Special Interest Group

Worker Productivity Outcome Measures in Arthritis

REUBEN ESCORPIZO, CLAIRE BOMBARDIER, ANNELIES BOONEN, JOHANNA M.W. HAZES, DIANE LACAILLE, VIBEKE STRAND, and DORCAS BEATON

ABSTRACT. Arthritis is a leading cause of work disability and makes up a significant amount of the socioeconomic cost and health burden to the working age population. We discuss the measurement of worker productivity: that is, absenteeism and presenteeism. Absenteeism refers to the time missed from work due to health reasons and presenteeism refers to the time of impaired performance while at work due to health reasons resulting in productivity loss. While the term absenteeism is commonly used and has several definitions by itself, the current arthritis literature lacks the use of presenteeism as a work outcome measure in describing health states of the workers and for economic costing. Due to advanced medical management and job accommodations that allow workers to stay at work, absenteeism alone may not be enough to give us a complete picture of worker productivity. From our review, we found that the conceptualization and measurement of absenteeism and presenteeism differ. Our research agenda was to carry forward a work outcome measurement that can be used for cost calculation and that can determine levels or states of productivity loss so we can accurately measure the influence of arthritis and advance arthritis care. We recognize the need to perform psychometric testing of work outcome measures and to improve our ability to identify transitions (i.e., move in and out of a productivity state over time) made by workers with arthritis. (J Rheumatol 2007;34:1372–80)

Key Indexing Terms:
RHEUMATOID ARTHRITIS | OUTCOMES | WORK
EMPLOYMENT | INSTRUMENTS | PRODUCTIVITY

From the Department of Rehabilitation Science, University of Toronto, and Institute for Work and Health, Toronto, Ontario, Canada; Division of Clinical Decision-making and Health Care, Toronto General Research Institute, Toronto; Department of Rheumatology, University Hospital Maastricht, and Caphri Research Institute, Maastricht, The Netherlands; Department of Rheumatology, Erasmus MC, University Medical Center, Rotterdam, The Netherlands; Division of Rheumatology, University of British Columbia, Vancouver, BC, Canada; Division of Immunology, Stanford University School of Medicine, Palo Alto, California, USA; and Department of Health Policy, Management, and Evaluation, University of Toronto, Toronto, Canada.

R. Escorpizo was supported by a EULAR travel award, and a WSIB RAC fellowship. Dr. Beaton is supported by a New Investigators award from the Canadian Institutes of Health Research. This work was supported by the Institute for Work and Health, Toronto, Canada.

R. Escorpizo, BSc, PT, MSc, PhD Student, Graduate Department of Rehabilitation Science, University of Toronto, Institute for Work and Health; C. Bombardier, MD, Senior Scientist, Institute for Work and Health, Head, Senior Scientist, Division of Clinical Decision-making and Health Care, Toronto General Research Institute, Professor, Department of Health Policy, Management, and Evaluation, University of Toronto; A. Boonen, MD, PhD, Assistant Professor of Rheumatology, Department of Rheumatology, University Hospital Maastricht, and Caphri Research Institute; J.M.W. Hazes, MD, PhD, Professor of Rheumatology, Department of Rheumatology, Erasmus MC, University Medical Center; D. Lacaille, MD, MHSc, FRCPC, Assistant Professor, Division of Rheumatology, University of British Columbia, Research Scientist, Arthritis Research Centre of Canada; V. Strand, MD, Adjunct Clinical Professor, Division of Immunology, Stanford University School of Medicine; D. Beaton, BSc, OT, PhD, Director, Mobility Program, Clinical Research Unit, St Michael's Hospital, Scientist, Institute for Work and Health, Assistant Professor, Department of Health Policy, Management, and Evaluation, University of Toronto.

Address reprint requests to Prof. D. Beaton, Mobility Program, Clinical Research Unit, St. Michael's Hospital, 70 Richmond St. East, Suite 315, Toronto, Ontario M5B 1W8, Canada. E-mail: beatond@smh.toronto.on.ca

Arthritis affects the working age population, and the associated personal and economic costs are high[1,2]. In a recent literature survey, the annual national cost (indirect and direct) of arthritis amounted to as much as US $124.8 billion in the United States, and more than half of people with arthritis have work disabilities and activity limitations in some way[3]. People with arthritis are more likely to be not working (work loss)[1,4] and have higher amount of lost time from work[5] than healthy people[6]. However, recent advances in disease management and work accommodations may mean that people with arthritis are able to stay at work, although perhaps with some difficulty. In such situations, work outcomes describing a worker's productivity loss must expand to include productivity loss at work (presenteeism) as well as off work (absenteeism). At OMERACT 7, participation (in paid and nonpaid work) was endorsed as an important outcome in the psoriatic arthritis group, but no instrument was recommended because of the lack of a validated measurement instrument[7]. At OMERACT 8, we embarked on the process of moving toward a consensus on how to address one component of participation, namely, worker productivity, and specifically how to capture both absenteeism and presenteeism in people with arthritis. Our first step was to review the measurement and clinical trial literature to find the ways worker productivity has been measured and to see if any existing measure passes the "OMERACT filter," which will be defined below. We describe here the results of our literature review, including feedback from a pre-OMERACT survey, workshops at rheumatology meet-

ings, and the special interest group session itself. We also present the research agenda for the coming 2 years in preparation for the next OMERACT meeting.

