

# Work Productivity and Costs Related to Patients with Inflammatory Bowel Disease

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## Objectives

Inflammatory-Bowel-Disease (IBD) is a lifelong illness with significant disease burden and impact on quality-of-life (QoL) as a result of work ability reduction, sick leave and restriction of leisure time. Productivity-loss often contributes significantly to the total costs in economic evaluations adopting a societal perspective. The aim of this study is to analyze the impact on work productivity (WP), to calculate the WP costs and to elaborate QoL factors that influence WP.

## Methods

A questionnaire was circulated among Austrian IBD patients by the Austrian Crohn's Disease/Ulcerative Colitis Association (ÖMCCV) including general questions about demography, self-assessment of disease state, as well as a Work Productivity and Activity Impairment questionnaire and the Short Inflammatory Bowel Disease Questionnaire (SIBDQ). According to biologic therapy label it must be assumed that patients treated with biologics exhibit moderate to severe disease activity.

**The Work Productivity and Activity Impairment (WPAI)** questionnaire is an instrument to measure impairments in both paid work and unpaid work. It measures absenteeism, presenteeism as well as the impairments in unpaid activity because of health problem during the past seven days. It has been validated to quantify work impairments for numerous diseases including IBD (Reilly et al. 1993). **Short Inflammatory Bowel Disease Questionnaire (SIBDQ)** is a 10 item shortened version of the original IBDQ which was 32 items. SIBDQ measures quality of life in four domains, bowel symptoms, emotional health, systemic systems and social function (Irvine et al. 1996).

A representative number of 510 people (134 males) with median age of 40 years completed the questionnaire. Patients showed a median disease duration of 9 years: 46% were treated with biologics and 64% were employed.

Table 1: Patient characteristic

	IBD	CD	UC
Patients (n)	510	345	165
Female (n, %)	376 (73.7%)	260 (75.4%)	116 (70.3%)
Male (n, %)	134 (26.3%)	85 (24.6%)	49 (29.7%)
Median age	40	41	38
Mean age (SD)	40.4 (13.1)	40.7 (12.7)	39.5 (13.5)
Median disease duration (years)	9	12	6
Self-assessed relapse (n, %)	96 (18.8%)	44 (12.8%)	52 (31.5%)
Received biologics (n, %)	237 (46.5%)	183 (53.0%)	54 (32.7%)
Employed, payed work (n, %)	326 (63.9%)	208 (60.3%)	118 (71.5%)

**Included biologics:** Adalimumab (Humira®), Infliximab (Remicade®), Vedolizumab (Entyvio®), Golimumab (Simponi®), other (Anti IL-12/IL-23) and Infliximab-Biosimilars (Remsima®, Inflectra®)

## Results

### Health related quality of life (SIBDQ score)

The median SIBDQ score was 45 (16-69). The difference between median score in patients in self-assessed remission (n=319) and relapse (n=96) was -18 (95%-CI=-18.5 to -17.5). The HRQoL (SIBDQ Score) of patients with relapses is comparable among therapies

Figure 1: Median SIBDQ score, total population (n=510)

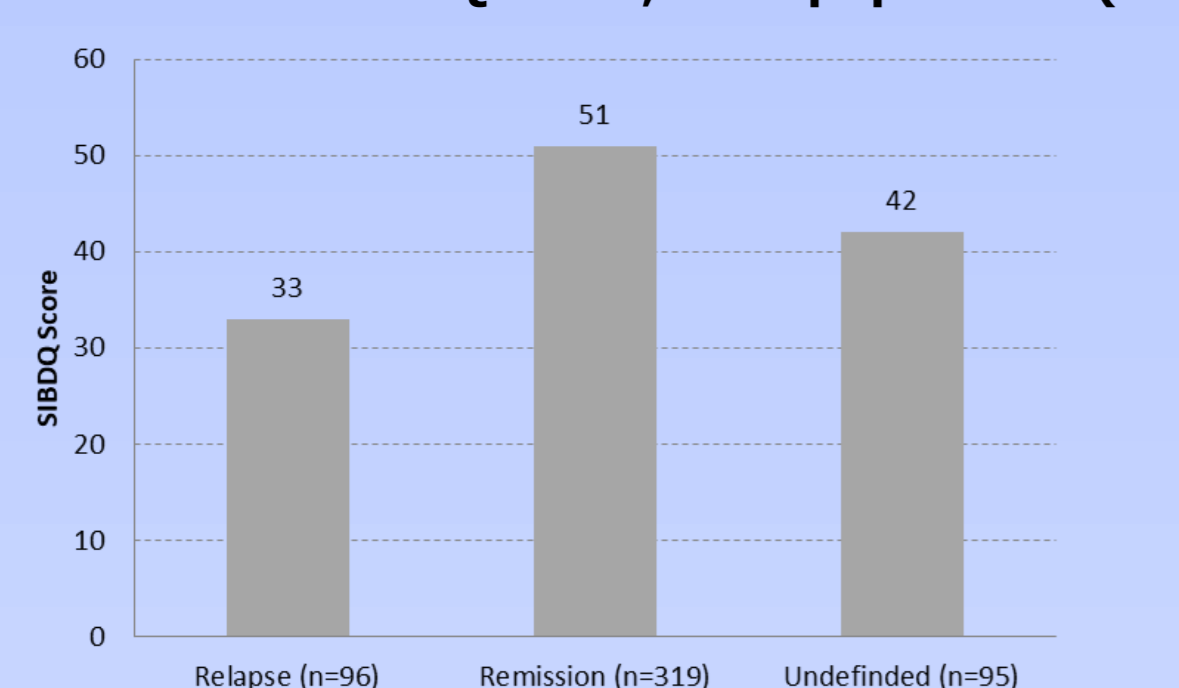


Figure 2: Median SIBDQ score, patients with biologics (n=237)

