

# Measuring Worker Productivity: Frameworks and Measures

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**ABSTRACT.** Worker productivity is a combination of time off work (absenteeism) due to an illness and time at work but with reduced levels of productivity while at work (also known as presenteeism). Both can be gathered with a focus on application as a cost indicator and/or as an outcome state for intervention studies. We review the OMERACT worker productivity groups' progress in evaluating measures of worker productivity for use in arthritis using the OMERACT filter. Attendees at OMERACT 9 strongly endorsed the importance of work as an outcome in arthritis. Consensus was reached (94% endorsement) for fielding a broader array of indicators of absenteeism. Twenty-one measures of at-work productivity loss, ranging from single item indicators to multidimensional scales, were reviewed for measurement properties. No set of at-work productivity measures was endorsed because of variability in the concepts captured, and the need for a better framework for the measurement of worker productivity that also incorporates contextual issues such as job demands and other paid and unpaid life responsibilities. Progress has been made in this area, revealing an ambivalent set of results that directed us back to the need to further define and then contextualize the measurement of worker productivity. (J Rheumatol 2009;36:2100–9; doi:10.3899/jrheum.090366)

## Key Indexing Terms:

ABSENTEEISM  
RHEUMATOID ARTHRITIS

OUTCOMES

PRESENTEEISM  
WORK PRODUCTIVITY

Arthritis is recognized to be a leading cause of pain and disability and, more recently, as placing people at increased risk of work loss. The impact of arthritis on those who are

still working is less well described and is inconsistently measured. At OMERACT 7 the psoriatic arthritis group voted work role participation as a desired outcome, but one

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that required more research to find a measure that passes the OMERACT filter<sup>1</sup>. At OMERACT 8 we introduced a group taking up this challenge<sup>2</sup>, and in this article we report our ongoing work with measures of absenteeism and at-work productivity loss presented at OMERACT 9. We describe a conceptual framework that helps us understand the dynamic nature of the impact of arthritis on work, a review of existing measures, the outcomes of OMERACT 9, and the directions we are suggesting for future research.

### CONCEPTUAL FRAMEWORK FOR MEASURING WORKER PRODUCTIVITY

Work productivity, in its simplest definition, is the output per unit of input, for example production output per labor hours. At a workplace level, work productivity is influenced by many factors (e.g., technology, market forces) including the input of the individual worker — worker productivity. The measurement of individual worker productivity is of interest from several perspectives. For a society or an industry, worker productivity is one of many factors that contribute to indicators of the success of the workplace or the well being of that business or society. In the field of health economics, the loss of worker productivity due to an illness is counted in the indirect costs of the analysis<sup>3,4</sup>. Models for health economics vary and are beyond the scope of this article, but one approach, that of human capital, directly links the worker’s productivity loss with a cost. Hence, changes in labor input, i.e., the number of work days lost due to illness, are translated directly to lost productivity using market wage rates. The final perspective is at an individual worker/patient level, where there is interest in measuring individual worker productivity in order to describe the impact of a condition on ability to work, or the effects of an intervention such as work station changes on the ability of a person to work productively. In this way worker productivity is measured as an outcome state. Loss of either type of productivity (cost or ability/difficulty) has often been quantified by days absent from work (absenteeism). Equally important are the difficulties experienced on the job, where the person is working but perhaps with some difficulty or inefficiency, referred to as at-work productivity loss or at-work disability. It is also known in the literature as “presenteeism”<sup>5-7</sup>.

Combining perspectives and the focus of the measurement (absenteeism or presenteeism), we can see that the measurement of worker productivity can span 4 quadrants or domains (see Figure 1).

### RELATIONSHIP BETWEEN HEALTH STATUS AND WORKER PRODUCTIVITY

The productivity loss experienced by a worker is highly contextualized. It is a person–environment state where the demands of a given job (physical, social, psychological aspects) are weighed against the capacity of the person in that job. The relationship between worker health/ability and productivity loss is not a direct, linear one where more pain and disability will lead to a direct, predictable change in productivity levels. It is one in which the person is trying to adapt, and modifications may be made to the job (environment) to enable a return to work or to avoid work absence/difficulties. This can also vary with disease activity over time.

We have modified a model of Brouwer, *et al*<sup>8</sup> to demonstrate a possible course of worker productivity over time and how this course would translate into a set of outcomes (see Figure 2). This model helps demonstrate not only the continuum of absenteeism and presenteeism, but also the contextual factors that must be considered.