The definition and concept of worker productivity

Work productivity can be referred to as the economic productivity of a *workplace* and, as such, might be described in terms of throughputs, costs, profits, or output targets. *Worker* productivity is a critical part of that broader measure of workplace productivity: the part that is directly affected by an illness and potentially amenable to health-related interventions. In the International Classification of Functioning, Disability, and Health (ICF)[8] framework of global functioning, worker participation has been recognized as a separate category, and its measurement has already been included in many of the ICF disease-specific core sets. Worker productivity is generally subdivided into 2 components: absenteeism and presenteeism[9]. The concept of *absenteeism* has been defined as productivity loss due to health-related absence from work, while *presenteeism* refers to reduced performance or productivity while at work due to health reasons[9]. Absenteeism may include personal time off, sick days off work, time on short and/or longterm work disability, or time on worker's-compensated days; and presenteeism could be characterized as the time not being on the task, or decreased work quality and quantity[10]. While absenteeism and presenteeism may be distinct productivity states, both of these components are part of a continuum[11], and many hypothesize that workers likely transition back and forth over time.

Absenteeism and the potential for work loss (withdrawal from the workforce), in the early years after its onset[12] and several years after[13], have been well documented in the literature. Complete work cessation is a common outcome of rheumatoid arthritis (RA) across studies, with rates ranging from 32% to 50% within 10 years of disease onset, and increasing to 50%–90% after 30 years of disease[14]. All longitudinal studies show that work disability starts early at the onset of RA and that rates increase over time. In a systematic review of arthritis studies around work productivity, 22% to 76% of workers with RA missed work or took short-term sick leave in the last 6 months and 36%–84% did so in the last year, with a median work loss of 39 days[15].

Presenteeism is less frequently measured in the literature; however, we are learning that many people are having difficulty while at work. In arthritis, presenteeism accounted for 3.2 lost days per 20 workdays, compared to 0.2 days due to absenteeism[16]. By estimating the indirect costs of arthritis in economic analyses, Li, *et al* found that presenteeeism costs exceed those related to absenteeism[17], the former accounting for 41% loss of productivity compared to 12% due to absenteeism. Their findings complemented a study by Collins, *et al* that described chronic health conditions such as arthritis as among the "most important determinants" of loss of productive work, with more costs associated with presenteeism than with absenteeism and medical costs combined[18]. Such studies, however, are scarce despite the alarming at-work burden associated with arthritis in workers.

Worker productivity loss is increasingly recognized as an important part of the burden of arthritis, from the perspectives of both personal and economic impact. It is essential that we properly quantify this burden and estimate costs with reference to both absenteeism and presenteeism as outcome measures. In arthritis clinical trials where worker productivity is included as an outcome measure, there is a paucity of use of presenteeism scales, and there is variability on how absenteeism is being used and measured. For these reasons, there is a need to review absenteeism and presenteeism in terms of their conceptual definition and approach to their measurement and the way these 2 outcomes can be translated into productivity costs.

Review of measures of worker productivity

Absenteeism. Absenteeism is the most common approach by which lost productivity has been quantified in arthritis studies, but it is not without methodological challenges. Different reviews on work participation in rheumatic diseases illustrate that multiple definitions have been used to describe those that are no longer employed. From these definitions, being "off work" can reflect a number of states such as "work-disabled due to arthritis" (reflection of benefit payouts, requires meeting disability criteria for payment), "not working due to arthritis" (refers to actual work status rather than ability, regardless of criteria), or "not currently employed" (a variety of outcomes where arthritis may play a role, such as the unemployed looking for work, early retirement, etc.). Further, work cessation can be permanent or temporary (e.g., disability leave, sick leave). Partial work reductions such as reducing to part-time work, and occasional work loss such as days or hours missed from work due to arthritis, are other components of absenteeism. Absenteeism can be measured as a state or as a volume. State is a description of the work status measured at one point in time, such as "at work" versus "off work." Measuring the volume includes quantifying the duration or the amount of a given work status, such as measuring the number of days missed from work in the past year, or the duration of time on sick leave.

Absenteeism has not been measured and reported in a uniform way in the arthritis literature. The literature on work participation until now clearly concentrated on description of the working status of patients in terms of being gainfully employed or not. Few articles described absence from work with a paid job, usually referred to as sick leave.

