

Changing Labour Market Conditions and Health

A Systematic Literature Review (1993-98)

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## **Preface**

The Treaty of Amsterdam states that a high level of human health protection shall be ensured in the definition and implementation of all Community policies and activities. The Amsterdam Treaty as well includes among the objectives of the European Union the promotion of economic and social progress which is balanced and sustainable and a high level of employment. Therefore employment policies would need to be formulated taking into account their implications for citizens' health.

The European Commission in its second report on the integration of health protection requirements in Community policies had already pointed out that employment and unemployment have broad repercussions on health. Research in several Member States has demonstrated the impact of unemployment on health. Unemployed workers suffer a higher proportion of depression, suicides and psychiatric and psychosomatic conditions. They are affected by a higher risk of early mortality, higher morbidity and higher use of health care services.

On the other hand, there is less research on new labour market developments and health and little information available at European level. This is the reason why the European Foundation decided to develop a research project to describe and analyse the impact of atypical forms of work on health. The project has included the production of a bibliographic review -the one that you have in your hands- and a secondary analysis of the 1996 Work Environment Survey complemented by other statistical data.

This bibliographic review concludes that, in spite of methodological shortcomings of some of the literature reviewed, there is substantial evidence of significant health impacts associated with current labour market conditions. In addition the possible consequences of workplace reorganisation, redundancy and job insecurity are spelled out. These results could be used by the social partners, governments and European institutions to improve health through employment.

We are grateful to the authors of the report - Stephen Platt, Stephen Pavis and Gazala Akram - for their efforts in putting together in an easy readable form the vast amount of literature on the subject. We would like to thank as well the members of the working group that have helped to develop the project - Francisco Jesus Alvarez Hidalgo, Hans-Jürgen Bieneck, Fiona Murie, Olivier Richard and Laurent Voge l- and last but not least the Foundation team responsible for this project - Pascal Paoli, Sophia MacGoris and Jaume Costa.

Employment policies are usually produced without taking into account their health implications. If this reports fosters the debate among policymakers and the social partners on how to include health in the employment agenda the ambitions of the Foundation would be fulfilled.

Clive Purkiss  
Director

Eric Verborgh  
Deputy Director

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# 1. Introduction

During the past decade the pace of change in labour markets across Europe have continued to accelerate. Although the overall labour force participation rate (ie total labour force as a percentage of the working population aged 15-64 years) has tended to increase (with some exceptions), different trends by age and gender have been noted. Thus, participation rates among under 25 year olds have declined, reflecting the growth of tertiary education and training. Participation rates among older workers, particularly males, have fallen, with the steepest decline in Finland, France, the Netherlands and the UK. Participation rates among women, above all in the 25-49 age group, have increased to a greater extent than among men, so that the gap between male and female participation rates has closed considerably (and almost disappeared in Scandinavia). In general, working hours have been reduced, mainly as a result of the shift in employment from agriculture and manufacturing to services and the growth of female employment. The exceptions to this trend are Ireland and the UK; the latter holds the record for the highest average weekly hours worked by employees in the 12 country European Union (43.7 hours in the early 1990s).

The pattern of employment has continued to show the movement out of the agricultural and industrial sectors and into service industries. For instance, in Belgium in 1973, 41% of civil employment was in industry and 55% in services; the percentages were 28% and 70%, respectively, in 1992. Overall, in the European Union, the percentage of the employed workforce in service industries increased from 53% in 1980 to 63% in 1993. The decline of manufacturing and the growth of service jobs (many low-paid) has produced some deskilling in the workforce, but technological and organisational change in manufacturing and the demand for IT competence in the service sector have produced an opposite effect.

Probably the most discussed feature of the European labour market has been the drive towards flexibility as a key policy objective. While there is incomplete agreement about what is meant by 'flexibility', the ability to adapt rapidly to changes in conditions and technology is typically included in most definitions. Adnett (1996) distinguishes between numerical flexibility (ie the adjustment of labour inputs to changes in output and demand), functional flexibility (ie the match between available workers and vacancies), temporal flexibility (ie variety of working time arrangements), locational flexibility (ie greater range of locations where work is undertaken) and wage flexibility (ie matching pay to productivity and profitability). Outstanding among these different types of flexibility has been the growth of 'atypical' or 'precarious' employment and the decline of the 'standard' full-time, permanent employment. Precarious employment includes part-time work, on-call contracts, fixed-term contracts, seasonal work, agency work, homeworking, teleworking, freelancing, self-employment and informal work (Delsen, 1991).

Across Europe in 1991 about 15% of the workforce was engaged on a part-time basis (De Grip *et al*, 1997). The Netherlands had by far the largest proportion of such employment (32.4%), with the lowest in Greece (3.4%). Over half (56%) of all part-time employment in the EU occurs in low-skilled occupational groups (service, production and sales workers). In recent years the increase in part-time employment has accelerated, with an average increase of 2.2% during 1991-5. In all EU member states in 1991 the frequency of part-time employment was about twice as high among female workers as it was for the total working population.

