22 **	20.**	ULE
Broken wrist A, Dom	7	24	39	ULE
Shoulder injury D. Non-Dom	7	20 **	21 **	ULE
Shoulder injury D. Dom	7	30 **	30 **	ULE
Broken hin	7	36 **	38 **	ULE
Injury to knee joint	8	32 **	39 **	ULE
Several broken fingers B, Non-Dom	8	21 **	20 **	ULE
Broken bones in lower leg	8	35 **	41 **	ULE
Shoulder injury A, Non-Dom	8	38 **	38 **	ULE
Several broken fingers B, Dom	8	24 **	39 **	ULE
Broken ankle - B	9	30 **	33 **	ULE
Injury to wrist A, Dom	9	32 **	37 **	ULE
Vibr induced white finger B	9	34 **		SS
Hearing loss A	9	38 **	00.00	55
Shoulder Injury A, Dom	9	30 **	32	ULE
Chronic pain - A	10	63 **		NS
Dermatitis B	10	35 **		SS
Injury to lower back - B	10	55 **		PS
Broken ankle- A	11	37 **	41 **	ULE
Broken elbow, Non-Dom	11	27 **		ULE
Injury to knee ligaments	11	34 **	35 **	ULE
Broken elbow, Dom	11	38 **		ULE
Asthma A	13	46 **		CR
Shoulder injury C, Non-Dom	13	35 **	28 **	ULE
Shoulder injury C, Dom	14	39 **	36 **	ULE
Hearing loss B	16	37 **	07 **	55
Amp of several fingers D, Non-Dom	17	37 **	36 **	ULE
Amp of several fingers C. Non-Dom	18	37 **	37 **	ULE
Amp of several fingers C. Dom	19	40 **	60 **	ULE
Chronic pain - A	20	65 **		NS
Facial burn	20	54 **		SS
Injury to lower back - A	20	53 **		PS
Injury to lower back - C	20	60 **		PS
Amp of several fingers B, Non-Dom	23	39 **	46 **	ULE
Eye loss	24	43 **		SS
Amp of several fingers B, Dom	25	41 **	49 **	ULE
Amp of several fingers A, Non-Dom	29	43 **	55 **	ULE
Head injury - B	30	64 **		NS
Amp of acyaral fingers A. Dom	30	0/	57 **	
Several broken fingers A, Non-Dom	33	40	50 **	ULE
Several broken fingers A. Dom	35	43 **	46 **	ULE
Below knee amp - B	35	49 **	49 **	ULE
Below knee amp - A	38	57 **	64 **	ULE
Heart attack	45	65 **		CR
Below elbow amp B, Non-Dom	49	58 **	54 *	ULE
Amp of hand, Non-Dom	49	53 **	54 **	ULE
Below elbow amp A, Non-Dom	49	57 **	57 **	ULE
Above knee amp - B	50	61 **		ULE
Below elbow amp B, Dom	54	56 **	65 **	ULE
Amp of hand, Dom	54	56 **	51	ULE
Acthma B	54	61*	01	CP
Head injury - A	75	79*		
noau injury - A	15	10		110

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from the written descriptions of the same conditions, and so the Workers' Compensation Board concluded that the video approach produced valid results.

Research Findings

The Survey Data

The non-economic loss survey resulted in loss of enjoyment of life or Ouality-of-Life (O of L) values from a large number of injured workers and a general population control group on each of the 78 benchmark conditions. These data were examined to determine whether statistically significant differences existed between the clinical impairment rating of a condition (that is, the permanent impairment value from the AMA Guides, hereafter referred to as the AMA PI) and the loss of enjoyment of life value assigned to that condition (that is, the Q of L values derived from the surveys of injured workers and the control group). A finding of statistically significant differences between the AMA PI values and the Q of L values, on the whole, would lead to the conclusion that the AMA PI values are not appropriate proxy measures for determining non-economic awards, assuming that the Q of L values are in fact appropriate measures of non-economic loss.

In examining the outputs of quality-of-life measurement, group mean scores are the values usually used in analysis. Individuals vary greatly in their health state preferences and these differences are not fully explained by the usual demographic characteristics, such as age, socio-economic status, religion, illness, and occupation.²¹ Sackett and Torrance, for example, reported a standard deviation of approximately 0.30 for individuals valuing the same medical condition on a 0-1 utility scale.²² However, the imprecision and variability inherent in individual measurements is ameliorated by taking the mean of a large group of subjects. Moreover, group mean values have been reported to be remarkably stable, regardless of the make-up of the group.

That is, given a level of knowledge about a medical condition, the preference values for that condition remain quite similar across very different large groups of respondents.

The group mean respondent values from the survey for each of the 78 benchmark conditions constitute the Q of L data used in this study. Table 1 shows the mean Q of L values for the 78 conditions from surveys of the injured worker (IW) and control group (CG) populations, as well as the corresponding clinical impairment rating (AMA PI) value.