Choice of outcome will depend on the purpose (e.g., describe a health state versus analysis for economic costing) and the perspective (e.g., societal vs consumer) of the study. Nonetheless, there is a need for using outcomes measures of absenteeism that are uniform across studies, that are defined clearly, and that include the entire spectrum of absenteeism.

Because many outcomes are influenced by the social system of the respective country, age and sex matching with population controls is advised. A number of other methodological issues remain unanswered. Should work absence be measured only in relation to arthritis, or should it include all causes of work absence? How do we differentiate those with and without an employment contract? Should weekend days be included in calculations? What is an appropriate recall time? How should adaptations or other changes to remain employed made at and outside work be handled in the analysis? Finally, it is important to measure potential confounding factors that influence risk of work loss, and control for them if appropriate, when evaluating the influence of arthritis or its treatment on absenteeism outcomes.

Details about the review of measures of presenteeism are given in the next section; Table 1 shows a summary of some of the conceptual differences between absenteeism and presenteeism.

From the presenteeism measures we reviewed (details in the next section), we found that some of the measures also include absenteeism sections. The differences in measurement and concepts are given in Table 2.

Presenteeism. Recent published reviews have identified several measures of presenteeism[10,19-22] and have revealed that there is a large difference in the conceptual foundation, content, and development of these measures. These reviews highlighted that there is no consensus over which measure to use, and it has been difficult to find the evidence of how they will perform in an arthritis population. We are also aware of 2 more recently developed measures in arthritis that were not in the reviews, namely, the Work Activity Limitations Scale (WALS)[23] and the Work Instability Scale (WIS)[24]. We therefore needed to update the literature reviews and to focus more on evidence in either arthritis or musculoskeletal (MSK) disorders — assuming that the evidence on the latter may be applicable to arthritis.

We conducted a literature review focusing on patient-reported indicators of presenteeism. We took measures from the review articles (published 2001-2004) mentioned above (n = 7), and supplemented them with 5 measures found in our own literature review (up to 2002), and the grey literature (n = 2). We then identified 24 key articles for each scale and conducted citation searches on these articles to locate any additional measures or any information on psychometric testing for any of the measures. This citation search yielded 198 articles, from which we gathered 2 more scales. In total, we found 16 measures that quantify presenteeism in some way. These measures include the 4 versions of the popular Work Limitations Questionnaire[25] and 2 versions of the Stanford Presenteeism Scale[26]. In Table 3, all 16 measures are presented showing their conceptual foci, the number of scores one gets from the scale (subscales, domains), the number of items for the scale, and finally, where each instrument lies on the OMERACT filter (truth, discrimination, and feasibility)[27]. We stratified the evidence of OMERACT filter status into arthritis/MSK studies versus other studies. A study was considered arthritis/MSK only if separate analyses were available for patients with arthritis or MSK disorders. In cases where a scale has both absenteeism and presenteeism components, the filter status presented is based on the evidence about the presenteeism section only. For each component of the filter, we set general guidelines. For example, for construct validity we wished to see moderate to strong correlations with other indicators of worker productivity such as quantity or quality of product output or another presenteeism scale. We took note of correlations that were greater than 0.5, but ideally greater than 0.75 and preferably with confirmation of an a priori hypothesis of the expected relationship between constructs. For test-retest reliability we wished to see at least 0.75 (group level) or 0.90 for individual level measurement using an intraclass correlation coefficient (although we did include correlations) or kappa coefficients of roughly the same magnitudes.

Table 1. Concepts and attributes of measuring absenteeism and presenteeism.

Absenteeism	Presenteeism
Currently working (fulltime)	Degree/percentage of impairment
Currently working, reduced amount of time (part-time)	Proportion/percentage of time
Complete work cessation—permanent	Frequency of impaired work
Work disabled	Overall work performance
Not working due to arthritis	Self versus others' performance
Not working due to other health problems	Quality and quantity
Not working for other reasons (e.g., early retirement, lifestyle choice, stopped work voluntarily)	Efficiency/percentage being effective
	Effect on well-being
Unemployed, looking for work	Degree of agreement with work limitations
Retirement due to age	Amount/level/degree of difficulty
Complete work cessation — temporary	Number of difficulties
Temporary work disability	Time missed due to delays in starting work
Sick leave	Number of hours
Occasional work loss	
Days missed from work	
Hours missed from work	

Table 2. List of instruments that have both absenteeism and presenteeism subscales. Definition of absenteeism given below (only items that were applicable to paid work were included). Note: no. hrs – no. of hours, no. days – no. of days.

