

# Estimation of Indirect (Work-Related Productivity) Costs Associated With Moderate-to-Severe Plaque Psoriasis in Germany

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## BACKGROUND

- Moderate-to-severe plaque psoriasis (psoriasis) is a chronic skin disease that causes skin cells to grow too quickly, resulting in thick patches of skin referred to as plaques.<sup>1</sup>
- The total cost for the treatment of this disease includes direct (therapy of the patient) and indirect (less tangible, secondary) cost components such as lost wages.<sup>2</sup>
- Indirect cost data are necessary for cost-effectiveness studies from a societal and employer's perspectives. Unfortunately, cost-effectiveness studies from these perspectives are limited because productivity loss data are rarely collected in psoriasis clinical trials.
- Previous research suggests the possibility of estimating indirect costs via work productivity loss data from patients with psoriasis.<sup>3</sup>

## OBJECTIVE

- To estimate indirect costs of moderate-to-severe plaque psoriasis dependent on the level of psoriasis improvement (Psoriasis Activity and Severity Index [PASI] change from baseline) due to treatment from both societal and employers' perspectives in Germany.

## METHODS

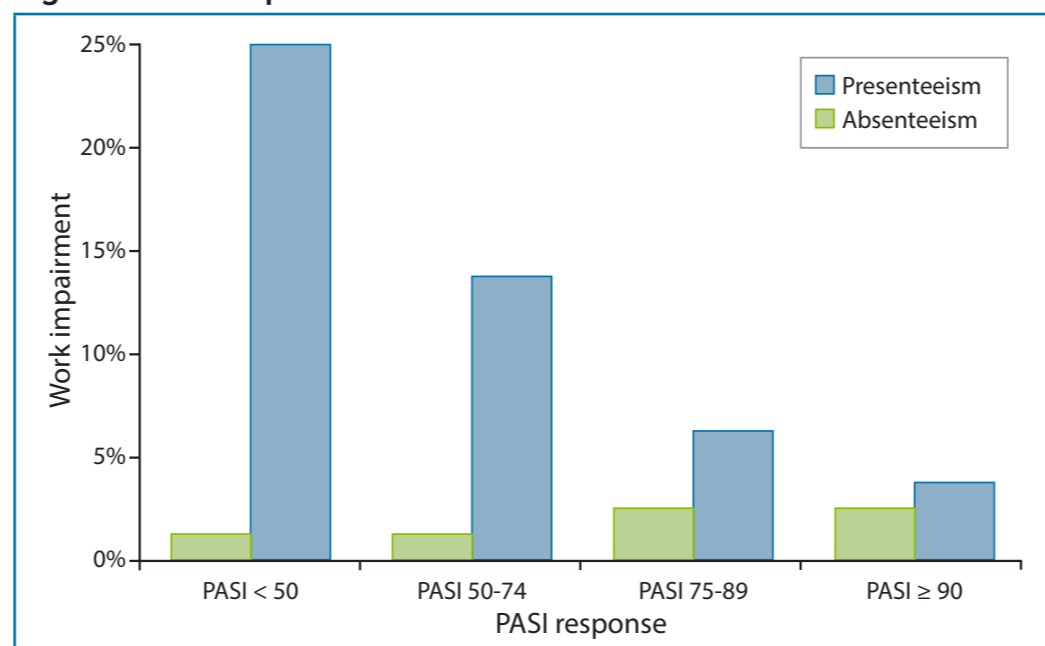
- Work Productivity and Activity Impairment Questionnaire: Psoriasis (WPAI:PSO) data from a recent clinical trial (CLEAR) were analyzed by PASI response at 16 weeks.
  - The WPAI is a quantitative measure of health-related work productivity loss, with a 1-week recall period, that assesses work time missed (absenteeism), reduced on-the-job effectiveness (presenteeism), and daily activity impairment.<sup>4</sup>
  - The WPAI can be adapted to specific disease areas and health problems. The psoriasis adaptation of the questionnaire, the WPAI:PSO, is used to collect patient responses regarding the effect of psoriasis on their ability to work and perform regular activities.<sup>5</sup>
  - The CLEAR study (CAIN457A2317) is a randomized, double-blind, placebo-controlled, multicenter clinical trial of secukinumab compared with ustekinumab in patients with plaque-type psoriasis. Primary and secondary endpoints are PASI 90, PASI 75, and Dermatology Life Quality Index response.<sup>6</sup>
- PASI change from baseline (PASI response) was categorized as PASI 0-50, 50-74, 75-89, and  $\geq 90$ , where 0 to 50 indicates a 0% to 50% improvement in PASI score from baseline, 50 to 74 indicates a 50% to 74% improvement in PASI score from baseline, and so on.
  - PASI response is a weighted measurement of the average redness, thickness, and scaliness of psoriasis lesions used to assess the severity of the disease. PASI 75 response (75%-100% improvement in PASI score) is recognized as a clinically meaningful endpoint in clinical trials for psoriasis treatment.<sup>7</sup>
  - While PASI 75 response is the current treatment goal in guidelines, the European Medicines Agency suggests the best evidence of efficacy is shown in patients who achieve PASI 90 response.<sup>8</sup> The European S3-guidelines suggest that PASI 90 response may be discussed as a treatment goal for the future.<sup>9</sup>
  - An analysis of the benefits of achieving skin clearing improvements in patients with psoriasis suggests that those with PASI 90 response achieve greater health-related quality-of-life improvements than those with PASI 75 response.<sup>9</sup>
- Work impairment by PASI score data (Table 1) were obtained from reported work impairment due to psoriasis for CLEAR trial subjects who were employed at baseline.<sup>11</sup>
- All analyses were conducted on pooled secukinumab and ustekinumab data to generate indirect cost estimates based on improvement of the PASI score rather than on treatment.