Interpretation of Non-Economic Loss Research Findings

The primary focus of our study was to determine if, and under what circumstances, the quality-of-life or non-economic loss values derived from survey participants (both injured workers and the general population control group) were different than the permanent impairment ratings from the American Medical Association *Guides* (AMA PI) for the 78 benchmark conditions. In interpreting the data from the non-economic loss survey, we acknowledge that there is no definitive standard against which to compare the accuracy — or correctness — of the values for the purpose of measuring loss of enjoyment of life. AMA PI values and Q of L values are both subjective measures, derived from different perspectives, of the effects of the permanent consequences of injury or disease on an individual.

The AMA *Guides* measure permanent impairment; impairment is defined there as "an alteration of an individual's health status that is assessed by medical means."²³ Impairment is what is wrong with a body part or organ system and its function.²⁴ The *Guides* do not purport to measure the extent of disability that is associated with a particular impairment, but rather simply assign a percentage value (determined by physicians) to the degree of total body impairment that is inferred from a specific set of clinical observations.

The *Guides* contain 12 separate and independently developed "guides," each of which represents a specific body system (that is, there is one chapter on the musculoskeletal system, another chapter on the respiratory system, a third chapter on the cardiovascular system, and so on). The basis of the development of the relative values



JULY/AUGUST 1994

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for the various impairments in the AMA Guides is not clear from the publication itself. In fact, the values reflect the collective judgement of the several independent groups of physicians who prepared the various chapters of the Guides according to their clinical specialty. (This procedure was confirmed in personal communication with the Guides' past editor, Alan J. Engelberg.) The number of physicians involved in producing any one chapter was relatively small.

The Q of L values, on the other hand, represent the assessments of significant numbers of individuals on the degree of loss of enjoyment of life they believe they would experience as a result of the same set of clinical circumstances.

... for most impairments, the Q of L values were higher....

Thus, there need not be any prior expectation that the AMA PI and Q of L values will be the same. The degree to which the Q of L survey values differ from the AMA PI values is presumably indicative of the fact that different underlying concepts are being measured by each scale: impairment and non-economic loss are different.

Analysis Across All Benchmark Conditions

The AMA PI values and the mean Q of L survey values from the two samples were initially compared; Figure B (which is based on data in Table 1) provides a graphic representation of the clinical impairment ratings and the Q of L survey responses from the injured worker sample. If the AMA PI values and the Q of L survey values had been similar, they would have clustered along the straight line with the 45 degree angle. The fact that the data points are almost all above the straight line indicates that, for most impairments, the Q of L values were higher than were the corre-

PAGE 8

Table 2. Mean Values and Mean Differences between Control Group(CG) and Injured Workers (IW)¹ by Percentage of AMA PermanentImpairment Rating (AMA PI)

AMA PI Rating	Ν	Mean Value		Difference
		CG	IW	(CG-IW)
1.0 - 5.0%	291	22.6%	26.8%	-4.2%**
5.1 - 10.0%	316	30.6	33.7	-3.1 *
10.1 - 25.0%	203	39.1	40.1	-1.0
25.1 - 100.0%	403	54.4	54.0	0.4

Notes: * Indicates a statistically significant difference at the 5% level of significance. ** Indicates a statistically significant difference at the 1% level of significance.

¹ Table 2 presents the results of an analysis of the differences between the Q of L values for the general population control group and a matched subset of injured workers. (Injured worker values in Table 1 are on the total injured worker sample.)

sponding AMI PI values.

Several important conclusions can be drawn from the results presented in Figure B and Table 1. First, injured workers consider the loss of enjoyment of life to be greater than the impairment value that would be assigned to the condition using the AMA *Guides*. As is evident in Table 1, injured worker values on the loss of enjoyment of life are significantly higher than the associated AMA PI values for the majority of conditions. The control group values on the loss of enjoyment of life are also higher than the AMA PI values.

Subsequent empirical tests confirmed that the AMA PI values and the mean Q of L survey values from the two samples were indeed statistically different (that is, there was an extremely low probability that the observed differences were attributable to chance). In Table 2, for a given condition (of the 78 choices), the Q of L ratings for the injured worker and for the control group were compared. For example, for those conditions with AMA PI ratings of 1.0 to 5.0 percent,





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the injured workers (IW) provided Q of L values that, on average, were 4.2 percent higher than the Q of L values of the control group.

Several important conclusions can thus also be drawn from the results presented in Table 2. First, although the control group values for the quality of life are higher than the corresponding AMA PI values, they are lower than the injured worker values for those conditions - and the difference between the control group and injured worker values are statistically significant for the first two categories (i.e., when the clinical impairment rating is between 1 percent and 10 percent). That is, for less clinically severe conditions, the control group considers the loss of enjoyment of life to be significantly less than does the injured worker group. However, injured worker and control group values are not significantly different with respect to the middle and high range AMA PI values (i.e., 10.1 to 100.0 percent).