About one in eleven (9.3%) of the European workforce was employed on a temporary contract in 1991 (De Grip *et al*, 1997). Differences between EU member states are less pronounced, although Spain has a much higher proportion (24.1%) than the other countries. Most (63%) temporary employment is in low-skilled occupations. The most recent (1991-5) growth in temporary employment is about half (1.1%) that noted in respect of part-time employment. In most member states the rate of temporary employment is only marginally higher among female, than among male, workers.

Evidence from the 1991/2 EU survey on the work environment (Paoli, 1992) found that about 30% of respondents considered their health and safety at risk while at work, largely associated with exposure to noise, air pollution, handling of dangerous substances and working in painful positions. Ongoing analysis of the 1995/6 survey results strongly suggests an association between more stressful and dangerous working conditions and precarious employment.

It is against this background that the authors were contracted to conduct a review of the literature on the relationship between employment and health in the European region and other advanced industrial countries. The methodology of the review is fully set out in Chapter 2. Chapters 3-7 report the substantive findings in five specific areas: workplace reorganisation (Chapter 3); moving in and out of the labour market (Chapter 4); workplace health promotion interventions (Chapter 5); new technology (Chapter 6); and features of the work environment (Chapter 7). Chapter 8 provides a discussion and conclusion and the references are found in Chapter 9.



## 2. Methods

### 2.1 Overview of search strategy

#### 2.1.1 Development of strategy

A preliminary search strategy was generated using keywords/phrases/terms that were identified as being relevant to the key elements of the ‘new’ labour market and health. The labour market conditions were separated into five ‘blocks’. Contained within each block were the relevant keywords. The health conditions were similarly separated into (initially) eight ‘blocks’.

As the review was investigating the health impact of **recent** changes in labour market conditions, any subsequent searches were restricted to searching the last five years, 1993-1998 inclusive. (Any study published in this time period which contained data from earlier years was only included if it contained data from the year 1986 onwards.)

Age limits were applied to the search strategy wherever the electronic database allowed. The ages covered ranged from thirteen to sixty five years inclusive (ie those individuals most affected by the changes in labour market conditions).

#### 2.1.2 Construction of ‘blocks’

In order to make the review as comprehensive and systematic as possible, other appropriate words were identified for inclusion into the search strategy by consulting the MeSH\* mapping facility on Medline and BIDS Embase and from the thesauri of other databases.

Each keyword/phrase/term was assigned to a particular block. Each of these blocks was constructed using the *Boolean ‘OR’ operator*. Our intention was to run each labour market block against each health block using the *Boolean ‘AND’ operator*, eg. labour market participation and mortality, labour market participation and morbidity etc, creating 40 reference ‘sets’. The actual ‘blocks’ and their keywords are detailed below; the strategy used can be found in the Appendix 1\*\*.

#### **EMPLOYMENT BLOCK**

labour market participation

Restructuring

Labour market insecurity

Non-employment

Changes in work

#### **Keywords**

*labour market, workforce, economically active, employment, self employment.*

*redundancy, workforce reduction, job loss, reorganisation.*

*job (in)security, short or fixed term contract, casualisation.*

*retirement, unemployed, training, long term sickness, social security.*

*overtime, long hours, shiftwork, new technology, job/labour market flexibility, deskilling, part time employment, low pay, underemployment.*

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\* MeSH: medical subject heading term. This allows the term to be ‘exploded’ so that other similar or related terms, which are encompassed under the original MeSH term, can also be identified.

\*\* Revised (simplified) versions of this strategy were applied to the other databases.

## HEALTH BLOCK

Mortality	<b>Keywords</b> <i>mortality, standardised mortality ratio (SMR), karoshi.</i>
Morbidity	<i>morbidity, disease, incidence, prevalence.</i>
Mental morbidity	<i>mental health/illness, anxiety, depression, stress, fatigue, burn out, suicide</i>
Physical morbidity	<i>neoplasms, cancer, coronary heart disease, myocardial infarction, hypertension, angina, blood pressure, musculo-skeletal</i>
Health behaviour	<i>health knowledge, health attitudes, health education, lifestyle, cigarette smoking, alcohol drinking, diet, nutrition, exercise.</i>
Positive health	<i>well-being, quality of life, physical fitness.</i>
Health care costs	<i>health expenditure, health service indicators, health care/hospital costs.</i>
Service utilisation	<i>health service use/uptake, care/contact with primary /secondary /tertiary care services.</i>

### 2.1.3 Final version of strategy

Due to the great number of references generated (which would later cause manageability problems) and on the advice of the Foundation, a few changes were made to the search strategy. (The search at this time had only been performed on the Medline database.)