Instrument	Concept of Absenteeism	Number of Items; Scored Scale	Timeframe
EWPS	No. of hours missed	3 items, no. hrs expected to work, no. hrs worked, and reason why fewer hours were worked than expected	1 week
HLQ	No. of working days lost	1 item (Module 1: absence from paid work), no. days due to health reasons or other reasons; response can also be described as due to a specific health condition or due to other health condition (depending on the purpose of the study)	2 weeks
HRPQ-D	No. of work hours missed from paid employment, at home, and at school	2 items, no. hrs of scheduled work outside home, no. hrs missed due to mononucleosis*	Daily
LFQ	No. of days of work missed, may include paid work, school, or activity	1 item, no. days missed at work or school due to mental illness*	4 weeks
OST	No. of days of work or school missed	1 item, no. days missed at work or school due to migraine*	4 weeks
SPS13	No. of hours away from work	1 item, no. hrs missed (0-40+ continuous scale) due to health condition	4 weeks
WHI	No. of hours missed for any reason (full days) and no. of hours missed for health reasons on days worked (part days)	3 items, (1) no. days (translated into no. hrs) missed due to any reason, (2) no. hrs missed due to health reasons on days worked, no. hrs missed = (1) + (2)	2 weeks
WHO-HPQ	No. of hours missed on full days being absent; no. of hours missed on workdays, extra hours of work being made up for absence, no. of hours missed due to used personal or vacation days	6 items: no. hrs worked each week, no. hrs expected to work, no. days when worker missed an entire workday due to physical or mental health condition, no. days when worker missed an entire workday due to other reasons (e.g. vacation), no. days when worker missed partial workday due to physical or mental health condition, no. days when worker missed partial workday due to other reasons (e.g. vacation), overall no. hrs worked	1 week
WPAI GH	No. of hours missed from work including hours missed during sick days due to health reason, other reasons	3 items: no. hrs missed due to health condition (including sick days, getting to work late or getting off from early), no. hrs missed due to other reason (e.g. vacation), no. hrs actually worked	1 week
WPSI	No. of days missed from work including during sick days	1 item, no. days due to health condition and associated symptoms (including days of coming in late or taking off early due to physician's appointment)	1 year

EWPS: Endicott Work Productivity Scale[35], HLQ: Health and Labour Questionnaire[34], HRPQ-D: Health-Related Productivity Questionnaire Diary[36], LFQ: Life Functioning Questionnaire[37], OST: Osterhaus technique[38], SPS13: Stanford Presenteeism Scale (13 items) [33], WHI: Work and Health Interview[39], WHO-HPQ: Health and Work Performance Questionnaire[40], WPAI-GH: Work Productivity and Activity Impairment[41], WPSI: Work Productivity Short Inventory[42].
* These questionnaires attributed absenteeism to a specific disorder as shown. For HLQ and HRPQ-D, developers specified changing this to the disorder of interest.

Table 3. List of presenteeism measures (N = 16, WLQ/WRF family of measures (4) are counted as one) and the OMERACT filter. Measures in bold print were used in arthritis/MSK studies. Measures with "$" in parentheses indicates its potential or current utilization in economic costing analyses. References are given for evidence in arthritis/MSK only. Table continues next page.

Instrument	Concept	Scored Scales (no. of items)	Timeframe	OMERACT Filter Evidence				
				Truth		Discrimination		Feasibility***
				Face/Content Validity*	Construct Validity	Reliability**	Responsiveness	
SPS13 ($)	Proportion of time encountering a difficulty	1. Work impairment score (10) (a) Completing work (5) (b) Avoiding distraction (5) 2. Work output score (1)	4 weeks	+ [18]	–	–	–	+ [18]
WALS	Amount/level of difficulty	Single scale (11)	Current (may also use 1 week, 1 month, or few months)	++ [17,23]	+ [17]	–	–	++ [17,23]
WIS	No. of difficulties encountered (stress, pace); work instability = degree of mis-match between self and job	Single scale (23)	At the moment	+ [24]	+ [24]	+ [24]	–	+ [24]
WLQ25 ($)	Proportion of time having difficulty	1.Physical demands (6) 2. Mental-interpersonal (9) 3. Time management (5) 4. Output demands (5)	2 weeks	++ [25,43]	++ [33,44,45]	–	–	++ [25,43] * Physical demands scale is reversed
WLQ16 ($)	Proportion of time having difficulty	1.Physical demands (4) 2. Mental-interpersonal (6) 3. Time management (2) 4. Output demands (4)	4 weeks	+ Same as WLQ	+ [46]	–	+ [46]	+ [46]
WLQ8 ($)	Proportion of time having difficulty	1.Physical demands (2) 2. Mental-interpersonal (2) 3. Time management (2) 4. Output demands (2)	2 weeks	+ Same as WLQ	+ [47]	–	(+)	+ [47]
WPSI ($)	No. of hours	Single scale (1)	2 weeks to 1 year	+ [48]	–	(+)	–	+ [48]
EWPS	Frequency of encountering reduced work productivity	Single scale (25)	1 week	(++)	(+)	(+)	(+)	(++)
HLQ ($)	Proportion of time experiencing various aspects of decreased performance	Module 2: reduced productivity at paid work due to illness (7)	2 weeks	(++)	(+)	–	–	(++)
HRPQ-D ($)	No. of hours	Single scale (1)	Daily for 1 week	(+)	–	–	–	(+)
HWQ ($)	Quality, quantity, and efficiency of work and impact on well-being	1. Productivity (11) (a) personal assessment of productivity (5/11) (b) others' assessment of the worker's productivity (6/11) 2. Impatience/irritability (3) 3. Concentration/focus (4) 4. Work satisfaction (4) 5. Satisfaction with supervisor (2) 6. Non-work (personal life) satisfaction (4)	1 week	(+)	–	–	–	(+)