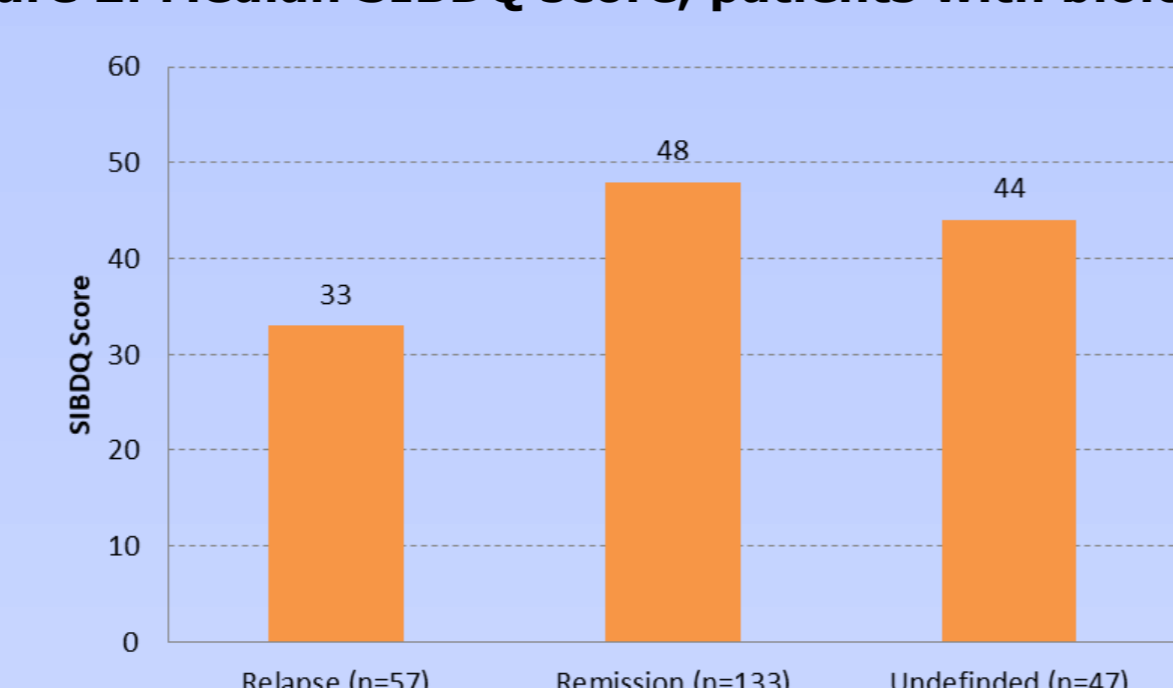
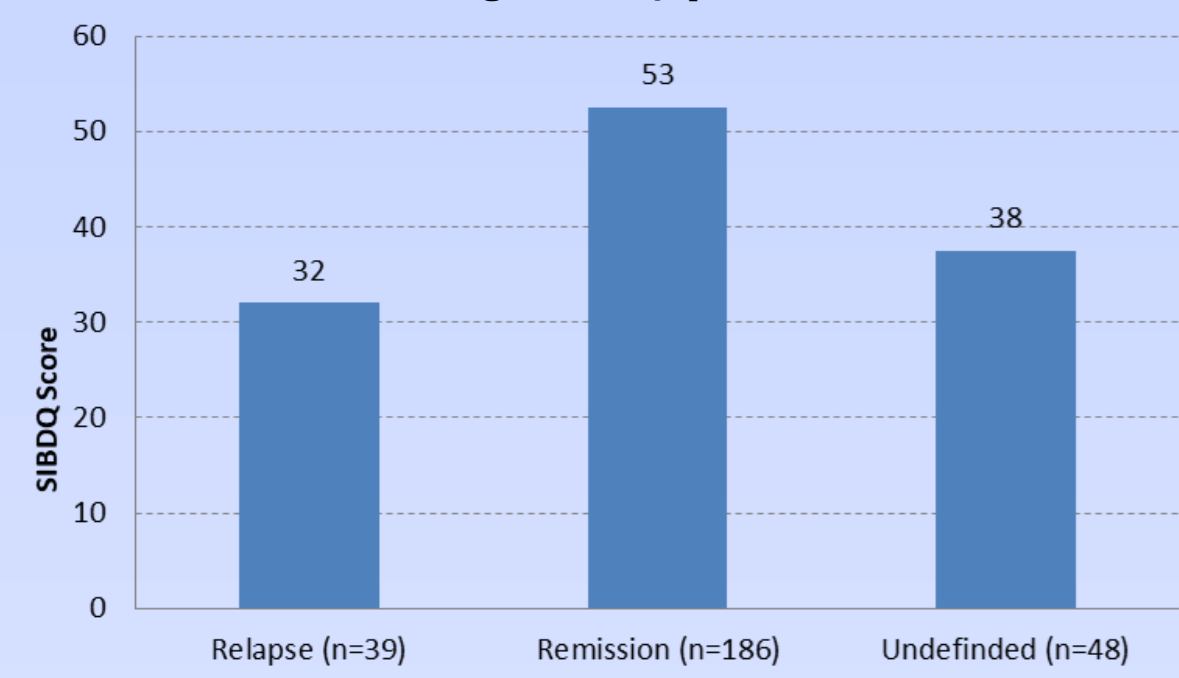


Figure 3: Median SIBDQ score, patients without biologics (n=273)



The median disease duration of patients on biologics was 10 years; without biologics 9 years. The HRQoL did not correlate with the disease duration ( $r=0.0314$ ).