In Figure 2 the vertical axis describes the health state and abilities the worker needs to put into the job. Along this axis are 2 thresholds, Q1 and Q2, which are job dependent thresholds of the amount of worker ability needed to be able to complete the job without any loss in productivity (Q1) and the level of worker health/ability below which he/she is unable to be at work doing this job (Q2). Between Q1 and Q2, the individual is working, but with some difficulty or some loss in productivity. Q1 and Q2 will vary between jobs — heavy versus light work will have different thresholds for the level of health where the individual simply cannot perform the job tasks. The thresholds can also vary with job accommodations (modified duties for example). Efforts to lower the job demands would allow an individual at the same level of health to stay on the job. The horizontal axis depicts “time” and, as shown in this hypothetical example, an episode of illness may lead to absence from work and

Perspective→ Component	Outcome state	Cost indicator
Absenteeism	No. of days/hours off work	Cost of time away from job
At-work productivity loss or Presenteeism	Difficulties at work	Worker productivity loss expressed in hours and translated to dollars

Figure 1. Two-by-two table depicting the 4 subcomponents of worker productivity, defined by the perspective and the component of worker productivity considered.

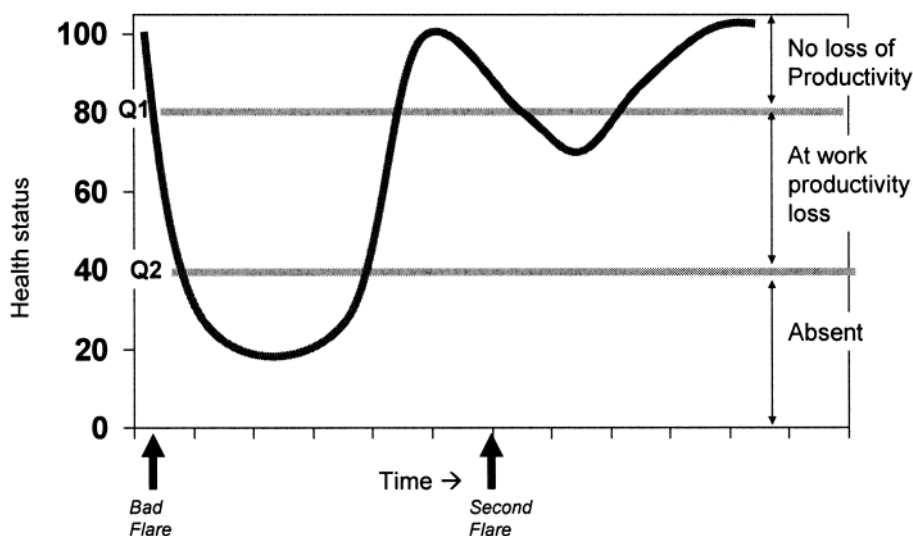


Figure 2. Model of an individual's health state and impact on their (worker) productivity over time, from Brouwer, *et al*<sup>8</sup>: (Pharmacoeconomics 2005;23:209-18, adapted with permission). The vertical axis depicts a level of functioning and health, or quality of life ("Health Status"). Q1 and Q2 are defined by the job. Q1 is the first intersection with job demands, defined as the threshold above which the loss of health does not affect functioning on the job. Q2 defines a threshold below which the individual is not able to work. Between Q1 and Q2 lies the range of at-work productivity loss (presenteeism), where the individual is at work, but is unable to be as productive as the job demands.

at-work productivity loss (presenteeism) on one occasion, but the next time may lead to only a loss in at-work productivity. This flexibility is important in describing arthritis, a condition that will likely have an ongoing episodic course.

Through our OMERACT experience, we have found that it is also important to begin defining the contextual factors that influence worker productivity<sup>4</sup>. The International Classification of Functioning, Disability, and Health (ICF)<sup>9</sup> classifies contextual factors in 2 broad domains — person and environmental factors. Badley defines them more specifically into those that are "scene setters"<sup>10</sup> — defining the nature of the job, or the features of the person that precede the illness episode. Equipment, methods used to do the job tasks, hours of work, proximity to transportation, as well as the age, gender, and height of the worker are "scene setters." Badley also defines "barriers"<sup>10</sup> (or enablers) as a second group of contextual factors. These are potentially more modifiable and could include the ability to accommodate the disease flare, ability to share work or modify duties, access to benefits, supervisory support and support for at-home roles. Gignac, *et al* have reported examples of adaptations made by people with arthritis in order to stay at work<sup>11</sup>.