The data in Tables 1 and 2 indicate that the injured worker Q of L values are not significantly different from the AMA PI values for those conditions where the clinical impairment rating is high. The Q of L values and AMA PI values converge as the impairment ratings become more severe. Thus, there appears to be greater agreement about the severity of loss of enjoyment of life and the degree of permanent impairment for conditions considered more severe clinically.

On the other hand, a "sanctity of the body" effect appears to be evident among both the injured worker and control group respondents even with respect to the least severe clinical impairments. "Sanctity of the body" is the phrase used here to describe the observation that, regardless of how minimal the severity of the clinical measure of an impairment is, there appears to be a significant loss of quality of life associated with the impairment. Thus, as shown in Table 1, the four conditions that received the lowest AMA permanent impairment ratings — ranging from 0 to 1 percent AMA ratings received quality of life ratings of from 10 to 16 percent from injured workers. The members of the control group were not asked to assess the two conditions

with0percent AMA ratings, but for the two conditions that the AMA *Guides* rated at 1 percent, the control group members provided quality of life ratings of 11 and 15 percent.

Analysis by Body System

The 78 benchmark conditions selected for the study were identified on the advice of experienced Workers' Compensation Board physicians who conduct permanent impairment examinations. The selection criteria for the benchmark conditions were twofold: first, the frequency of occurrence in Ontario workers' compensation permanent impairment cases; and second, representativeness — in terms of the injury type and severity of impairment — in the Ontario worker population with permanent impairments. As

... a "sanctity of the body" effect appears to be evident....

a result, the 78 benchmark conditions constituted impairments from 8 of the 12 different AMA *Guides* "body system" chapters.²⁵

The Q of L values for 76 of the benchmark conditions and the corresponding AMA PI values were categorized by relevant body systems (which correspond to individual or related chapters in the AMA Guides).26 There are several findings from the results that are presented in Figure C. First, the data points on the 76 benchmark conditions can be readily sub-divided into five groupings related to the body systems chapters of the AMA Guides, with musculoskeletal (MSK) impairments subdividing into injuries of the extremities and injuries of the spine and pelvis. Second, some body system classifications have few data points (that is, are represented by few of the 76 benchmark conditions) and these are limited to a narrow range of AMA PI values (for example, sensory systems, which includes visual and hearing impairments).

Third, the relationship between AMA PI and Q of L values vary, depending on the particular body system classification. For example: a 10 percent (AMA PI) impairment of the musculoskeletal system, and a 10 percent (AMA PI) impairment of the nervous system, receive very different loss of enjoyment of life values: 32 percent for the former and 62 percent for the latter, respectively. This finding, which we term the "body system" effect, is apparent across most of the five body system groupings listed in Figure C. The "body system" effect appears to reflect in part the workers' view that those benchmark conditions where recurrent episodes of pain, which occur over a number of years and which are characteristic of the natural history of the condition (for example: pelvis and spine MSK), have considerably greater impact on the quality of life than do other conditions with similar AMA PI values (for example: upper and lower extremity MSK). The majority of these upper and lower extremity conditions were the result of acute trauma. Subsequent to rehabilitation, significant periods of ongoing pain are not usually characteristic of the residual impairment.

Discussion of the Major Findings and Conclusions

The AMA *Guides*' Systematic Tendency to Undervalue the Loss of Enjoyment of Life

One of the purposes of this study, as previously noted, was to determine the appropriateness of using the AMA *Guides*' permanent impairment values as proxy measures of loss of enjoyment of life for non-economic loss awards under the Workers' Compensation Act (Bill 162).

Figure B provides a convenient way to assess the appropriateness of using the AMA permanent impairment (PI) values as a proxy for the loss of the enjoyment of life. If the PI values were a perfect proxy for the Quality-of-Life (Q of L) survey results, the triangles (each of which shows the correspon-

dence between the PI value and Q of L value for a particular medical condition) would have all fallen exactly on the diagonal line. A more realistic test of the validity of using the PI values as proxies for the loss of the enjoyment of life would have required the triangles to be located relatively near the diagonal line, with about as many observations above the line as below.

Neither of these tests of the appropriateness of using AMA PI values as a proxy for the loss of the quality of life is satisfied. Instead, with minor exceptions, the triangles lie well above the diagonal line, which means that the AMA PI values systematically underpredict the loss of the quality of life that workers associate with the various permanent impairments. It should be emphasized that the data in Tables 1 and 2 make clear that it is not just injured workers, but also the control group (consisting of survey respondents polled from the general Ontario population), who systematically reported losses of the quality of life that exceeded the AMA Guides' clinical impairment ratings for a wide range of impairments. We are unaware of any previous research that has demonstrated this systematic tendency of the AMA PI ratings to "undervalue" the loss of enjoyment of life associated with a large number of impairments encompassed by the AMA Guides.27

"Body System" Effect

The differences between the Q of L values and the AMA PI values, when categorized by body system groupings (see Figure C), is an interesting and significant research finding that also has not been previously identified. However, there are several caveats that pertain to this finding. Most of the body system categories in Figure C (with the exception of the upper and lower extremity grouping) are represented by only a few impairments, and thus it would be inappropriate to generalize this finding to all body system categories listed in the AMA Guides. It would also be inappropriate to simply assume that the differences demonstrated across the body systems shown in Figure C were similar across the full range of AMA PI ratings for those body systems.