### Work productivity

The mean work productivity reduction amounted to 7 hours and 18 minutes (95%-CI=±1.2) for the last 7 days. Work absenteeism accounted for 4 hours and 30 minutes (95% CI=±1.1) and reduced productivity at the workplace (presenteeism) for 3 hours and 48 minutes (95%-CI=±0.3).

Figure 4: Productivity loss (h:min), total population

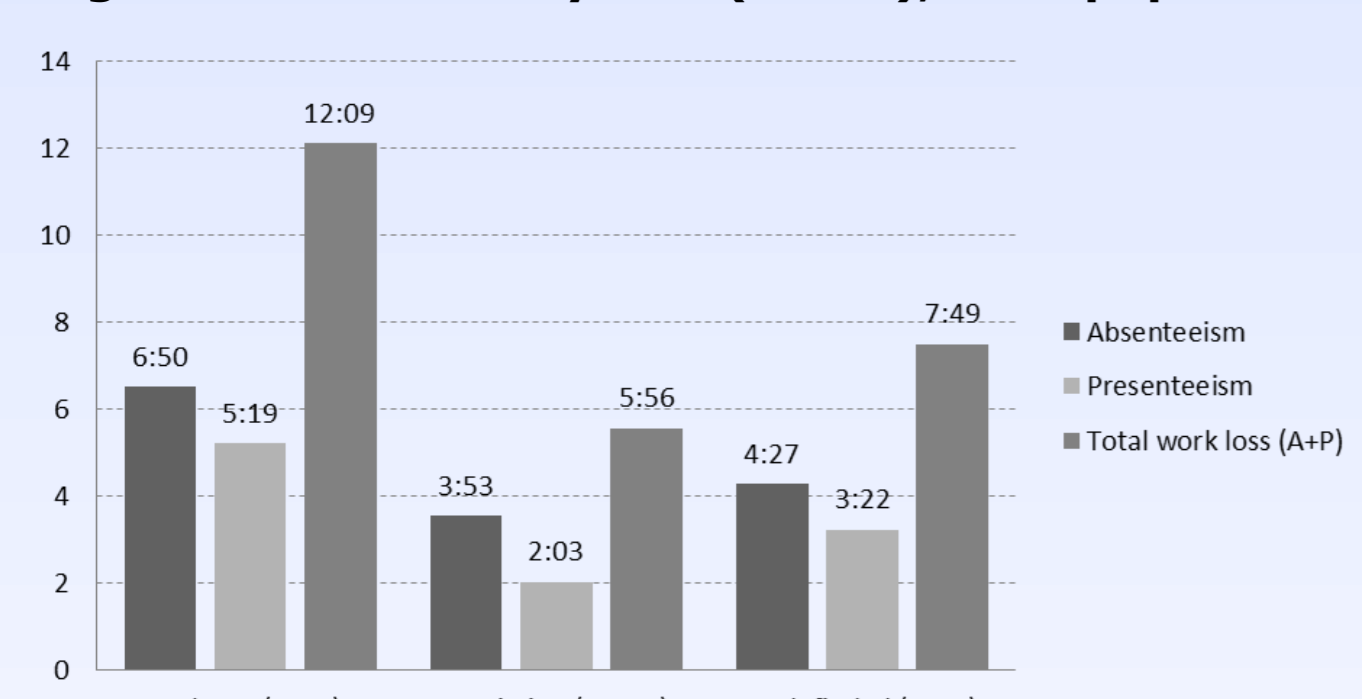


Figure 5: Productivity loss (h:min), patients with biologics

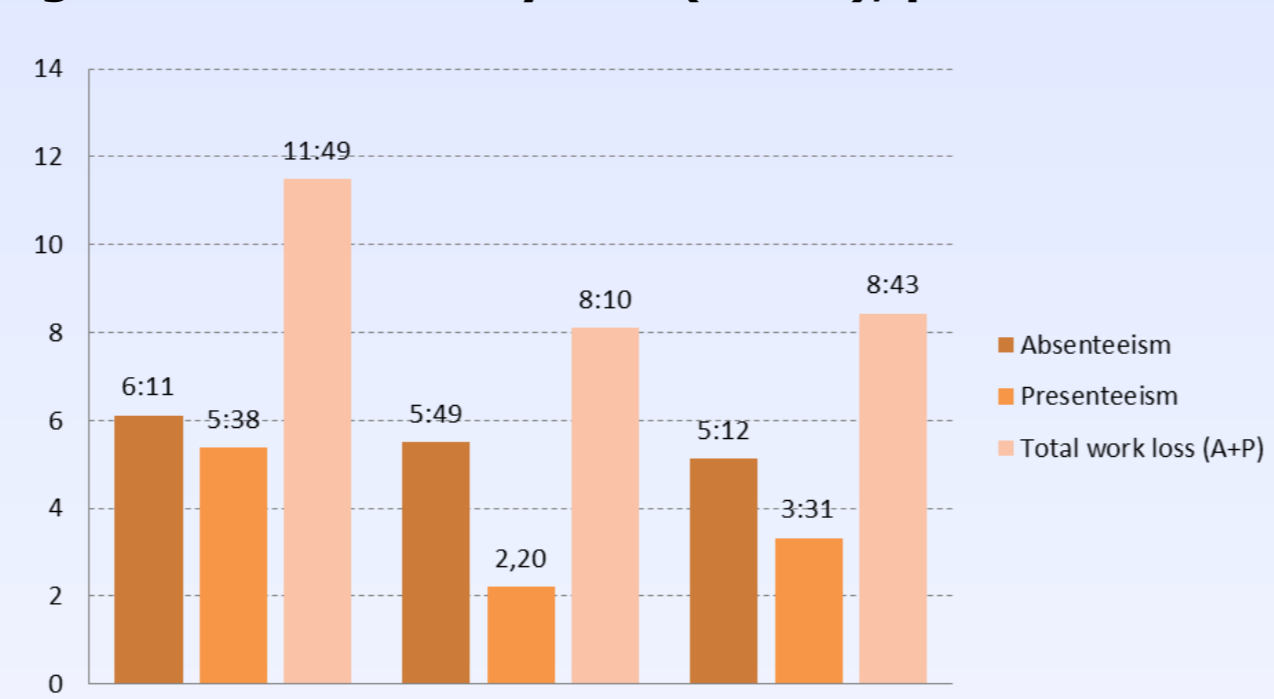
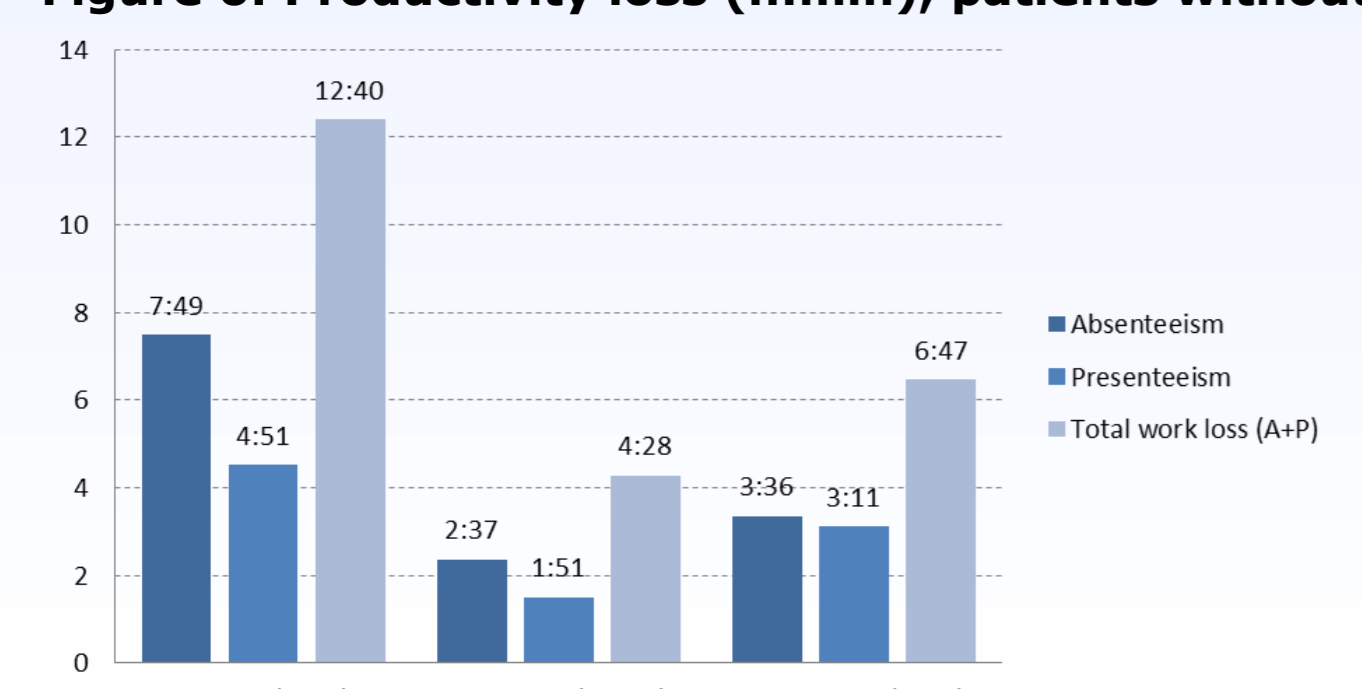