In addition to the above, one must consider the work-life balance that individuals with arthritis must manage. Badley suggests the term "volition"<sup>10</sup> to reflect that there are often choices made by individuals with arthritis about their ability to work. Balancing the demands of activities of daily work (ADW) and activities of daily living (ADL), one individual may need to work in order to maintain a sense of self,

whereas another may choose to be absent from work in order to maintain the energy needed for parenting, caregiving, or other responsibilities at home or in the community. There might be an absence of volition. An individual may not be able to leave the work force or take time off because of economic needs (family income, access to work-related benefits).

This model demonstrates that absenteeism and presenteeism are more about a balance of job demands, health state, and contextual factors. In an effort to measure worker productivity, one must consider the individual with arthritis and their individual course over time, with all the complexities of the contextual factors around work. We have used the ICF<sup>9</sup> to help define the core and contextual variables to be measured. The ICF also reminds us of secondary causes of disability: a limitation in work ability may cause deconditioning, which might lead to further problems at the point of return to work; or work loss could cause stress and have secondary effects on an individual's psychosocial well being. Considering all these factors, as our next task we reviewed the measures currently available.

## MEASURES OF WORKER PRODUCTIVITY

At OMERACT 8 we reviewed the available measures of presenteeism and absenteeism<sup>2</sup>. There were over 16 different scales that captured presenteeism. Only 11 had been used in arthritis or other musculoskeletal disorders. There were also several different states described under "absenteeism" — temporary, short term or permanent disability

and off work but looking for employment. We conducted reviews and, although we found evidence for the feasibility of many of these different scales, there was much less or no evidence for truth or discriminative features<sup>2</sup>. For OMERACT 9, three activities were conducted: (1) A pre-OMERACT survey of attendees to obtain background perspectives; (2) a review of the available literature to update the tables; and (3) a workshop to address issues of absenteeism and presenteeism (at-work productivity loss) measurement, to obtain an OMERACT vote on a set of outcome measures to consider at this point, and to define directions for research for the next 2 years.

*Pre-OMERACT survey.* One hundred and twenty-eight persons responded to this anonymous survey. Nearly all respondents (96.8%) agreed that work was an important part of the life of an individual with arthritis. There was strong endorsement for the measurement of both absenteeism and presenteeism in clinical trials in arthritis. There was a definite recognition that work was an important issue for individuals with arthritis (76% said agree/strongly agree) and recognition that this is poorly addressed in most clinical encounters (59% said few or very few have the work issue addressed well in current arthritis care and 87.4% stated that work was not being addressed sufficiently). A list of available instruments to measure work productivity was posted. Few participants recognized these scales; even fewer had experience using them in arthritis care or research. Very few of these instruments were endorsed as having passed the OMERACT filter, and fewer than 5 of 128 respondents endorsed any single instrument. Finally, 90.2% believed that, in addition to the level of productivity, worker productivity should be measured in the context of job demands, accommodations at work, and coworker/supervisor support at work. In summary, it was agreed that measurement of worker productivity was very important but rarely addressed, was highly contextualized, and that there were no clear candidates for instrumentation.

*Update of the literature review.* In 2007 a review of the 19 available scales for absenteeism and presenteeism was published<sup>2</sup>. In the update we found 21 instruments, with increasing evidence for meeting the OMERACT filter. Table 1 summarizes these instruments. Table 2 provides an overview of the evidence from published literature within musculoskeletal populations for meeting the OMERACT filter. Not all the instruments listed in Table 1 are included in Table 2, as many have not been used in musculoskeletal conditions. Table 2 also provides additional assessments based on 2 studies soon to be published on the Work Productivity Survey (WPS-RA) presented at EULAR 2008<sup>12,13</sup>. In this instrument, the mean number of days per month with reduced productivity and the mean degree of interference of arthritis with work were both sensitive to differences between methotrexate treatment alone and methotrexate plus Certolizumab Pegol<sup>12</sup>. In a study of the

