

HPQ Select Methodology and Measurement

This document is organized in two sections as follows:

Section 1. Methodology

This section describes the methodology used to develop the health-related lost time estimates including the weighting strategy and handling of missing data.

Section 2. Measurement

This section describes the measures displayed in each of the graphs and charts in order of their appearance in the Executive Summary and Full Report.

Section 1. Methodology

This section describes the methodology used to develop the health-related lost time estimates including the weighting strategy, regression-based modeling, handling of missing data and other methodological issues. Dr. Ronald Kessler, Harvard Medical School, provided methodological guidance on the continued development of the HPQ-Select survey instrument. Prior studies on HPQ measures that are also included in the HPQ-Select survey provide the foundation for the continued development of the HPQ-Select survey instrument^{1,2,3}. Dr. Rita Englehardt, UCLA Department of Biomathematics, provided additional consultation on weighting and model specification.

Lost Productivity

To be useful to employers, health-related lost productivity must be monetized in a way that is both methodologically sound and pragmatic. Quantifying health-related lost productivity as the “opportunity costs” of the employer’s response to time loss from work – both from absence and presenteeism – meets these criteria. Nicholson and Pauly, et. al.⁴ found that these costs are a function of (1) the ability of the employer to replace workers, (2) the time value of output (that is, can the employer immediately sell all products/services generated or

¹ Kessler, R.C., Barber, C., Beck, A., Berglund, P., Cleary, P.D., McKenas, D., Pronk, N., Simon, G., Stang, P., Üstün, T.U., Wang, P. (2003). The World Health Organization Health and Work Performance Questionnaire (HPQ). *Journal of Occupational and Environmental Medicine*, 45 (2), 156-174.

² Wang, P., Beck, A.L., Berglund, P.A., Leutzinger, J. A., Pronk, N.P., Richling, D., Simon, G.E., Stang, P.E., Ustun, T.B., Kessler, R.C. (2003). Chronic Medical Conditions and Work Performance in the HPQ Calibration Surveys. *Journal of Occupational and Environmental Medicine*, 45(12), 1303-1311.

³ Kessler, R.C., Ames, M., Hymel, P.A., Loepke, R., McKenas, D.K., Richling, D., Stang, P.E., Ustun, T.B. (2004). Using the WHO Health and Work Performance Questionnaire (HPQ) to evaluate the indirect workplace. *Journal of Occupational and Environmental Medicine*, 46(Suppl 6), S23-S37.

⁴ Reference Nicholson, S., Pauly, M.V., Polsky, D., Sharda, C., Szrek, H. and Berger, M.L. "Measuring the Effects of Work loss on Productivity with Team Production." *Health Economics*. 2006;15(2):111-123.

can it stockpile), and (3) the degree to which employees work in teams (that is, when one team member loses time for work, the entire team is affected). Relying on data from 800 employers, the authors generate a series of “multipliers” that are tied to individual occupations. Thus, in this work:

$$\text{Total lost productivity} = \text{total lost work days} * \text{salary and benefits} * \text{multiplier}$$

Minimum Sample Size

For adequate power a minimum sample size of 500 respondents is required to generate a report.

Weighting

The number of HPQ-Select survey respondents represents the **Sample** and the overall workforce size is the **Population**. We obtain marginal demographic information on the age, sex and occupational distribution of the overall workforce (**Population**) and compare this to the **Sample** demographics to develop a weighting scheme. Weights equal 1.0 if the sample size is exactly as expected; weights are greater than 1.0 if the sample size is smaller than expected; and weights are smaller than 1.0 if the sample size is larger than expected. Using age * sex * occupation cell counts the **Sample** data is weighted to reflect the **Population** distribution. Weights also equal 1.0 if the client chooses the unweighted report.

Missing Values and Recodes

The actual hours worked are capped at 100 hours per week.

Missing income data is imputed based on the average income adjusted for occupation, sex and age.

When a salesperson’s income is over \$100,000, they are re-categorized as an executive, administrator or senior manager.

Section 2. Measurement

This section describes the measures displayed in each of the graphs and charts in the order of their appearance in the Executive Summary and Full Report.