Figure 6: Productivity loss (h:min), patients without biologics

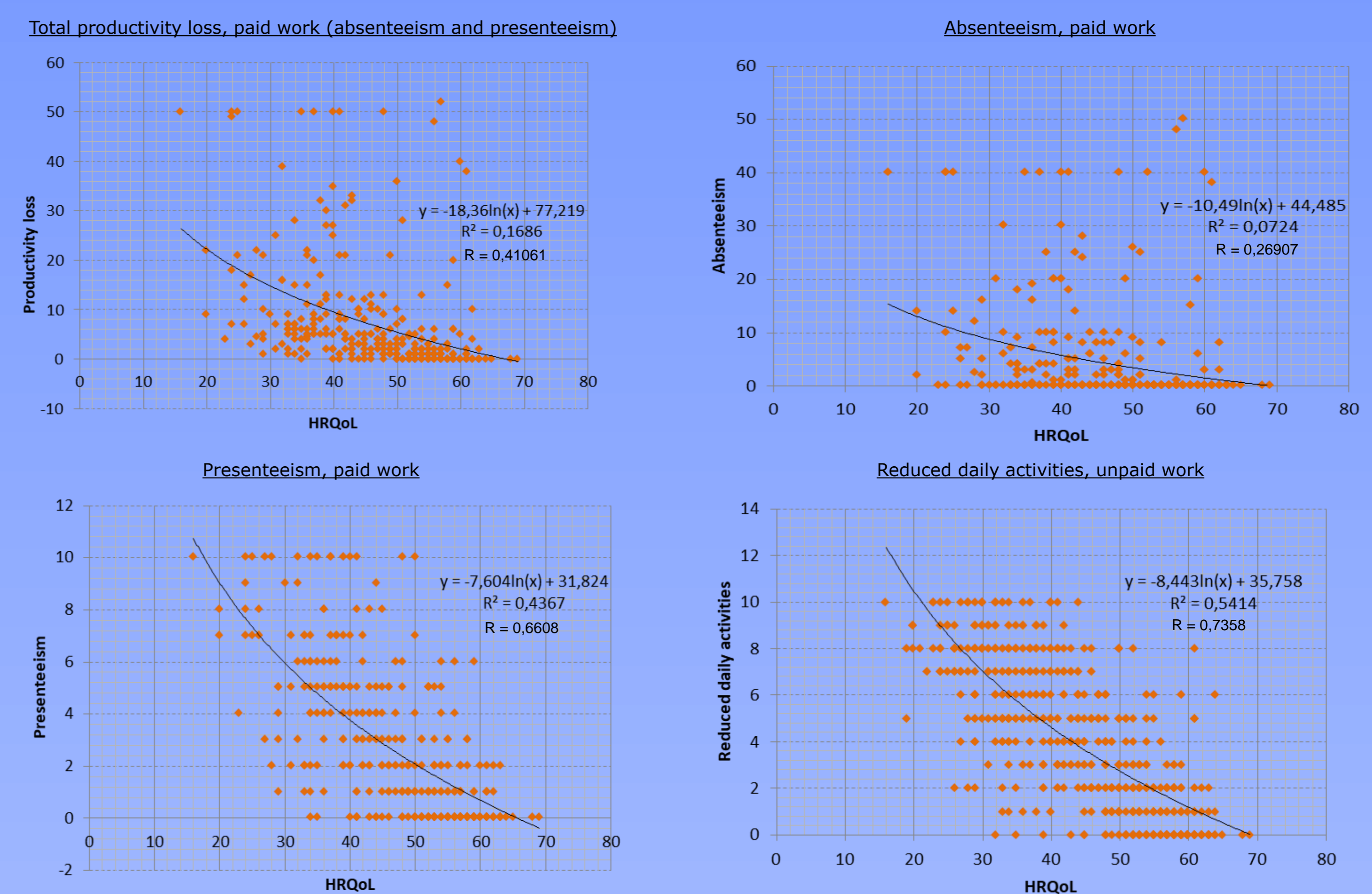


During a relapse 12 hours and 9 minutes working hours were lost vs. 5 hours and 56 minutes in remission ( $p<0.0001$ ); for patients with biologics experiencing a relapse 11 hours and 49 minutes were lost and 12 hours and 40 minutes without biologics.

### Correlation HRQoL (SIBDQ score) and productivity loss

Productivity loss correlated with HRQoL ( $r=0.4106$ ). The impact on HRQoL (as dependent variable) due to reduced productivity is comparable ( $r=0.3963$ ; not displayed in fig. 7). Presenteeism ( $r=0.6608$ ) correlates stronger with productivity loss than absenteeism ( $r=0.26907$ ). The correlation between HRQoL and the level of daily activity ( $r=0.7358$ ) is stronger than with productivity loss. The influence of daily activities (unpaid work) on the HRQoL (as dependent variable) is comparable ( $r=0.7497$ ; not displayed in fig.7).

Figure 7: Regression analyzes: complete productivity loss, absenteeism and presenteeism



X: HRQoL (SIBDQ score), independent variable  
Y: Productivity loss in h, dependent variable

### Indirect costs due productivity loss

Based on average annual gross income (Statistik Austria) an total of 143 € per patient and week (95%-CI=±23.8) were lost (7,411 € per year). Among patients in relapse on average 12.377 € per year compared to 6,040 € per year of patients in remission ( $p<0.0001$ ) were lost.

In line with the positive correlation between disease duration and treatment with biologics ( $r=0.4326$ ), patients receiving biologics exhibit higher costs due to productivity loss compared to patients without biologics (9,236 € vs. 5,894 €;  $p=0.0011$ ). Productivity loss of biologics first line patients is lower than in later lines (7.499 vs. 10.900€;  $p=0.0899$ ).

There is a positive correlation between disease duration and treatment with biologics ( $r=0.4325$ ).

Among patients receiving biologics, the cost of productivity loss was highest with Stelara® (16,068 €; 95%-CI ±7,041.8) and lowest with Humira® (6,446 €; 95%-CI ±2,085.7 €).