validity and responsiveness of the WPS-RA, Osterhaus, *et al* reported a single item standardized response mean of 1.10 for the interference scale to change of American College of Rheumatology response criteria (ACR-20) responders over non-responders<sup>13</sup>. The WPS-RA was also found to discriminate between combination therapy (Certolizumab Pegol and methotrexate) versus methotrexate alone<sup>12</sup>. Table 3 provides a summary of one study that directly compared the measurement properties (internal consistency, feasibility, validity, and responsiveness) of 5 at-work productivity loss scales, conducted in part to support this OMERACT initiative<sup>14</sup>. The Work Activity Limitations Scale (WALS), Work Instability Scale (WIS), and Work Limitations Questionnaire (WLQ-25) were the strongest contenders and were also preferred by the study participants<sup>14</sup>. WALS and WIS were more sensitive to difficulty experienced at work, and WLQ to self-perceived loss in productivity. Although contributing to the OMERACT evidence, this study also raised the issue of how task-specific the instruments seem to be, and whether they measure productive work performed outside the workplace. From this review of the literature, it was felt that there were 6 main contenders with at least some evidence satisfying each component of the OMERACT filter evidence: WALS, WIS, WLQ-25, Work Productivity and Activity Impairment (WPAI), Work Productivity Scale-Rheumatoid Arthritis version (WPS-RA), and Health Productivity Questionnaire (HPQ).

*Workshop at OMERACT 9.* At the workshop held at OMERACT 9, after brief background presentations, participants reviewed the available evidence for 21 instruments in breakout groups with trained facilitators. They were asked to discuss and vote on which instruments they believed to be the strongest contenders to advance for further work and validation. Additionally, they discussed and defined variables to be considered when assessing absenteeism.

Several concerns were raised during the process. Many participants had not previously seen all 21 questionnaires. Many felt that the instruments were too simplistic to capture the complexity of the person/job fit and its likely course over time and thus were unable to adequately measure presenteeism. They reiterated the point raised at OMERACT 8 that the different questionnaires really assess different aspects of worker productivity, and that no one instrument was able to measure absenteeism and also presenteeism in the context of the individual and their "job fit." Finally, although OMERACT filter evidence was acknowledged, the heterogeneity of the results with no clearly outstanding winner raised concerns about moving forward with one or even several of the top 6 contender instruments, rather than revisiting core measurement concepts.

OMERACT 9 participants were asked to vote on endorsing questionnaires found among the top 6 in order to identify a working set of instruments. As shown in Figure 3, the votes ranged from WIS-RA (54%), WPS-RA (48%) and



Table 1. Content and structure of measures of presenteeism found in the literature. Not all have been used in MSK/Arthritis.

Instruments	Concept	Scored Scales and No. of Items ()	Timeframe
<b>HLQ (\$)</b> A & P	Proportion of time experiencing various aspects of decreased performance	Module 2: reduced productivity at paid work due to illness (7)	2 wks
<b>WHO-HPQ (\$)</b> A & P	Section 1: Proportion of time Section 2: Overall work performance (0–10 scale) Section 3: Self vs 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 wks
<b>HRPQ-D (\$)</b> A & P	No. of hours	Single scale (1)	Daily for 1 wk
<b>HWQ (\$)</b> P	Quality, quantity and efficiency of work and impact on well being	1. Productivity (11) a. personal assessment of productivity (5/11) b. other’s 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 wk
<b>OST (\$)</b> A & P	% effectiveness at doing job while symptomatic	Single score	1 mo
<b>QQ## (\$)</b> P	No. of hours of reduced productivity	1. Quality of work done compared to normal (1) 2. Quantity of work done (1)	Daily
<b>SPS6</b> P	Degree of agreement with limitations at work	1. Completing work (3) 2. Avoiding distraction (3)	4 wks
<b>SPS13 (\$)</b> A & P	Proportion of the time encountering a difficulty	1. Work impairment score (10) a. Completing work (5) b. avoiding distraction (5) 2. Work output score (1)	4 wks
<b>WALS</b> P	Amount/level of difficulty	Single scale (11)	NA
<b>WHI (\$)</b> A & P	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 (h/day)	2 wks
<b>WIS</b> P	No. of difficulties encountered (stress, pace); work instability = degree of mismatch between self and job	Single scale (23)	“Now”
<b>WLQ25 (\$)</b> P	Proportion of time having difficulty	1. Physical demands (6) 2. Mental-interpersonal (9) 3. Time management (5) 4. Output demands (5)	2 wks
<b>WLQ16 (\$)</b> P	Proportion of time having difficulty	1. Physical demands (4) 2. Mental-interpersonal (6) 3. Time management (2) 4. Output demands (4)	4 wks
<b>WLQ8 (\$)</b> P	Proportion of time having difficulty	1. Physical demands (2) 2. Mental-interpersonal (2) 3. Time management (2) 4. Output demands (2)	2 wks
<b>WPAI-GH (\$)</b> A & P	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 wk
<b>WPSI (\$)</b> A & P	No. of hours	Single scale (1)	2 wks–1 yr
<b>WRF/WL26 (\$)</b> P	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 wks
<b>ORQ (\$)</b> P	Degree of “interference with job”	Two subscales: 1. Productivity scale (4) 2. Satisfaction scale (4)	NA