Table 3. Continued from previous page.

LFQ	Degree of difficulty in functioning	Section/domain: Duties at work, school, or activity center (4)	1 month	(+)	(+)	(+)	–	(+)
OST (**$**)	% effectiveness at doing job while symptomatic	Single score	1 month	(++)	(+)	–	–	(++)
QQ † (**$**)	No. of hours of reduced productivity	1. Quality of work done compared to normal (1) 2. Quantity of work done (1)	Daily	(++)	(+)	–	–	(++)
SPS6	Degree of agreement with limitations at work	1. Completing work (3) 2. Avoiding distraction (3)	4 weeks	(+)	(+)	–	–	(+)
WHI (**$**)	Proportion of time encountering a work limitation	Lost Productive Time for Days At Work. a) decreased productive work (4) b) 1 item asking lag to beginning productive work each day when ill (hours per day)	2 weeks	(++)	–	–	–	(++) * computer-assisted telephone interview * 6-8 modules
WHO-HPQ (**$**)	Section 1; Proportion of time Section 2: Overall work performance (0-10 scale) Section 3: Self versus others in level of performance	1. Presenteeism scale (7) 2. Global items on overall performance of self, usual self, and usual other workers for presenteeism relative to "usual" (3) 3. Performance relative to other workers (1)	1 to 4 weeks	(++)	(++)	–	–	(++)
WRF/WL26 (**$**)	Proportion of time having difficulty	1. Work scheduling (6) 2. Physical demands (8) 3. Mental demands (4) 4. Social demands (3) 5. Output demands (5)	4 weeks	(+) Same as WLQ	(+)	–	–	(+)
WPAI-GH (**$**)	Degree of impairment	1. % work time missed due to health (2) 2. % impairment while working due to health (1) 3. % overall work impairment due to health (3) 4. % activity impairment due to health (1)	1 week	(++)	(++)	(+)	(+)	(++)

* Also includes "sensibility" of the measure; ** includes internal consistency and test-retest reliability (must satisfy both); *** includes easiness to administer (time, money), interpretation. † QQ is part of the Productivity and Disease Questionnaire (Prodisq) [49]. EWPS: Endicott Work Productivity Scale[35], HLQ: Health and Labour Questionnaire[34], HRPQ: D-Health-Related Productivity Questionnaire Diary[36], HWQ-Health and Work Questionnaire[50], LFQ: Life Functioning Questionnaire[37], OST: Osterhaus technique[38], QQ: Quantity and Quality Method [30], SPS6: Stanford Presenteeism Scale (6 items)[26], SPS13: Stanford Presenteeism Scale (13 items) [33], WALS: Work Activity Limitations Scale[23], WHI: Work and Health Interview[39], WHO: HPQ-Health and Work Performance Questionnaire[40], WIS: Work Instability Scale[24], WLQ25: Work Limitations Questionnaire (25 items)[25], WLQ16: Work Limitations Questionnaire (16 items)[46], WLQ8: Work Limitations Questionnaire (8 items)[51], WRF/WL26: Work Role Functioning/Work Limitations-26 items[52], WPAI: GH-Work Productivity and Activity Impairment[41], WPSI: Work Productivity Short Inventory[42].

Grading System (each element is graded on a level of evidence): ++: two or more studies with evidence supporting this property in A/MSK; +: one study with evidence supporting this property in A/MSK; ( ): there is evidence of this property, but not in A/MSK; – no evidence of achievement of this property was found.

Responsiveness evidence was based on an effect, correlation, or area under the curve congruent with the anticipated effect[28]. We particularly sought evidence for between-group difference in change (relative difference) that would have the most relevance for application to a clinical trial[29].