Executive Summary

1. Lost Productivity Equivalentents

$$\text{as \% of human capital costs} = \text{total lost productivity}/\text{human capital costs}$$

as % of earnings = total lost productivity/earnings

as % of workforce = total lost work days/*available work days*

Assume 260 available work days per FTE

2. Lost Productivity by Condition

Using values from Appendix 4:

% lost productivity by condition = lost productivity for *condition N*/total lost productivity

For each of the top 10 lost productivity conditions; condition 1 through 10.

3. Prevalence and Treatment of Top 10 Conditions

% with condition = number of employees with condition out of 100 employees

Share with condition treated by professionals = number of employees treated out of 100 employees with condition

4. Top 5 Health Conditions Driving Lost Productivity

The following four values from Appendix 4 are charted for each of the top 5 lost productivity conditions:

total lost productivity for condition/100 FTEs

total lost work days for condition/100 FTEs

prevalence of condition (% in workforce)

% with condition treated by professionals

5. Savings equivalents in key operational measures for the company

\$ Productivity gains are calculated as the % savings in total health-related lost productivity at each improvement level:

savings target at 1% = 1% * total lost productivity

savings target at 5% = 5% * total lost productivity

savings target at 10%= 10% * total lost productivity

Equivalent revenue growth is the amount of additional revenue - based on the company's *gross revenue to earnings ratio* - needed to equal productivity gains at each productivity savings level:

equivalent revenue growth at 1%=savings target at 1% (above)/*gross revenue to earnings ratio*

equivalent revenue growth at 5%=savings target at 5% (above)/*gross revenue to earnings ratio*

equivalent revenue growth at 10%=savings target at 10% (above)/*gross revenue to earnings ratio*

Gross revenue to earnings ratio = earnings/total gross revenue

Added work days are the additional work days that could be funded at each productivity savings level:

added work days at 1% = 1% * total lost workdays

added work days at 5% = 5% * total lost workdays

added work days at 10% = 10% * total lost workdays

Human capital growth is the % increase in *human capital costs* that could be funded at each productivity savings level:

Human capital growth at 1%=savings target at 1%(above)/*human capital costs*

Human capital growth at 5%=savings target at 5%(above)/*human capital costs*

Human capital growth at 10%=savings target at 10%(above)/*human capital costs*

Human capital costs = payroll * (1 + benefits load percent)

6. Survey sample

Survey participation rate = number of survey participants/total number of employees in the company.

See appendix 1 for more details on the sample distribution relative to the employer's overall workforce.

Full Report

Section I. Health Conditions and Their Treatment

A. Prevalence of acute vs. chronic conditions

% None = number of employees without any *acute* nor chronic conditions/total number of employees

% *Acute* only = number of employees with only *acute* conditions/total number of employees

% Chronic only = number of employees with only chronic conditions/total number of employees

% *Acute* and chronic = number of employees with both *acute* and chronic conditions/total number of employees

Acute conditions include cold/flu, strain/sprain, broken bone, any other injury.

Chronic conditions include all conditions listed in Appendices 2-4.

B. Chronic health groupings

% of employees with conditions categorized within each of nine *chronic health groups*.

To develop the *chronic health groups* all chronic conditions listed in Appendices 2-4 were subjected to principal components analysis with orthogonal rotation (varimax), extracting the number of factors with eigenvalues greater than 1.0. Urinary or bladder problems were combined with the digestive health grouping on substantive rather than empirical grounds. A ninth group, substance abuse, was developed on substantive grounds as well.

1. *Socio-emotional*: depression, chronic nervousness/worry/anxiety, other emotional, chronic fatigue or low energy, chronic sleeping problems
2. *Metabolic*: high blood pressure or hypertension, diabetes, obesity, high blood cholesterol
3. *Arthritis/pain*: arthritis, chronic back/neck pain, osteoporosis, other chronic pain (non-headache)
4. *Headache*: migraine headaches, other frequent or severe headaches
5. *Respiratory*: asthma, chronic bronchitis or emphysema, seasonal allergies or hay fever
6. *Digestive*: ulcer in stomach or intestine, chronic heartburn or GERD, irritable bowel disorder, urinary or bladder problems
7. *Heart/Pulmonary*: congestive heart failure, coronary heart disease, TB/COPD/any other lung disease
8. *Cancer*: other cancer, skin cancer