Table 1. Continued.

Instruments	Concept	Scored Scales and No. of Items ()	Timeframe
<b>RA-WPS (\$)</b> A & P	No. of days of reduced productivity, degree of interference with work	Eight items + one sociodemographic: Missed days at work/household work (2) Degree of interference (2) Days with productivity at work/household work reduced by half or more (2) Days missed family, social, or social activities (1) Days with outside help (1)	1 mo
<b>WLQ (by Munir) (\$)</b> P	Frequency/proportion of time	6 items: Physical demands (2) Cognitive demands (3) Social demand (1)	12 mo
<b>WSL (\$)</b> P	Degree to which various items described behaviors at work or to indicate how often they engaged in certain thoughts at work. Behaviors, symptoms, and emotions experienced “during periods of high work demands.”	Part 1: Characteristic responses at work (categorical items): 57 items 1. Working Through Pain (13) 2. Social Reactivity (12) 3. Limited Workplace Support (10) 4. Deadlines/Pressure (10) 5. Self-Imposed Workspace/Workload (10) 6. Breaks (2) Part 2: Response to increased work demands (dichotomous items) 34 items 1. Mood (feelings of Anger, Grumpiness, and Dread) (14) 2. Pain/Tension (Neck Pain, Shoulder Tension, and Back Tension) (7) 3. Autonomic Response (Cold Feet, Clammy Hands, and Heartburn or Upset Stomach) (8) 4. Numbness/Tingling and accounts (Hand/Finger Numbness, Feel Tingling Down Hands, and Feel Weaker) (5)	NA
<b>WSS (\$)</b> P	Same as WSL	Part 1: Characteristic responses at work (24) 1. Working through pain (6) 2. Social reactivity (5) 3. Limited workplace support (4) 4. Deadlines/pressure (4) 5. Self-imposed workload/workload (3) 6. Breaks (2) Part 2: Response to increased work demands (8) 1. Mood (6) 2. Autonomic response (2)	

A: absenteeism; P: presenteeism, MSK: musculoskeletal, NA: insufficient information available, or not stated. Measures in bold were used in arthritis/MSK studies. Measures with “\$” in parentheses indicates potential or current utilization in economic costing analyses. For definitions of instruments see Table 2.

WALS (47%) to a handful of endorsements for the instruments outside the top 6. All these votes were below the 75% threshold considered to reflect an endorsement by OMERACT. The facilitators received substantial feedback regarding the lack of a strong endorsement. Because work and work productivity are so contextualized, there was a resistance to recommend moving forward until a better conceptual and measurement framework for worker productivity could be developed. Discussion supported the need for ongoing work to define this type of instrument, a framework for measurement and interpretability that would encompass transitions between all the states — absenteeism, presenteeism, changes in job demands, changes in employer, and part-time versus full-time work — transitions that may have nothing or everything to do with personal choices made because of arthritis. Several breakout groups named specific challenges faced in conceptualizing and therefore measuring worker productivity.

## ADDITIONAL FACTORS AND INDICATORS FOR MEASUREMENT OF WORKER PRODUCTIVITY

At OMERACT 9, several additional factors were identified that should be considered in the measurement of worker productivity (see Table 4).