The instruments differed in their conceptual foci as well as the domains they considered important to include. These differences are shown on columns 2 and 3 of Table 3. For example, 11 out of the 16 measures (HLQ, HRPQ-D, QQ, SPS13, WHI, WHO-HPQ, all WLQ versions including WRF, and WPSI) quantified presenteeism as the amount of time, while 3 measured the effects of work limitations on quality of life (HWQ, WIS, and WPAI-GH). Some instruments, such as WALS and WIS, had never been used for costing and were more designed to describe a state of difficulty of fit with the job. Fourteen of the scales had been used for costing or have the potential for cost calculations (indicated by a dollar sign "$" in the table). These cost-applicable measures tended to quantify presenteeism as the "amount of time having difficulty" rather than a level or degree of difficulty.

Nine of the instruments had "filter" evidence in MSK/arthritis. We judged most of the scales to be feasible. Many had some (one supporting article) or strong (2 supporting articles) evidence of construct validity, although often the correlations were lower than expected. In 3 studies that compared these scales (QQ, WHI, and HWQ) to observed indicators of productivity, low correlations (< 0.5) were found. Few of these instruments have been evaluated for their discriminative ability in measuring change in clinical trials.

In our review, no single measure emerged as a clear leader in the area of quantifying presenteeism in the arthritis population, and most lacked information on their ability to accurately measure change over time.

Direct comparisons of measures

Studies that have direct comparisons of these measures will likely be helpful in deciding which one would be appropriate to use in arthritis clinical trials. Six such comparisons were found in the literature[22,30-33]. These studies highlighted the differences encountered when quantifying work limitations. Lavigne, *et al*, for example, found the Osterhaus technique described 53% of the sample as "limited," whereas the HLQ found 10%[31]. In a study by van Roijen, *et al* there were 8.9 days per migraine patient per year of reduced efficiency based on OST, while HLQ estimated 2.7 days per patient per year (r = 0.41)[34]. Correlations between measures were also low; Turpin, *et al* reported correlations between 0.2 and 0.4 for the WLQ domains and the Stanford Presenteeism Scale (13-item version)[33]. Other studies are under way specifically comparing work disability measures (Beaton, unpublished, 5 measures; Gignac, unpublished, 3 measures); early results from these 2 studies suggest similarly low to moderate correlations among scales. These studies will also directly compare responsiveness of the scales as results become available. Direct comparisons between instruments in the same group of patients suggest that there are differences in what is being quantified in each scale, making interpretation of presenteeism across studies using different scales difficult.

Contextual factors and work

Our literature review and special interest group discussions highlighted that work productivity loss or its remediation must always be considered within the context of a specific job. The various contextual factors that can influence worker productivity (participation) are described within the ICF framework as personal and environmental factors. The ability of a person to work well on their job is associated with multiple factors that influence the interaction between the worker and his or her job. These factors may include job demands, pace, and flexibility; and these factors bring about a challenge on how we should define the concept of work and worker productivity (absenteeism and presenteeism). We must also consider the person's life outside of work — leisure and care-giving responsibilities at home that could influence the worker's ability to be flexible at work, or to try different accommodations. Research has shown that people will readily adapt their job tasks or drop discretionary activities at home in order to retain their work status. Job accommodations (i.e., availability of modified work) and coping strategies of workers with arthritis influence the way work-related factors are contextualized as some jobs might be more amenable to change than others. Moreover, social supports at home may influence whether a person can decide to return to work or not, or the level of their support may affect their capacity to do so. Broader societal-level factors such as variability of the labor force and the social security system in different countries may also influence the way work limitations are managed and viewed. Finally, the fact that workers with arthritis transition in and out of different levels of disability or productivity and work status over time adds to the complexity of how work outcomes would be measured and influenced by these contextual factors.

Research agenda toward OMERACT 9

Three key issues were raised at OMERACT 8 and these issues will lead us forward to OMERACT 9. First, we need the capacity to measure both economic costs associated with lost productivity and the level of that lost productivity (such as a work productivity loss state) in order to measure the impact of arthritis and its response to care. We will continue with these 2 roles in mind. Second, we need to continue with psychometric testing of the available scales in cohort studies that are currently under way. Third, we need to consider that workers transition to and from different productivity states over time along with the level of presenteeism at work. Moreover, contextual factors around work and work demands must be integrated in addressing these 3 key issues.

ACKNOWLEDGMENT

The authors acknowledge members of OMERACT who participated in our preconference survey. We also acknowledge the contribution of Peter Tugwell and Vibeke Strand as our executive liaisons.

