WELLNOMICS RISK MANAGEMENT

REFERENCE LITERATURE

Wellnomics® White Paper

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Introduction

The Wellnomics Risk Management product and risk algorithm was developed through a three year project in collaboration with a team of international experts in Office Ergonomics from the TNO Research Institute.

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Dr. Birgitte M. Blatter	Occupational Epidemiologist
Drs Sjors J. Frielink	Health Scientist

This team surveyed the existing literature on WMSD's amongst office workers in order to develop the content and risk algorithm used in the Wellnomics product.

Below is a list of the scientific references used in developing the tool.

Epidemiological literature

From the epidemiological literature available the following 5 review papers were used as the starting point.

Punnett and Bergqvist, (1997), *Visual Dispay Unit Work and Upper Extremity Musculoskeletal Disorders, national institute for working life - Ergonomic expert Committee Document No 1*, Solna Sweden.

Ariëns GAM, Mechelen W van, Bongers PM, Wal G van der, Bouter LM. (2000). *Physical risk factors for neck pain.* Scand J Work Environ Health 26:7-10.

Ariëns GAM Mechelen W van, Bongers PM, Bouter LM, Wal G van der. (2001). *Psychosocial risk factors for neck pain: a systematic review* Am. J. Ind. Med. 39:180-194.

National Research Council (NRC). (1999). *Work-related musculoskeletal disorders: report, workshop summary and workshop papers*. Washington: National Academy Press.

National Research Council and the Institute of Medicine. (2001). *Musculoskeletal Disorders and the Workplace: Low Back and Upper Extremities. Panel on Musculoskeletal Disorders and the Workplace*. Commission on Behavioral and Social Sciences and Education. Washington, DC: National Academy Press.

Windt, DAWM van der, Thomas E, Pope DP, Winter AF de, Macfarlane GJ, Bouter LM, Silman AJ. (2000) *Occupational risk factors for shoulder pain: a systematic review*. Occup Environ Med 2000;57:433-442.

From the review by Punnett and Bergqvist the 21 methodologically stronger studies were cited. These are studies with no evidence of likely major selection or information bias; adequate control of potential confounding by gender, at minimum, preferably age and other covariates. The 26 methodologically weaker studies they used were excluded. The other reviewers used largely the same studies. Studies with important outcomes for the tool they used and that were not in Punnett and Bergqvist are included. From the stronger studies the results that indicate a risk for RSI for VDU users were taken into account. These were listed, clustered first by kind of risk and then by the size of their Odds or Relative Risk ratio's.

As a result the following individual studies were used.

Ariëns GAM, Bongers PM, Douwes M, Miedema MC, Hoogendoorn WE, Wal G van der, Bouter LM, Mechelen W van. (2001) *Are neck flexion, neck rotation and sitting at work risk factors for neck pain? Results of a prospective cohort study in an occupational setting*. Occup Environ Med 2001;58:200-207.

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Andersen JH, Mikkelsen S, Brandt JP, Butcher I, Funch-Lassen C, Kryger A, Overgaard E, Thomson JF. Pain, (2000) *Clinical Findings and Disability Among VDU-Workers, the NUDATA study*. Premus lecture

Aronsson G, Berqvist U, Almers S. (1992) *Work organisation and musculoskeletal discomforts in VDT work*, in Swedish. Arbete och Hälsa 4:1-40

Bergqvist U, Knave B, Voss M, Wibom R. (1992) A longitudinal study of VDT work and health. Int. J Hum Comp Interact 4:197-219

Bergqvist U, Wolgast E, Nilsson B, Voss M. (1995) *Musculoskeletal disorders among visual display terminal workers; individual, ergonomic and work organizational factors*. Ergonomics 38:763-776.

Bergqvist U. (1995) *Visual display terminal work - a perspective on long term changes and discomforts*. Int J Ind Erg 16:201-209.