Table 1. Overall Work Impairment by PASI Response

PASI Response	Overall Work Impairment	
	Mean	SE
PASI < 50	22.78%	0.155
PASI 50-74	13.34%	0.085
PASI 75-89	6.40%	0.063
PASI $\geq 90$	4.93%	0.065

SE = standard error.  
Source: Novartis, 2014a.<sup>11</sup>

Figure 1. Work Impairment Due to Absenteeism and Presenteeism



- Overall work impairment due to psoriasis decreased with greater skin clearance in the CLEAR study, with the majority of impairment being related to presenteeism rather than absenteeism (Figure 1).
- Employment parameter inputs (Table 2) were obtained from the CLEAR study and German national employment averages for full- versus part-time employment, the number of hours worked per week, and hourly wages.

Table 2. Employment Parameters

Parameter	Value	Source
Percentage of psoriasis population employed	67.00%	7
Part-time percentage of employment	18.92%	15,16
Average work hours per week		
Full-time	41.70	13
Part-time	16.92	13
Average hourly wage		
Full-time	€20.99	1
Part-time	€16.79	1

- The percentage of the psoriasis population that is employed was obtained from the demographics and background characteristics of the CLEAR study.<sup>12</sup>
- The percentage of patients employed part time was calculated as the total number of men and women employed part time<sup>13</sup> divided by the total number of employees in Germany.<sup>14</sup>
- The average number of hours per work week for both full-time and part-time employees was obtained from Statista (2013),<sup>14</sup> assuming a 5-day work week.
- The average hourly wage for both full-time and part-time employees was obtained from Destatis (2015)<sup>16</sup> and assumed to be the cost of lost productivity per hour.
- Productivity loss (average work hours lost per week) was calculated as the average work hours per week times the percentage of work impairment.
- Annual indirect costs were calculated by multiplying the productivity loss by the average hourly wage data.
- Assuming PASI response values are the lower bound of the range (e.g., PASI 50-74 = 50) (based on Rodgers et al., 2011<sup>17</sup>), a simple linear regression was fit to estimate indirect costs per unit change in PASI score.