In terms of absenteeism indicators, there was 94% endorsement of the following to be considered when measuring absenteeism: work days missed due to arthritis (sick days), vacation days taken because of arthritis, part days/hours missed because of arthritis, change in number of hours worked per week, temporary work cessation (work disability/sick leave), and permanent work cessation due to arthritis. These indicators have been endorsed by OMERACT 9. Additional consideration will be given to assessment of permanent work cessation due to (a) health other than arthritis; (b) choice; and (c) retirement; as well as unemployed but looking for work (employable). It is recommended that these queries be

**Table 2.** Summary of the position of presenteeism measures on the OMERACT filter. This table focuses on the level of evidence available for the measurement properties of the presenteeism scales. Evidence had to be available in an arthritis population, or in data that had been stratified and showed separate results for arthritis/musculoskeletal disorders (A/MSK). If evidence was available on a given feature but in another population, we would use parentheses () to indicate that it was promising but might not generalize to A/MSK.

Instrument and key reference/s for evidence	OMERACT Truth		OMERACT Discrimination		OMERACT Feasibility***
	Face/Content Validity*	Construct Validity	Reliability**	Responsiveness	
Endicott Work Productivity Scale (EWPS) <sup>15</sup>	(++)	(++)	(+)	—	(++)
Life Functioning Questionnaire (LFQ) <sup>16</sup>	(++)	(++)	(+)	—	(++)
Health and Labour Questionnaire (HLQ) <sup>17</sup>	(++)	(++)	—	—	(++)
Health and Work Performance Questionnaire (HPQ) <sup>18-21</sup>	++	++	—	(+)	++
Health-Related Productivity Questionnaire Diary (HRPQ-D) <sup>22</sup>	(+)	—	—	—	(+)
Health and Work Questionnaire (HWQ) <sup>23</sup>	(+)	(+)	—	—	(+)
Osterhaus technique (OST) <sup>24</sup>	(++)	(+)	—	—	(++)
Quantity and Quality Method (QQ) <sup>25</sup>	(++)	(+)	—	—	(++)
Stanford Presenteeism Scale-6 items (SPS6) <sup>26</sup>	(++)	(++)	—	(+)	(++)
Stanford Presenteeism Scale-13 items (SPS13) <sup>27, 28</sup>	+	+	—	—	+
Work Activity Limitations Scale (WALS) <sup>29</sup>	++	++	—	—	++
Work and Health Interview-The American Productivity Audit (WHI) <sup>30,31</sup>	++	—	—	—	++
Work Instability Scale-Rheumatoid Arthritis (RA-WIS) <sup>32</sup>	+	+	+	—	+
Work Limitations Questionnaire — 25 items (WLQ25) <sup>33-35</sup>	++	++	—	(++)	++
Work Limitations Questionnaire — 16 items (WLQ16) <sup>36,37</sup>	++	++	—	+	++
Work Limitations Questionnaire — 8 items (WLQ8) <sup>38,39</sup>	++	++	—	(+)	++
Work Productivity and Activity Impairment-General Health (WPAI-GH) <sup>31</sup>	+	+	+	(+)	+
Work Productivity Short Inventory (aka Wellness Inventory by Pfizer) (WPSI) <sup>40, 41</sup>	++	++	(+)	—	++
Work Role Functioning (WRF)/WL26 <sup>42</sup>	(+)	(+)	—	—	(+)
Occupational Role Questionnaire (ORQ) <sup>43</sup>	+	+	+	—	+
RA-Specific Work Productivity Survey (WPS-RA) <sup>12,13</sup>	+	+	+	+	+
Work Limitations Questionnaire (WLQm) <sup>36</sup>	+	+	—	—	+
Workstyle Scale — Long version (WSL) <sup>44</sup>	+	+	+	—	—
Workstyle Scale — Short version (WSS) <sup>45</sup>	+	+	+	—	+

\* Includes “sensitivity” 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).

Grading System (each element is graded on the level of evidence): ++ = 2 or more studies with evidence supporting this property in A/MSK; + = 1 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. OMERACT filters: Truth = may satisfy the following: face, content, construct, criterion; Discrimination = reliability and responsiveness, and in particular responsiveness in a clinical trial; Feasibility = easy, time, money, interpretability.

**Table 3.** Psychometric properties derived from a concurrent comparison of 5 measures of at-work productivity loss in persons with inflammatory arthritis and osteoarthritis<sup>14</sup>.