The small number of data points per body system grouping does not, however, mean that the "body system" effect evident in Figure C is random, since in fact there are a large number of Q of L survey responses from which the mean value of the benchmark conditions is computed.

"Pain" Effect

The injured workers' and control group's responses to the video presentations of conditions associated with the spine, pelvis, or Chronic Pain Syndrome (involving the back and extremities) suggest that a differential response to the impact of pain — the "pain" effect—is associated with these impairments — more so than with any of the other 78 benchmark conditions. We postulate that the survey participants concluded, on the basis of the videos, that these particular impair-

The effect of pain may have been differently perceived by the physicians....

ments had a significant impact on the quality of life, over and above the physical limitations suffered due to the nature of the conditions.

The effect of pain may have been differently perceived by the physicians who, based on their clinical experience, derived the AMA Guides' PI values for these impairments. These physicians may have viewed the pain element as a more episodic and an integral component of these impairments rather than as an additional element in the impairments. Thus, the AMA PI ratings by physicians for these benchmark conditions are considerably less than the corresponding Q of L values, apparently because the impact of pain on one's enjoyment of life is considered more important to the survey respondents than to the physicians who developed

the clinical impairment ratings for the *Guides*. However, this is a speculative conclusion, as there are few impairments from Table 1 that are included in the spine, pelvis, or Chronic Pain Syndrome category.

"Sanctity of Body Image" Effect

A fourth notable finding is related to what appears to be a "threshold" effect at the lower end of the Q of L scale. Several videos in the upper and lower extremity grouping portray conditions with minimal clinical impairment and with clinical impairment values that have an AMA PI rating of 1 percent or less. However, even these conditions result in Q of L values of between 10 and 16 percent; as indicated by Table 1, there are statistically significant differences between these Q of L values and the corresponding AMI PI ratings. This difference may represent a "sanctity of body image" effect (that is, any condition - regardless of the level of permanent impairment as assessed by a physician — is valued by the injured person as having a significant impact on one's view of oneself or on the overall quality of one's life). Several other researchers have noted a similar phenomenon, including Torrance,28 Kaplan,29 and Wolfson,30 although not on medical conditions that are directly comparable.

Clinical impairment values that have an AMA PI rating of 10 percent or less are also characterized by a "threshold" effect with respect to the Q of L values for the control group; that is, the Q of L values are much higher (they range from 11 percent to 70 percent) and, as indicated by Table 1, there are statistically significant differences between these Q of L (control group) values and the corresponding AMI PI ratings. However, as indicated by Table 2, the Q of L (control values) are, on average, lower than the Q of L (injured worker) values for AMI PI ratings of 10 percent or less, and the differences between the Q of L values for the two groups of respondents are statistically significant; because of the previously mentioned potential "bias" (self-interest) in the injured worker re-

PAGE 10

sponses, the control group responses are more "conservative" ratings for the loss of quality of life caused by various impairments. Nonetheless, in our view, the control group responses are not necessarily the "truer" gauges of the actual losses in the quality of life resulting from impairments; as also previously noted, a worker who has already experienced the consequences of one type of impairment on daily living may be a better judge of the likely loss in quality of life associated with another type of permanent impairment than a control group member who has never experienced an injury resulting in a permanent impairment.

Thus, it appears that the magnitude of this "threshold" effect may be sensitive to the composition of the respondent group. Nonetheless, because the magnitude of the "sanctity of body image" effect with respect to minimal impairments (that is, those impairments with low AMA PI ratings) reported here appears so marked — even for the control group respondents this "threshold" effect finding warrants further study.

Clinical Impairment Ratings as Proxy Measures of Loss of Enjoyment

Clearly, the Q of L measures from the surveys are significantly different (both statistically and substantially) from the AMA PI values on similar conditions. We conclude that the AMA impairment ratings are not an appropriate proxy measure of the loss of enjoyment of life that results from injuries with permanent consequences. From the results of this study, an adjusted Q of L Scale for use in determining non-economic loss awards could be developed from the findings on the upper and lower extremity conditions, with some adjustment for the impairment of body image effect.

The findings also suggest a number of areas for further exploration, and an Interim Q of L Scale might be considered as a first step in the development of a series of scales based on the part of body effect, if further research corroborates the existence of this phenomenon.