## RESULTS

- On average, patients working with poorly controlled moderate-to-severe psoriasis (PASI response < 50) lost > 8 hours per week of productive work time due to psoriasis symptoms, while productivity loss for patients with high clearance (PASI response  $\geq 90$ ) was small (< 2 hours/week) (Figure 2).
- Weekly and annual indirect costs by PASI response for patients with psoriasis in Germany were estimated from a societal (67% of patients working) and employer's perspective (100% of patients working).
  - Annual indirect costs per patient were estimated to decrease with increased PASI response level from both a societal and an employer's perspective (Figure 3).
  - Indirect costs associated with PASI 90 response were 78% lower than those associated with PASI response < 50, 63% lower than those associated with PASI 50-74 response, and 23% lower than those associated with PASI 75-89 response.
- With each unit change in PASI improvement, annual indirect costs were estimated to decline by €82 from the employer perspective and €55 from a societal perspective (Figure 4).

Figure 2. Average Work Hours Lost Per Week

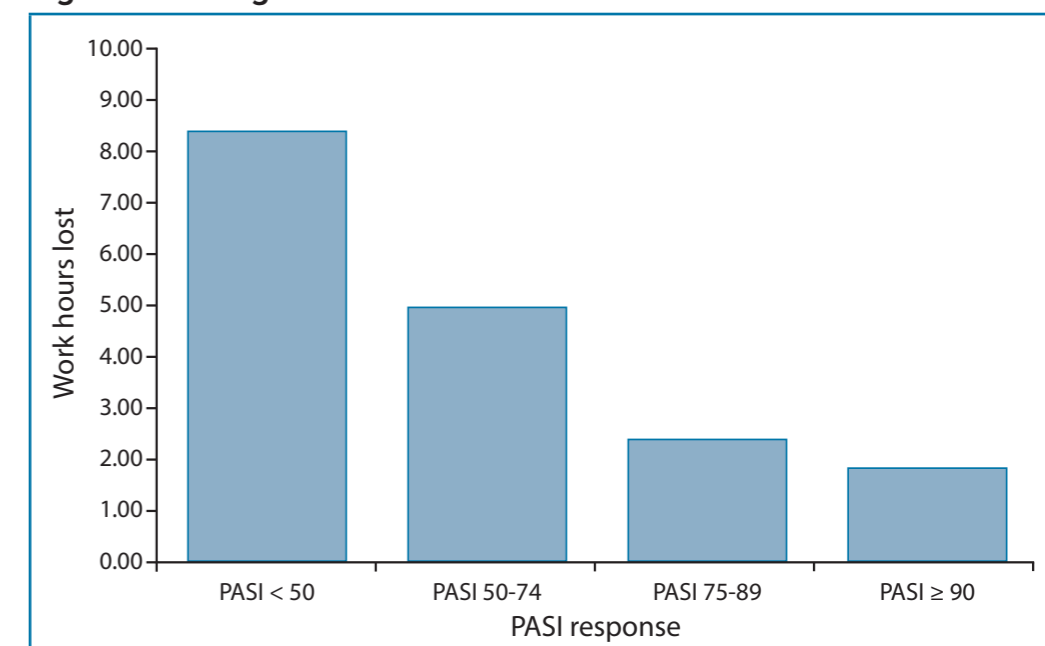


Figure 3. Annual Employer and Societal Indirect Costs