Bergqvist U, Wolgast E, Nilsson B, Voss M. (1995) *The influence of VDT work on musculoskeletal disorders*. 38:754-762

Bernard B, Sauter S, Fine L, Petersen M, Hales T. (1994) *Job task and psychosocial risk factors for work related musculoskeletal disorders among newspaper employees*. Scand J Work Environ Health 20:417-426

Burt S, Hornung R, Fine LJ. (1990) *Health Hazard Evaluation Report*: Newsday Inc., Melville, NY. National Institute of Occupational Safety and Health (HETA Report 89-250-2046).

Camerino D. Lavano P, Ferrario M, Ferretti G, Molteni G. (1994) *Musculoskeletal disorders, working posture, psychosocial environment in femal VDU operators and conventional office workers*. In: Grieco A, Molteni G, Piccolo B, Occhipinti E, eds. Work with Display Units 1994. Selected Papers of the Fourth International Scientific Conference on Work with Display Units. Milan, Italy, 2-5 October, 1994. Amsterdam: Elsevier Science B.V., 1995: 67-72

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Hales TR, Sauter SL, Peterson MR, et al. (1994) *Musculoskeletal disorders among visual display terminal users in a telecommunications company*. Ergonomics 37:1603-1621.

Hoekstra EJ, Hurrell J, Swanson Ng. (1994) *Health Hazard Evaluation Report: Social Security Administration Teleservices Centers,* Boston MA. National Institute of occupational Safety and Health, (HETA Report 92-0382-2450).

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Ignatius YTS, Yee TY, Yan LT. (1993) *Self-reported musculoskeletal problems amongst typists and possible risk factors*. J Hum Ergol 22:83-93.

Kamwendo K, Linton SJ, Moritz U. (1991) *Neck and shoulder disorders in medical secretaries. Part I: Pain prevalence and risk factors*. Scand J Rehab Med 23:127-133.

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Rossignol MA, Pechter Morse E, Summers VM, Pagnotto LD. (1987) *Video Display Terminal Use and reported Health Symptoms Among Massachusetts Clerical Workers*. J Occup Med 29:112-118.

Ryan GA, Bampton M. (1988) *Comparison of data operators with and without upper limb symptoms*. Community Health Studies12:63-68.

Sauter SL. (1984) *Predictors of Strain in VDT-Users and Traditional Office Workers*. In: Grandjean E, ed. Ergonomics and Health in Modern Offices. London: Taylor & Francis, 129-135.

Sauter SL, Gottlieb MS, Jones KC, Dodson VN, Rohrer KM. (1983) *Job and Health Implications of VDT Use: Initial Results of the Wisconsin-NIOSH Study*. Comm of ACM 26:284-294.

Sauter SL, Schleiffer LM, Knutson SJ, (1991) *Work posture, workstation design, and musculoskeletal discomfort in a VDT data entry task*. Hum Factors 33:151-167.

SHARP. (1993) *Cumulative trauma disorders in claims follow-up study. Washington State Department of Labor and Industries*, (Safety and Health Assessment Report 16-5-1993).

Tharr D. (1995) *Evaluation of work-related musculoskeletal disorders and job stress among teleservice center representatives*. Appl Occup Environ Hyg 10:812-816.

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Experimental Literature

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Schnoz, M., T. Laubli and H. Krueger, (2000). *Co-activity of the trapezius and upper arm muscles with finger tapping at different rates and trunk postures*. European Journal of Applied Physiology, 83, 207-14.

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Keir, P.J., J.M. Bach and D. Rempel (1999). *Effects of computer mouse design and task on carpal tunnel pressure*. Ergonomics, 42, 10, 1350-60.

Palmerud, G., M. Forsman, H. Sporrong, P Herberts and R. Kadefors (2000). *Intramuscular pressure of the infra- and supraspinatus muscles in relation to hand load and arm posture*. European Journal of Applied Physiology, 83, 223-30.

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