Figure 8: Productivity (absenteeism and presenteeism) loss with relapse or remission, per year in €

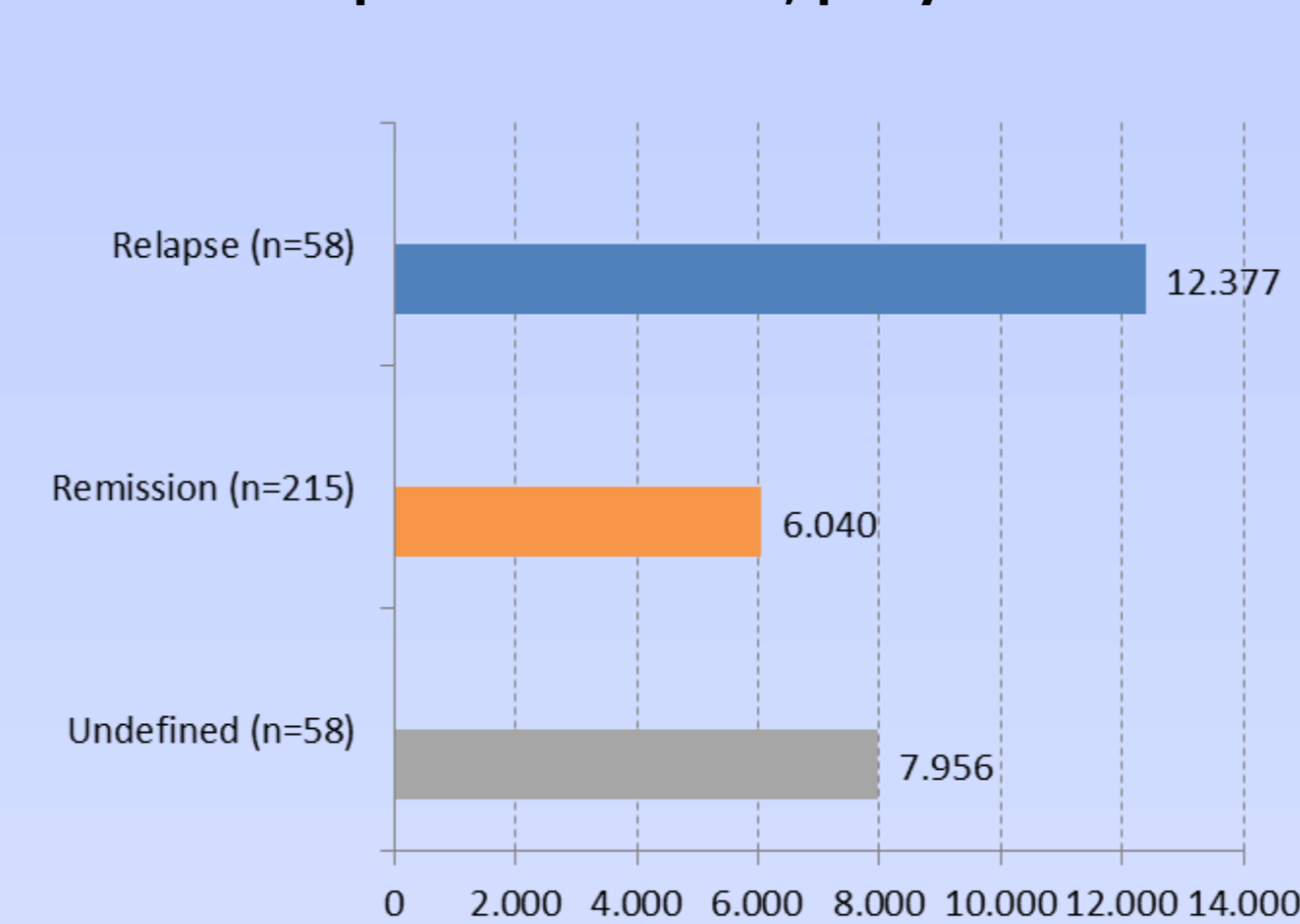


Figure 9: Productivity loss with or without biologics, per year in €

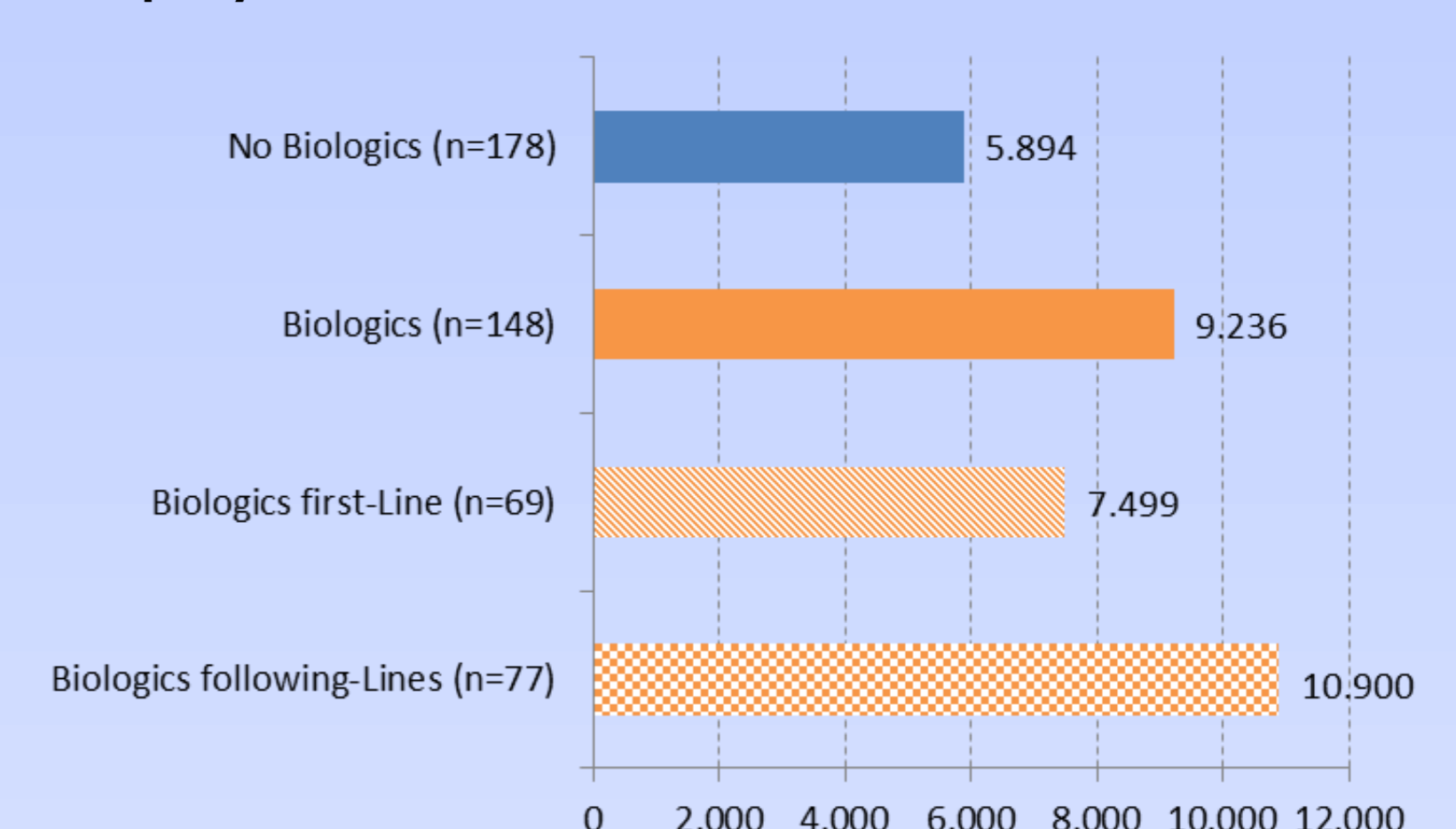


Figure 10: Regression analysis: Biologic treatment in % of patients and disease duration (20 years)