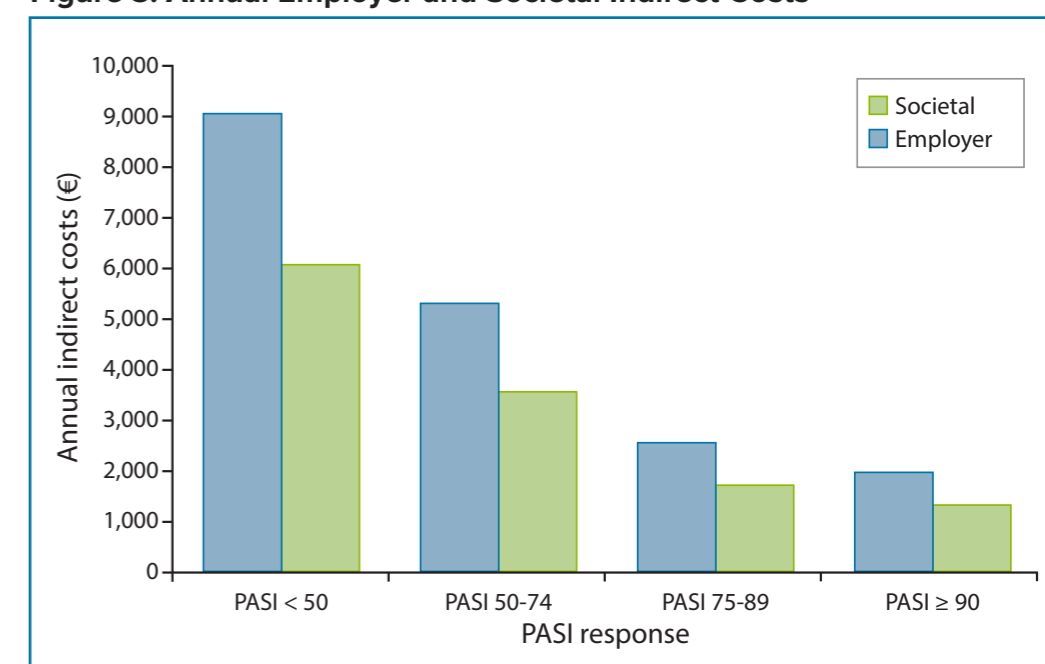
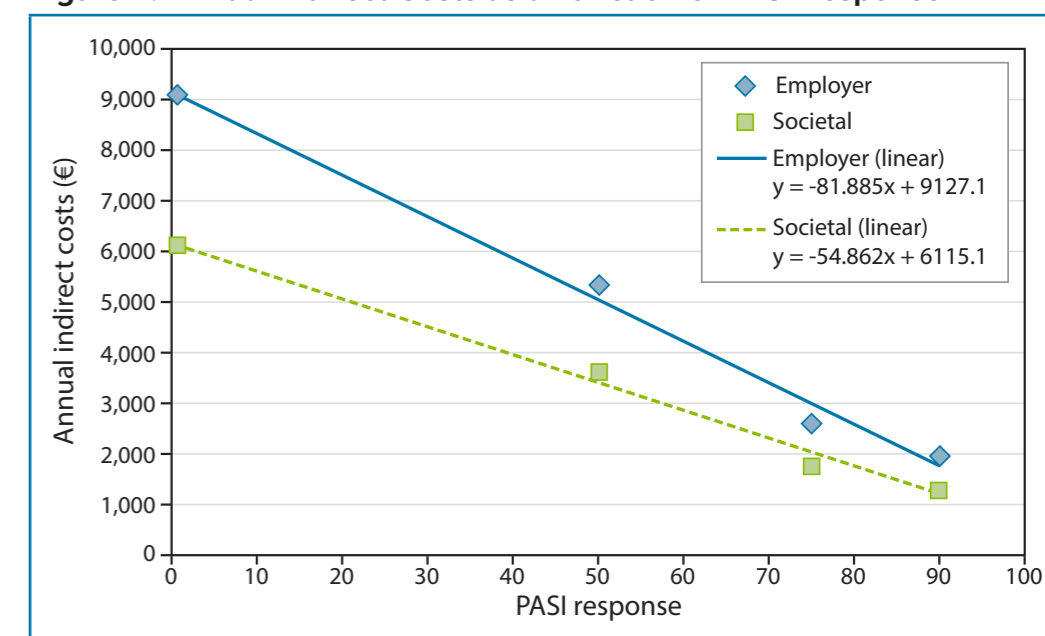


Figure 4. Annual Indirect Costs as a Function of PASI Response



## LIMITATIONS

- Short-term data were used to project long-term costs.
- Wages for the general population were assumed to be similar to wages for the psoriasis population.
- The percentage of the patients with psoriasis employed obtained from CLEAR trial data may not be representative of real-world employment percentages of the entire psoriasis population.
- The simple regression predicting indirect costs as a function of improvement of PASI score was conducted on summary statistics rather than patient-level data.

## CONCLUSION

- Work impairment in psoriasis is significant and dominated by presenteeism.
- There is a relationship between PASI response and work impairment, which suggests there is a work and cost benefit of clearing skin beyond PASI 75 response.
- PASI 90 response is linked to a prominent increase in workplace productivity and reduction in indirect costs from both a societal and employer perspective.

## CONTACT INFORMATION

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Please see handout for complete reference list.