The Impact of the Research Project in Ontario

An Interim QofL scale, as suggested above, was in fact developed and was provided to the bipartite Board of Directors of the Workers' Compensation Board of Ontario in June 1991, as part of the presentation of the non-economic loss research results.

While the Board of Directors found the research results of considerable interest, the findings also prompted a great deal of debate among the board.

The cost implications of adopting the Q of L values ... are significant....

The cost implications of adopting the Q of L values to determine non-economicloss awards are significant³¹ and the use of Q of L values as the primary approach to determining administrative awards in the Ontario Workers' Compensation Board would have been unique.

A process of consultation with the workers' compensation stakeholder community was subsequently undertaken to apprise a wider audience of interested parties of the research findings and to determine if a consensus existed to make it feasible to implement a Q of L values scale for determining non-economic losses.³²

Consultations with the bipartite, legislative Working Committee on Bill 162 Policies and Regulations, and an ad hoc External Consultative Group representing employers and workers, took place over several months. This entailed discussion of the research findings themselves and of a number of different strategies for incorporating the results into an administrative schedule. The parties agreed on the importance of developing an award system whose benefits would be equitable and accurately determined; they also agreed that the AMA Guides, though flawed, represented the most comprehensive

and detailed assessment system currently available for measuring clinical impairment. However, the parties disagreed about the Workers' Compensation Board's responsibility and mandate as it related to the development of a schedule for the compensation for permanent impairment; they also disagreed about the appropriateness of using the concept of "loss of enjoyment of life" rather than "impairment" as the measure of noneconomic loss.

The worker representatives argued that the Workers' Compensation Act required the Workers' Compensation Board to develop a rating schedule that would measure workers' loss of enjoyment of life. This argument was based on a contextual reading of the relevant sections of the Act. Since the Workers' Compensation Board's Q of L survey was designed to measure the loss of enjoyment of life, worker representatives favored designing a rating schedule based on the results of non-economic loss interviews conducted with injured workers.

The employer representatives did not share this view. They asserted that, based on a literal reading of the Act, the non-economic loss rating schedule should be limited to measuring a worker's clinical, medical impairment. The employer representatives thus argued in favor of continuing to use the AMA *Guides* and the values therein to determine clinical impairment.

Despite the extended period of consultation, no compromise position could be agreed upon by the parties as an acceptable means of utilizing the survey results. Thus informed by the consultation process results and concerned about the financial and policy implications of moving to a Q of L scale, the Workers' Compensation Board decided to continue to use the AMA Guides' clinical ratings to determine non-economic loss awards. They are, however, interested in the response of the broader research community to the results of the non-economic loss study, though, given the intensity of the debate among the worker and employer representatives, it is highly unlikely that a Q of L scale based on the research reported in this article will ever be adopted.

The Implications of the Research Project for Workers' Compensation Programs Outside of Ontario

One of the most interesting implications of the Ontario study concerns the following question: do permanent partial disability benefits in workers' compensation programs tend to favor minor or major injuries? That is, does the replacement rate — defined as the amount of cash benefits divided by the extent of disability - tend to increase, decrease, or remain constant as the severity of injuries increase? An earlier study by Berkowitz and Burton focused on the relationship between permanent partial disability benefits and work disability (as measured by actual loss of earnings due to work-related injuries). Their examination of California, Florida, and Wisconsin concluded:

in all three states, replacement rates rather consistently increase with the severity of injuries in the contested case samples. This finding casts some doubt on one of the most widely dispensed shibboleths of the workers' compensation field, namely, that permanent partial disability benefits tend to overcompensate minor injuries relative to major injuries.³³

The present study does not directly examine whether replacement rates for the non-economic loss (NEL) benefits provided by the Ontario workers' compensation program tend to increase or decrease as the severity of the injuries increase. However, because the amounts of the NEL benefits are proportional to the AMA permanent impairment (PI) ratings, and because the research results suggest that the actual extent of non-economic loss is much greater than the PI ratings for minor injuries (even taking into consideration concerns about the actual magnitude of the "sanctity of body image" effect for conditions with minimal clinical impairment ratings) and only modestly greater than the PI ratings for serious injuries, the implication is that, in reality, the replacement rates for the Ontario NEL benefits increase as the severity of the injuries increase. To the extent that the Ontario results for **nonwork disability** (noneconomic losses) and the California, Florida, and Wisconsin results for **work disability** (wage losses) can be generalized to other jurisdictions, the aforementioned shibboleth about workers' compensation overcompensating minor injuries is highly suspect.

... the data only raise further doubts about ... the use of the AMA Guides....