REFERENCES

1. Badley EM, Wang PP. The contribution of arthritis and arthritis disability to nonparticipation in the labor force: a Canadian example. J Rheumatol 2001;28:1077-82.
2. Maetzel A, Li LC, Pencharz J, Tomlinson G, Bombardier C, Community Hypertension and Arthritis Project Study Team. The economic burden associated with osteoarthritis, rheumatoid arthritis, and hypertension: a comparative study. Ann Rheum Dis 2004;63:395-401.
3. Dunlop DD, Manheim LM, Yelin EH, Song J, Chang RW. The costs of arthritis. Arthritis Rheum 2003;49:101-13.
4. Jantti J, Aho K, Kaarela K, Kautiainen H. Work disability in an inception cohort of patients with seropositive rheumatoid arthritis: A 20-year study. Rheumatology Oxford 1999;38:1138-41.
5. Lacaille D, Hogg RS. The effect of arthritis on working life expectancy. J Rheumatol 2001;28:2315-9.
6. Yelin E, Meenan R, Nevitt M, Epstein W. Work disability in rheumatoid arthritis: Effects of disease, social, and work factors. Ann Intern Med 1980;93:551-6.
7. Gladman DD, Mease PJ, Krueger G, et al. Outcome measures in psoriatic arthritis. J Rheumatol 2005;32:2262-9.
8. World Health Organization. International Classification of Functioning, Disability, and Health. ICF Introduction. Geneva: World Health Organization; 2001.
9. Boles M, Pelletier B, Lynch WD. The relationship between health risks and work productivity. J Occup Environ Med 2004;46:737-45.
10. Loeppke R, Hymel PA, Lofland JH, et al. Health-related workplace productivity measurement: general and migraine-specific recommendations from the ACOEM Expert Panel. J Occup Environ Med 2003;45:349-59.
11. Brouwer WB, Meerding WJ, Lamers LM, Severens JL. The relationship between productivity and health-related QOL: an exploration. Pharmacoeconomics 2005;23:209-18.
12. Barrett EM, Scott DG, Wiles NJ, Symmons DP. The impact of rheumatoid arthritis on employment status in the early years of disease: a UK community-based study. Rheumatology Oxford 2000;39:1403-9.
13. Wolfe F, Hawley DJ. The longterm outcomes of rheumatoid arthritis: Work disability: a prospective 18 year study of 823 patients. J Rheumatol 1998;25:2108-17.
14. Lacaille D, Sheps S, Spinelli JJ, Chalmers A, Esdaile JM. Identification of modifiable work-related factors that influence the risk of work disability in rheumatoid arthritis. Arthritis Rheum 2004;51:843-52.
15. Burton WN, Morrison A, MacLean R, Ruderman E. Systematic review of studies of productivity loss due to rheumatoid arthritis. Occup Med 2006;56:18-27.
16. Employers Health Coalition. The hidden competitive edge — employee health and productivity. Newton MA: Managed Care Communications; 2000. Internet. Available at: www.ehcaccess.org/store.asp. Accessed April 24, 2007.
17. Li X, Gignac MAM, Anis AH. The indirect costs of arthritis resulting from unemployment, reduced performance, and occupational changes while at work. Med Care 2006;44:304-10.
18. Collins JJ, Baase CM, Sharda CE, et al. The assessment of chronic health conditions on work performance, absence, and total economic impact for employers. J Occup Environ Med 2005;47:547-57.
19. Lofland JH, Pizzi L, Frick KD. A review of health-related workplace productivity loss instruments. Pharmacoeconomics 2004;22:165-84.
20. Prasad M, Wahlqvist P, Shikiar R, Shih Y-CT. A review of self-report instruments measuring health-related work productivity. A patient-reported outcomes perspective. Pharmacoeconomics 2004;22:225-44.
21. Lynch W, Riedel JE. Measuring employee productivity: A guide to self-assessment tools. 1-94 2001. Scottsdale, AZ: William M. Mercer Inc., Institute for Health and Productivity Management; 2001.
22. Ozminkowski RJ, Goetzel RZ, Chang S, Long SR. The application of two health and productivity instruments at a large employer. J Occup Environ Med 2004;46:635-48.
23. Gignac MA, Badley EM, Lacaille D, Cott CC, Adam P, Anis AH. Managing arthritis and employment: making arthritis-related work changes as a means of adaptation. Arthritis Rheum 2004;51:909-16.
24. Gilworth G, Chamberlain MA, Harvey A, et al. Development of a work instability scale for rheumatoid arthritis. Arthritis Rheum 2003;49:349-54.
25. Lerner D, Amick BC III, Rogers WH, Malspeis S, Bungay K, Cynn D. The Work Limitations Questionnaire. Med Care 2001;39:72-85.
26. Koopman C, Pelletier K, Murray J, et al. Stanford presenteeism scale: Health status and employee productivity. J Occup Environ Med 2002;4:14-20.
27. Boers M, Brooks P, Strand CV, Tugwell P. The OMERACT filter for outcome measures in rheumatology. J Rheumatol 1998;25:198-9.
28. Deyo RA, Centor RM. Assessing the responsiveness of functional scales to clinical change: an analogy to diagnostic test performance. J Chron Dis 1986;39:897-906.
29. Beaton DE. Understanding the relevance of measured change through studies of responsiveness. Spine 2000;25:3192-9.
30. Brouwer WB, Koopmanschap MA, Rutten FF. Productivity losses without absence: measurement validation and empirical evidence. Health Policy 1999;48:13-27.
31. Lavigne JE, Phelps CE, Mushlin A, Lednar WM. Reductions in individual work productivity associated with type 2 diabetes mellitus. Pharmacoeconomics 2003;21:1123-34.
32. Meerding WJ, Ijzelenberg W, Koopmanschap MA, Severens JL, Burdorf A. Health problems lead to considerable productivity loss at work among workers with high physical load jobs. J Clin Epidemiol 2005;58:517-23.
33. Turpin RS, Ozminkowski RJ, Sharda CE, et al. Reliability and validity of the Stanford presenteeism scale. J Occup Environ Med 2004;46:1123-33.
34. van Roijen L, Essink-Bot ML, Koopmanschap MA, Bonsel G, Rutten FF. Labor and health status in economic evaluation of health care. The Health and Labor Questionnaire. Int J Technol Assess Health Care 1996;12:405-15.
35. Endicott J, Nee J. Endicott Work Productivity Scale (EWPS): a new measure to assess treatment effects. Psychopharmacol Bull 1997;33:13-6.
36. Kumar RN, Hass SL, Li JZ, Nickens DJ, Daenzer CL, Wathen LK. Validation of the Health-Related Productivity Questionnaire Diary (HRPQ-D) on a sample of patients with infectious mononucleosis: results from a phase 1 multicenter clinical trial. J Occup Environ Med 2003;45:899-907.
37. Altshuler L, Mintz J, Leight K. The Life Functioning Questionnaire (LFQ): a brief, gender-neutral scale assessing functional outcome. Psychiatry Res 2002;112:161-82.
38. Osterhaus JT, Gutterman DL, Plachetka JR. Healthcare resource and lost labour costs of migraine headache in the US. Pharmacoeconomics 1992;2:67-76.
39. Stewart WF, Ricci JA, Leotta C, Chee E. Validation of the work and health interview. Pharmacoeconomics 2004;22:1127-40.
40. Kessler RC, Barber C, Beck A, et al. The World Health