Instrument and Key Reference	OMERACT Truth		OMERACT Discrimination		OMERACT Feasibility
	Face/Content Validity	Construct Validity	Reliability	Responsiveness	
EWPS	+	+	—	+	+
SPS6	+	+	—	+	+
WALS <sup>29</sup>	+	+	—	+	+
RA-WIS	+	+	—	+	+
WLQ Index	+	+	—	—	+
WLQ-Time management	+	+	—	—	+
WLQ-Physical demands	+	—	—	+	+
WLQ-Mental-interpersonal	+	+	—	+	+
WLQ-Output demands	+	+	—	—	+

For instrument definitions and details on the OMERACT filter see Table 2.

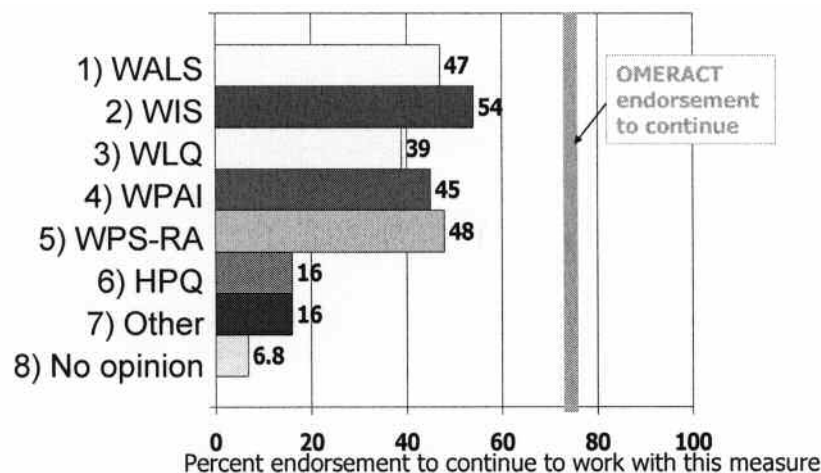


Figure 3. OMERACT 9 plenary votes for the endorsement of each at-work productivity instrument. WALS: Work Activity Limitations Scale; WIS: Work Instability Scale (Rheumatoid Arthritis Version); WLQ: Work Limitations Questionnaire; WPAI: Work Productivity and Activity index; WPS-RA: Work Productivity Survey, Rheumatoid Arthritis version; HPQ: Health Productivity Questionnaire.

Table 4. Additional factors to be considered in the measurement of worker productivity.

- Ability to combine information on absenteeism and presenteeism
- Ability to use the same scale to provide information for both outcome (health) state and economic analyses
- How to interpret a part-time or modified job versus a full-time job with the same instrument measure (i.e., level of difficulty at job). For example, how should days absent from a part-time job be compared to days off from a full-time job?
- Work needs to be placed in the context of the person's whole life and work-life balance: choices made to stay at work or leave work, or to reduce work demands and pursue leisure/family responsibilities; decisions made around resources (financial and time) to manage the disease, including medical appointments, treatments, and medication costs.
- Unpaid work, as that fits into the equation of how a person manages work responsibilities. Child or elder care responsibilities will influence paid work
- Job transitions need to be defined and interpreted. For example, should a switch from full- to part-time work be considered absenteeism if it was due to arthritis?
- It is questionable whether unemployed, but able to work and looking for work, should be counted as absenteeism. This category is sometimes called "employable," as the individual has not left the workforce entirely; rather they don't have a job to fit into at the moment

included in future studies of arthritis with reports back to OMERACT 10.

The research agenda for worker productivity was defined at OMERACT 9 as follows:

1. What role does length of absenteeism have on overall worker productivity?
2. What perspective should bear on a measure of productivity: self, family, society, workplace?
3. We need a better understanding of what is happening at the decision point to "not work."
4. What is going on at home that allows some people to keep working?
5. What impact does work, work absence, and presenteeism have on self-esteem and self-efficacy? Does that depend on individual, societal, or workplace variables?
6. How much is workplace and societal culture influencing open discussion about at-work productivity loss? This would include issues such as disclosure of arthritis to the

workplace, societal level health benefits, and workplace culture regarding illness.

7. What is the impact of arthritis on teamwork at the workplace?

8. Will we have a disease specific instrument? Or within arthritis, should we have an osteoarthritis instrument, a rheumatoid arthritis instrument, and an ankylosing spondylitis instrument? Or should we aim for a generic instrument that can also be used for other diseases?