The other interesting implication of the Ontario results that **reinforces** previous ideas in the literature is their challenge of the usefulness of the AMA *Guides* in workers' compensation programs. The AMA authors emphasize that

as used in the *Guides*, "impairment" means an alteration of an individual's health status that is *assessed by medical means*; "disability," which is *assessed by nonmedical means*, means an alteration of an individual's capacity to meet personal, social, or occupational demands, or to meet statutory or regulatory requirements.... The physician does not determine industrial loss of use or economic loss for the purpose of paying a disability benefit.³⁴

Despite this disclaimer, a number of states now use the AMA *Guides* in a relatively mechanical fashion to provide cash benefits that are closely linked to the PI rating and thus to turn a permanent impairment rating into a rating of work disability. This use of the AMA *Guides* has recently been criticized by, among others, Nortin Hadler³⁵ and Ellen Smith Pryor.³⁶

The adoption of the AMA *Guides* in the 1989 Ontario workers' compensation law predates much of this criticism. Moreover, the AMA *Guides* are used in the Ontario law, not as a basis for benefits designed to compensate for work disability (which is the purpose in most jurisdictions), but instead as a basis for benefits designed to compensate for nonwork disability. Prior to the present study, we had hoped that the AMA *Guides* would provide PI ratings that were valid proxies for the extent of nonwork disability (non-economic loss) associated with various medical conditions. Alas, the data only raise further doubts about the wisdom of the use of the AMA *Guides* in a modern workers' compensation program.

Perhaps when the AMA prepares a fifth edition of the *Guides*, the primary drafters should not be physicians, but economists (who will be asked to determine the relationship between various permanent impairments and the resulting loss of earnings) and psychologists and other behavioral scientists (who will be asked to assess the relationship between various permanent impairments and the resulting non-economic losses).

ENDNOTES

1. The final results of this research project were presented to the Board of Directors of the Ontario Workers' Compensation Board in June 1991.

The findings from this research project will be published in: Alexandra J. Sinclair and John F. Burton, Jr., "Development of a Schedule for Compensation of Non-Economic Loss: Quality of Life Values vs. Clinical Impairment Ratings." In *Research in Canadian Workers' Compensation*, eds. Terry Thomason and Richard Chaykowski. Kingston, Ontario: IRC Press, Industrial Relations Centre, Queen's University, forthcoming. This chapter includes more technical material than does the present *Monitor* article, which places greater emphasis on the policy implications of the research results.

The views expressed in this *Monitor* article are **solely** those of the authors and should not be construed as representing the views or official position of either the Ontario Workers' Compensation Board or the Institute for Work and Health.

2. American Medical Association (AMA), *Guides to the Evaluation of Permanent Impairment*, Third Edition Revised (Chicago, Illinois: American Medical Association, 1990), which is the version of the *Guides* cited throughout this article. The AMA has since published a fourth edition (1993 publication date).

3. John F. Burton, Jr., "Permanent Disability Benefits: A Conceptual Overview," Workers' Compensation Monitor 7, No. 1

PAGE 12

(January/February 1994), pp. 1-8.

4. The Workmen's Compensation Board (Ontario), *Permanent Disability Rating Schedule* (Effective February 15, 1972 and used until January 1, 1990), pp. 1-17.

5. See: John F. Burton, Jr., "Permanent Disability Benefits: A Conceptual Overview."

6. Monroe Berkowitz and John F. Burton, Jr., *Permanent Disability Benefits in Workers' Compensation* (Kalamazoo, Michigan: W. E. Upjohn Institute for Employment Research, 1987).

7. Paul C. Weiler, Reshaping Workers' Compensation for Ontario (1980). Report submitted to R. G. Elgie, Minister of Labour; and Paul C. Weiler, Compensating the Permanently and Partially Disabled Worker (1986).

8. John F. Burton, Jr., The Role of the Permanent Disability Rating Schedule in the Ontario Workers' Compensation Program (1986). Report prepared for the Ontario Workers' Compensation Board.

9. The other schedules reviewed by Burton included the 1972 *Permanent Disability Rating Schedule* (*Rating Schedule*) still in use in 1986 by the Ontario Workers' Compensation Board, as well as an alternative schedule entitled *Guidelines for the Evaluation of Permanent Impairment* (*MSD Proposed Guidelines*) that had been proposed in 1985 by the Medical Services Division of the Ontario Workers' Compensation Board as a possible substitute for the *Rating Schedule*.

Burton thought that the AMA Guides were superior to the 1972 Rating Schedule and the 1985 MSD Proposed Guidelines on these operational characteristics: a schedule should be based on clear concepts and should be comprehensive, comprehensible, consistent, and acceptable. Under the criterion of comprehensiveness, for example, Burton compared the amount of material provided for evaluation of the spine in the three rating systems: the AMA Guides (2nd edition) provided twelve pages that included eight numbered tables, three unnumbered tables, and over one hundred different impairment ratings for different disorders of the spine; the 1972 Rating Schedule provided four lines of material for the spine that included three possible impairment ratings; and the MSD Proposed Guidelines devoted two pages to the spine, which included sixteen possible impairment ratings.