Organization Health and Work Performance Questionnaire (HPQ). J Occup Environ Med 2003;45:156-74.
41. Reilly MC, Zbrozek AS, Dukes EM. The validity and reproducibility of a work productivity and activity impairment instrument. Pharmacoeconomics 1993;4:353-65.
42. Goetzel RZ, Ozminkowski RJ, Long SR. Development and reliability analysis of the Work Productivity Short Inventory (WPSI) instrument measuring employee health and productivity. J Occup Environ Med 2003;45:743-62.
43. Lerner D, Adler DA, Chang H, et al. Unemployment, job retention, and productivity loss among employees with depression. Psychiatr Serv 2004;55:1371-8.
44. Walker N, Michaud K, Wolfe F. Work limitations among working persons with rheumatoid arthritis: results, reliability, and validity of the work limitations questionnaire in 836 patients. J Rheumatol 2005;32:1006-12.
45. Wolfe F, Michaud K, Choi HK, Williams R. Household income and earnings losses among 6,396 persons with rheumatoid arthritis. J Rheumatol 2005;32:1875-83.
46. Beaton DE, Kennedy CA, The Workplace Upper Extremity Research Group. Beyond return to work: Testing a measure of at-work disability in workers with musculoskeletal pain. Qual Life Res 2005;14:1869-79.
47. Burton WN, Pransky G, Conti DJ, Chen C-Y, Edington DW. The association of medical conditions and presenteeism. J Occup Environ Med 2004;46 Suppl 7:S38-S45.
48. Ozminkowski RJ, Goetzel RZ, Long SR. A validity analysis of the Work Productivity Short Inventory (WPSI) instrument measuring employee health and productivity. J Occup Environ Med 2003;45:1183-95.
49. Koopmanschap M, Meerding WJ, Evers S, Severens J, Burdorf A, Brouwer W. Productivity and Disease Questionnaire – PRODISQ versie 2.1, user's manual. Rotterdam/Maastricht, 2004. Internet. www2.eur.nl/fgg/mgz/mgzpapers/prodisq. Accessed April 25, 2007.
50. Shikiar R, Halpern MT, Rentz AM, Khan ZM. Development of the Health and Work Questionnaire (HWQ): an instrument for assessing workplace productivity in relation to worker health. Work 2004;22:219-29.
51. Burton WN, Chen C-Y, Conti DJ, Pransky G, Edington DW. Caregiving for ill dependents and its association with employee health risks and productivity. J Occup Environ Med 2004;46:1048-56.
52. Amick BC III, Lerner D, Rogers WH, Rooney T, Katz JN. A review of health-related work outcome measures and their uses, and recommended measures. Spine 2000;25:3152-60.