In conclusion, worker productivity is an important outcome measure in arthritis and an important component of economic evaluations. At OMERACT 9 we reached consensus on several indicators of absenteeism and found additional information on validity and discrimination filter evidence for several measures of presenteeism. However, while some instruments looked promising, the variability in target concept, validity, and even responsiveness resulted in no single instrument being chosen based on OMERACT filter evi-



dence alone. There are conceptual and theoretical differences that must be sorted out. The message from OMER-ACT participants was to return with a better-developed framework for the measurement of worker productivity in order to inform the final selection and endorsement of an instrument.

## LOOKING FORWARD TO OMERACT 10

The Worker Productivity Workshop concluded with 3 defined tasks.

1. We need to develop a framework for the measurement of productivity loss within a job context. This context is defined by the individual's work status (full, normal hours vs part time or modified duties; unemployed; retired; etc.) and job type (physical, psychological, output demands of the current job). This framework should also be sensitive to the balance between paid and unpaid roles — working may be considered a success, but not if it is at the cost of home, family, social, or leisure activities. A template for consideration is shown in Figure 4: horizontal boxes define different work states and vertical boxes indicate the need for measures of absenteeism and/or presenteeism given this state. The dotted box reports the job context, which defines the nature of the job and work organization, as well as other contextual factors. Workshop discussions supported the need for a modular measure that would allow for description

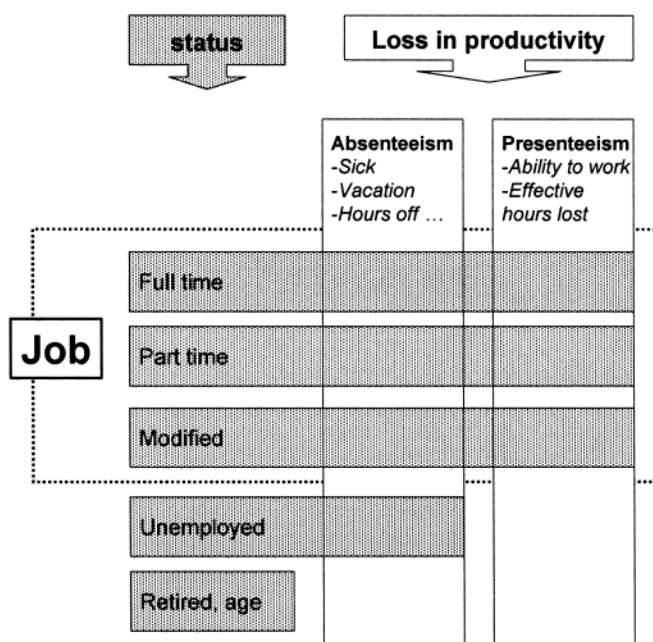


Figure 4. Potential framework for measurement of worker productivity that will serve as a starting point for OMERACT efforts over next 2 years. Different job states are described in rows. The latter 2 columns describe the need for measures of absenteeism and presenteeism (at-work productivity loss) for each state. In the background is the job, which also has to be measured in terms of its demands, organization, culture, and possibly, its attributes such as its flexibility.

of the job as well as absenteeism and presenteeism related to that job.

2. Having created this framework, we need to find or develop measures of absenteeism and presenteeism and job context descriptors. There was strong endorsement for a wider array of absenteeism indicators. There are some contender instruments for assessment of presenteeism, but it may be necessary to take parts from several different instruments to assemble a better measure of the entire concept of at-work productivity loss.

3. We need to work on methods to facilitate meaningful analyses. These efforts may follow a more modular worker productivity instrument, from which appropriate measures are drawn specific to the circumstances at the time of data collection. For example, there is no need to measure at-work productivity if an individual is off work on sick leave. Nor is there a need to measure absenteeism hours or days if a person is having difficulty only at work. Appropriate measures would also address issues at transition points and how to model the pathway of an individual's story over time, which may include episodes of absenteeism and trials of return to work. Perhaps a set of scales (modular format) would allow cross talk between states of absenteeism and presenteeism. Additional work is also required to define measurement properties, as well as interpretability of these instruments (minimal clinically important differences and patient acceptable states for at-work productivity loss).

Over the course of the next 2 years, the group will be seeking sponsorship for an international consortium of researchers, clinicians, and individuals with arthritis — with expertise in measuring job demands and understanding work-life balance — to work to understand how the modular components should be analyzed and interpreted for use in randomized controlled trials. We will draw from OMERACT participants, and also from experts outside of OMERACT in the work and health research arena.

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