10. Though Bill 162 was approved by the Ontario legislature in July 1989, the non-economic loss provisions had an effective date of January 2, 1990 since the provisions related only to the permanent consequences of injury or disease which occurred on or after that date. The Ontario legislature required the Workers' Compensation Board (Board) to prepare the necessary regulation for establishing a schedule to be used in determining noneconomic loss.

In January 1991, the regulation that stipulated the use of the AMA *Guides* was approved by the government. Until the Board develops a substitute rating schedule and the regulation is amended, the AMA *Guides* remains that rating schedule. The research project was intended to assist the Board in considering the need for developing an alternative schedule.

11. National Commission on State Workmen's Compensation Laws, *The Report of the National Commission on State Workmen's Compensation Laws* (Washington, D.C.: U.S. Government Printing Office, 1972).

12. Weiler, Reshaping Workers' Compensation for Ontario.

13. The Canadian jurisdictions of Newfoundland, New Brunswick, Quebec, Manitoba, Saskatchewan, and the Yukon have adopted the non-economic loss approach, as did Florida (for the period 1979 to 1993).

14. See, for example: Michael F. Drummond, Greg L. Stoddart, and George W. Torrance, Methods for Economic Evaluation of Health Care Programmes (Oxford: Oxford University Press, 1987).

15. The Workmen's Compensation Board (Ontario), Permanent Disability Rating Schedule (1972).

16. The possibility for bias exists among injured workers because they might assume that, if they provide a higher quality-of-life rating for the impairments they are asked to rate than their "true" assessments of those impairments, their own workers' compensation benefits might be increased. In order to overcome this possible source of an upward bias in ratings, the injured worker population selected for this research included individuals whose injury/disease had occurred prior to the implementation of Bill 162. Therefore, any change in the rating schedule based on their input would have no impact on their own benefits for existing permanent impairments, since they would continue to be evaluated under the pre-Bill 162 single-award approach using the Workmen's Compensation Board's Permanent Disability Rating Schedule (1972). Workers were aware this situation.

17. There is also the possibility that members of the control group who had never experienced an injury resulting in a permanent impairment might have been "biased" in the sense that their lack of experience with the loss of quality of life resulting from permanent impairments may have led them to underrate the consequences for daily living of what appear to be minor injuries. In that sense, a worker who has already experienced one type of permanent impairment may be better able to provide a true assessment of the likely loss of quality of life resulting from other types of permanent impairments. This is one reason why previous research on the quality of life has frequently included, as the primary survey members, those knowledgeable about the medical conditions (i.e., treating physicians, nurses, or a family member of an individual with the conditions).

18. The survey response rate among the injured worker population was approximately 72 percent of the permanently disabled workers eligible to participate. The control group, which was recruited by an external survey house from the working age general population with no current workers' compensation involvement, was selected to match the injured worker sample based on age, gender, type of employment experience (e.g., construction, mining, manufacturing, farming, etc.) and geographic location of residence (i.e., the Toronto, Hamilton, London, Windsor, Ottawa, Ludbury, or Thunder Bay area).

19. The workers who volunteered to participate in these videos were generally two to five years post-injury and had previously been assessed and rated for a permanent disability award under the pre-Bill 162 system.

20. Videos were used because of the diverse educational and ethnic backgrounds of the worker population being interviewed. The Methodological Advisory Committee considered it necessary to use an interview method that was not dependent on the respondents' literacy level. Videos were also translated into French, Italian, Spanish, and Portuguese and were used as required.

21. Drummond, Stoddart, and Torrance, Methods for Economic Evaluation of Health Care Programmes, p. 118.

22. David L. Sackett and George W. Torrance, "The Utility of Different Health States As Perceived By The General Public," *Journal of Chronic Disease* 31, No. 11 (1978), pp. 697-704.

23. American Medical Association, Guides to the Evaluation of Permanent Impairment (1990), p. 1.

24. Ibid.

25. The remaining four chapters related to medical conditions seen relatively infrequently in workers' compensation cases (e.g., conditions related to the hematopoietic, and endocrine, systems).

26. Two of the 78 benchmark condi-

tions (amputation of part of the tip of the finger, and crushing to the finger) were not included in Figure C.

27. We do not mean to thus suggest that previous research has indicated that the AMA PI ratings either "overvalue" or "accurately value" the loss of enjoyment of life associated with a large number of impairments encompassed by the AMA *Guides*. Rather, we are unaware of any previous research that has investigated the relationship between the AMA PI and the Q of L values.

28. George W. Torrance, "Preferences for Health States: A Review of Measurement Methods." In *Clinical and Economic Evaluations of Perinatal Programmes*, No. 2, ed. John C. Sinclair. Vail, Colorado: Mead Johnson Symposium on Perinatal and Developmental Medicine.

29. Robert M. Kaplan, James W. Bush, and Charles C. Berry, "Health Status Index, Category Rating versus Magnitude Estimation for Measuring Levels of Well-Being." *Medical Care* 17, No. 5 (May 1979), pp. 501-523.