9. *Substance abuse*: alcohol or drug problems, nicotine dependence

C. Health conditions in the workforce

% with condition = number of employees with condition out of 100 employees
Share with condition treated by professionals = number of employees treated out of 100 employees with condition

D. Co-morbid group

Number of chronic conditions:

% with *N conditions* = number of employees with *N conditions*/total number of employees

N conditions = A simple count of the number of employees with chronic conditions ranging from 0 to 8 or more conditions

Top 5 Co-Morbid Pairs of Conditions:

% with *joint prevalence* of conditions = number of employees with both conditions out of 100 employees

Share with both conditions treated by professionals = number of employees treated out of 100 employees with both conditions

Top 5 *joint prevalence* = the top five highest frequency pairs of conditions

E. Opportunities to improve treatment of chronic conditions

Top 10 Health Condition Prevalence and Treatment = a scatter plot of the prevalence (% in workforce) and treatment (% with condition treated by professionals) values for the top 10 most prevalent conditions appearing in Appendix 2.

Section II. The Link between Chronic Conditions and Lost Work Time

A. The magnitude of lost work time and its contributors

Using lost time values appearing in Appendix 3:

% absence = absence lost work days/total lost work days

% presenteeism = presenteeism lost work days/total lost workdays

B. Chronic conditions and lost work time

Using values form Appendix 3, Lost Time columns:

Number of lost work days per 100 FTE for each of top 10 most prevalent conditions

C. Opportunities for improvement

Lost Time, Prevalence and Treatment for Top 10 Conditions = a bubble plot of the prevalence (% in workforce) and treatment (% with condition treated by professionals) values for the top 10 most prevalent conditions appearing in Appendix 3. The size of the bubble is scaled based on the amount of lost time per condition as appears in Appendix 3.

Section III. Lost Productivity and Business Impacts

A. The magnitude of health-related lost productivity

Lost productivity values appearing in Appendix 4 ("Lost productivity/100 FTEs") generated as follows:

Total lost productivity = total lost work days * salary and benefits * *multiplier*

% absence lost productivity = absence lost productivity/total lost productivity

% presenteeism lost productivity = presenteeism lost productivity/total lost productivity

The *multiplier* is industry specific and accounts for effects of absence on productivity including team-based productivity. Reference Nicholson, S. et al. "Measuring the Effects of Work loss on Productivity with Team Production." Health Economics. 2006;15(2):111-123.

B. Lost productivity and health conditions

Using values from Appendix 4:

% lost productivity by condition = lost productivity for condition N/total lost productivity

For each of the top 10 lost productivity conditions; condition 1 through 10.

C. Lost productivity in the business context

as % of human capital costs = total lost productivity/human capital costs

as % of earnings = total lost productivity/earnings

as % of workforce = total lost work days/*available work days*

Assume 260 available work days per FTE

D. The business impact of improvements

\$ Productivity gains are calculated as the % savings in total health-related lost productivity at each improvement level:

savings target at 1% = 1% * total lost productivity

savings target at 5% = 5% * total lost productivity

savings target at 10%= 10% * total lost productivity

Equivalent revenue growth is the amount of additional revenue – based on the company's *gross revenue to earnings ratio* – needed to equal productivity gains at each productivity savings level:

equivalent revenue growth at 1%=savings target at 1% (above)/*gross revenue to earnings ratio*

equivalent revenue growth at 5%=savings target at 5% (above)/*gross revenue to earnings ratio*

equivalent revenue growth at 10%=savings target at 10% (above)/*gross revenue to earnings ratio*

Gross revenue to earnings ratio = earnings/total gross revenue

Added work days are the additional work days that could be funded at each productivity savings level:

added work days at 1% = 1% * total lost workdays

added work days at 5% = 5% * total lost workdays

added work days at 10% = 10% * total lost workdays

Human capital growth is the % increase in *human capital costs* that could be funded at each productivity savings level:

Human capital growth at 1%=savings target at 1%(above)/*human capital costs*

Human capital growth at 5%=savings target at 5%(above)/*human capital costs*

Human capital growth at 10%=savings target at 10%(above)/*human capital costs*

*Human capital costs = payroll * (1 + benefits load percent)*