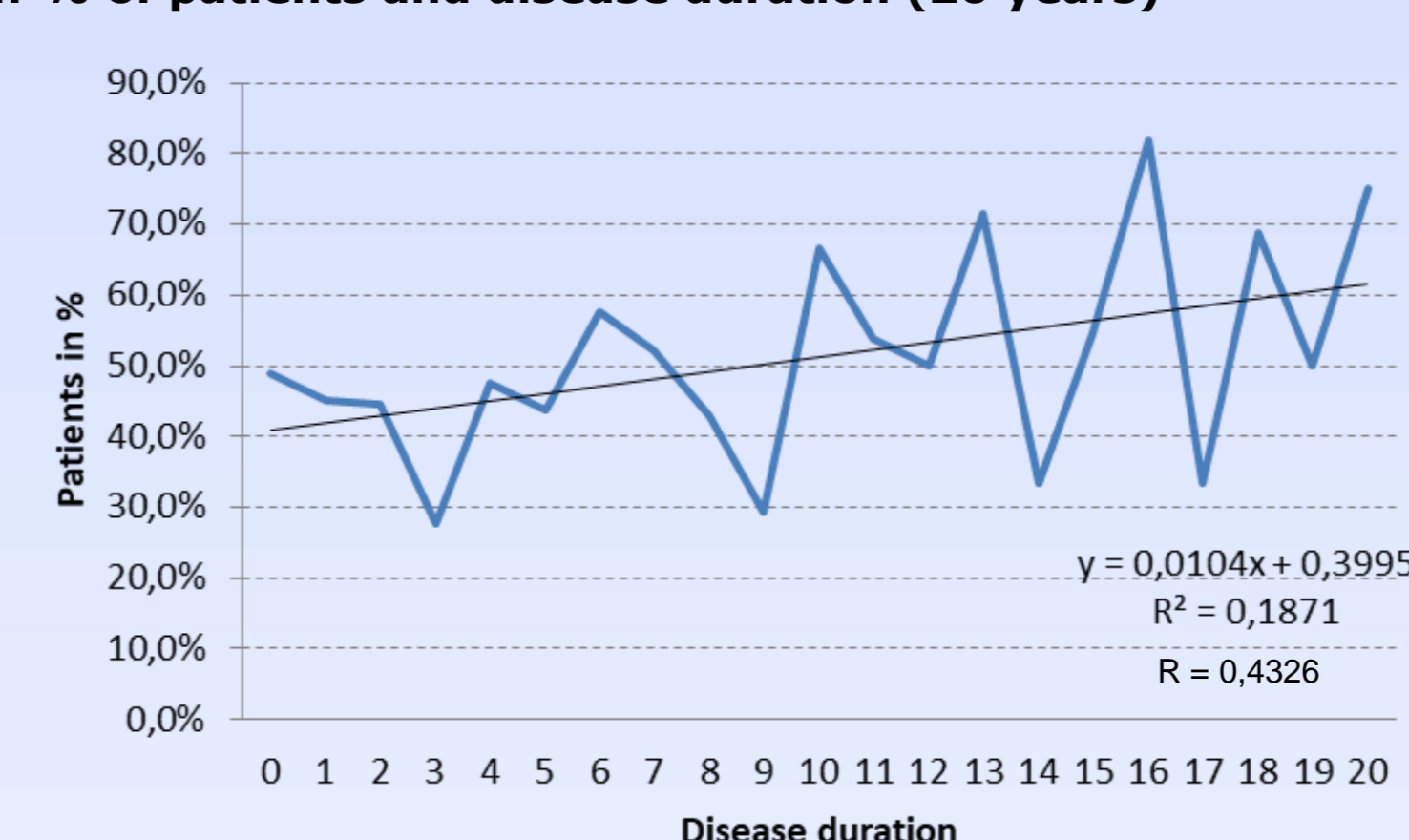
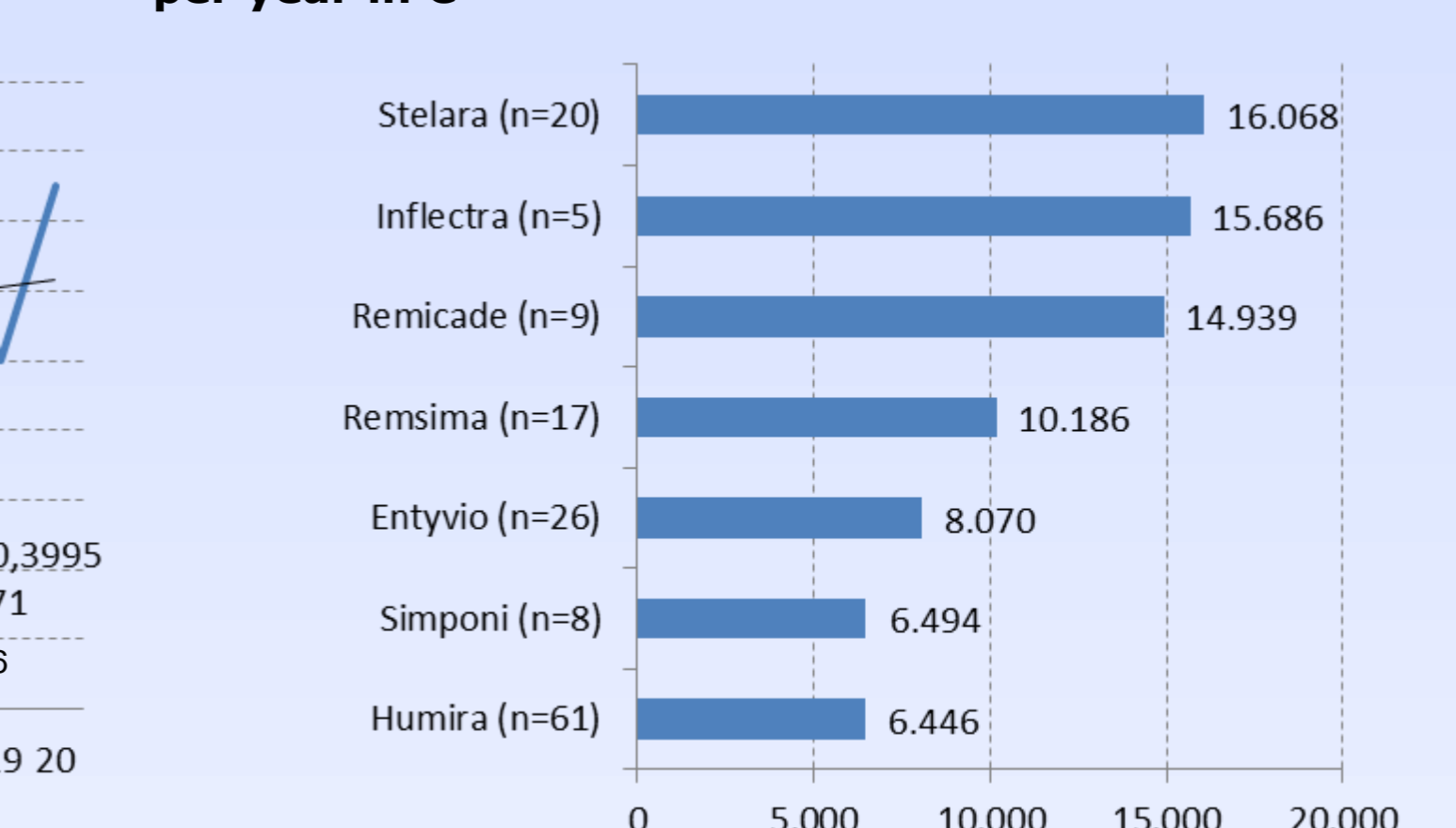


Figure 11: Productivity loss with different biologics, per year in €



## Conclusion

IBD accounts for a substantial disease burden with indirect costs for society related to work ability reduction. Patients who achieved remission had significant improved HRQoL than did patients who did not achieve remission. HRQoL significantly influences loss of work productivity. Improving HRQoL should be a key factor to reduce disease burden.

## References

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Additional literature with the author

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