¹¹ 30. Alan D. Wolfson, Alexandra J. Sinclair, Claire Bombardier, and Alison McGeer, "Preference Measurements for Functional Status in Stroke Patients: Interrater and Inter-technique Comparisons." In *Values and Long Term Care*, eds. Robert L. Kane and Rosalie A. Kane (Lexington, Massachusetts: D.C. Heath and Company, 1982), pp. 191-214.

31. Based on the best available data in 1991, it was estimated that the annual cost of non-economic loss awards, using the impairment values in the AMA *Guides*, would be approximately \$100 million (Canadian dollars). Using the same volume and distribution of permanent impairment cases, if the annual non-economic loss awards were calculated for all types of permanent impairment based on the unadjusted survey values for upper and lower extremity conditions, the cost would be approximately \$270 million.

An option that incorporated an adjustment acknowledging the concern about the magnitude of the "sanctity of body image" effect, at the low end of the scale, was also costed. The proposed adjustment retained the relative values from the Q of L survey results on upper and lower extremity conditions through a proportionate reduction across the range of the AMA PI scale, starting from a point at the low end of the scale such that when the AMA PI was 1 percent the Q of L value was 2. The annual cost of non-economic loss awards using this approach was estimated to be \$177 million.

32. The stakeholder community in-

cludes Ontario business and labor groups, government policy makers, health care professionals, and the scientific community.

33. Berkowitz and Burton, Permanent Disability Benefits in Workers' Compensation, pp. 377-378.

34. American Medical Association (AMA), *Guides to the Evaluation of Permanent Impairment*, Third Edition Revised, pp 1-2. Emphasis in the original.

35. See: Nortin M. Hadler, "Impairment Rating in Disability Determination for Low Back Pain: Placing the AMA *Guides* and the Quebec Institute Report into Perspective." In Workers' Compensation Desk Book, eds. John F. Burton, Jr. and Timothy P. Schmidle (Horsham, Pennsylvania: LRP Publications, 1992), I-129 to I-133.

The essence of Hadler's views are captured in this passage (at page I-132): "Adhering to the Guides in attempting to quantify impairment is in my opinion an unappealing, if not Orwellian, exercise, and not just for musculoskeletal diseases but for all diseases. Even the authors of the Guides discourage extrapolations from impairment to disability or handicap. Here I am in accord with this publication; the numbers generated by following the AMA Guides offer little, if any, insight into disability. It follows that this tedious, often expensive, stultifying examination is a sophism. I do not look forward to the fourth edition."

36. See: Ellen Smith Pryor, "Flawed Promises: A Critical Evaluation of the American Medical Association's Guides to the Evaluation of Permanent Impairment," Harvard Law Review 103, No. 4 (February 1990): 964-976, and the summary and critique of this article in: Workers' Compensation Desk Book, eds. Burton and Schmidle, I-115 to I-116.

A sample of Pryor's views is provided by this passage (as quoted on page I-115 of the Desk Book): "the Guides is not the objective, medical evaluative system that it purports to be and that has been so appealing to legislators and other decisionmakers. Instead, like any impairment rating scheme, it rests in large part on important and difficult normative judgments. Yet the Guides obscures this from the reader; it is laden with hidden or poorly explained value judgments that frequently are gender-based. The Guides' flawed promises of objectivity are especially troubling because they appeal to the craving of legislators and other decisionmakers for certainty and clarity in the difficult arena of impairment and disability assessment."

Appendix A

Members of the Methodological Advisory Committee Non-Economic Loss Study

Dr. Claire Bombardier (areas of specialty: medicine, clinical epidemiology, quality of life measurement) Director, Clinical Epidemiology Program, University of Toronto; Director, Clinical Epidemiology Unit, Wellesley Hospital; Rheumatologist, Rheumatic Disease Unit, Wellesley Hospital.

Professor John F. Burton, Jr. (workers' compensation research, economics) Director, Institute of Management and Labor Relations, Rutgers University, New Jersey.

Professor Anthony J. Culyer (economics, quality of life measurement) Head of Department, Department of Economics and Related Studies, University of York, England.

Professor Robert Evans (health economics, health policy) Professor of Economics, University of British Columbia; National Health Scientist, Health and Welfare Canada; Fellow and Director, Program in Population Health, Canadian Institute for Advanced Research.

Professor William Johnson (workers' compensation, economics, disability research) Professor of Economics, School of Health Administration and Policy, College of Business, Arizona State University.

Professor George Torrance (health economics, measurement methodology, quality of life measurement) Professor, Department of Clinical Epidemiology and Biostatistics, McMaster University.

Professor Paul Weiler (workers' compensation research and policy) Professor of Law, Harvard Law School, Harvard University.

Note: Bombardier, Burton, and Torrance were the "core members" of the committee.