- The health behaviour block was made considerably smaller by omitting the subject areas of drugs and sexual health.
- The mental morbidity block was also made smaller although suicide and its related terms were added .
- The Japanese term ‘karoshi’- (death from overwork) was added to the mortality block.
- Two new health blocks were created - occupational health and disability.
- Only European, Northern American, Japanese and Australian studies were to be retrieved.

Further decisions taken by the research team to aid manageability were

- The years searched for the mental morbidity block were changed to **1996-1998 inclusive**.
- The health behaviour block was searched for ‘**review articles**’ only.

The final search consisted of 5 x 10 blocks, giving 50 sets in total.

## 2.2 Literature retrieval

### 2.2.1 Searching on electronic databases

As Medline is the most sophisticated and powerful of all the databases it was decided to conduct the search on it first to give some indication as to the number of references that were likely to be generated. For the purposes of this review Medline was considered as the ‘gold standard’ to which other databases were compared. As the other databases each have their own mapping facility or thesaurus, the actual search strategy used was modified slightly before a search was performed on each database.

All references generated were either e-mailed or downloaded to 'floppy' disk and transferred via '*Bibliolink II for Windows*' to the bibliographic database '*Procite for Windows*'.

### Medline

Medline, the National Library of Medicine database, covers worldwide medical literature including research, clinical practice, administration, policy issues and health care services. It contains references to articles from 3200 journals published in the USA and about 70 other countries from 1966 onwards.

Information held in the Medline database can be found in three ways.

1. Printed- The *index medicus*, a manual index updated every year from which the electronic version is compiled.
2. Online- The whole database from 1966 onwards on a mainframe computer accessed over the Internet or other electronic 'server'.
3. CD-ROM (Read Only Memory)- The whole database on 10 to 18 different CDs. This version is not as up to date as the Online version.

In this instance the Medline database was searched using the local Telnet and OVID (Ovid Technologies) interface. (Both Telnet and Ovid are commercial vendors of this and other electronic databases.) Search terms were entered as MeSH terms or as 'textwords' (words that appear in the title or abstract) and the number of 'hits' was recorded.

### Difficulties encountered

The selected references or results of each combined set were e-mailed. Initially problems were encountered in e-mailing the results, as the local Ovid interface would only allow 500 references to be mailed at any one time. This meant that if a set had 500 or more references (which many of them did) then the first 500 would have to be mailed first followed by the next 500, etc. This proved to be time consuming and cumbersome. Additional problems were also caused due to the absence of a 'coding' facility for naming the mailed sets, making it difficult to identify them. (This problem was, however, eventually rectified and the number of references which could be e-mailed at any one time was increased from 500 to 32000.)

### BIDS Embase (Bath information and data services- Embase)

BIDS (based at Bath University) acts as the gateway by which other electronic databases can be accessed. Embase provides access to the *Excerpta Medica* database, a major pharmacological and biomedical literature database covering about 3300 journals from 110 countries. It has strong coverage of European journals from 1980 to date (in this case to March 1998). It contains more recent references than Medline and can be accessed Online or by CD ROM. The CD ROM version is updated monthly whereas the Online version is updated weekly. In this instance Embase was accessed via the Ovid interface using the Internet (<http://www.bids.ac.uk/embase>).

### Attributes

The WWW version is similar in layout to Medline with options made available to use either MeSH terms or the thesaurus. Due to its comparability with Medline, the search strategy used was similar to the Medline strategy, with both databases using truncating and adjacency vocabulary. It is also possible to save the used search strategy on the Embase web site.

### Difficulties encountered

The results of each combined set were e-mailed. However, only the first 200 references of each set could be sent at any one time, posing a problem for those sets which contained a greater number. The only alternative was to actually 'view' the whole set and 'mark' any relevant articles for mailing.

### BIDS-ISI Social Sciences Citation Index.

This database, again accessed through the BIDS service, indexes 1400 journals in all areas of the social sciences from 1981 onwards. It was searched using the local Telnet interface.

### Attributes

The Telnet interface is not as sophisticated as the Ovid interface through which both Medline or Embase were accessed. However, it is easier to use and has a quicker response time.

### Difficulties encountered

- The Telnet version does not have a 'MeSH mapping facility' which means that **all** the keywords/phrases/terms had to be individually entered and cannot be 'by-passed' by using the exploding option. This caused some operational problems as there is a limit in the number of terms/words that can be entered and subsequently combined using the *Boolean 'OR' function*. As a consequence, some terms/words were changed, but all were still kept within the framework of the original search strategy developed for Medline.
- The Telnet option does not allow the application of age limits within its search. Therefore, no distinction was made during the search as to which age group were being identified.
- The amount of information which can be saved or e-mailed at any one time also posed problems. In this instance references were first e-mailed and then stored in '*Procite*', via '*Bibliolink II*'. However only 150 references could be mailed at any one time. This proved to be quite an exhausting exercise when some searches were generating in excess of 1000 references for any one block.

### Silver Platter CD-ROM Psyclit and Sociofile

The Psyclit and Sociofile databases were searched using the Silver Platter Information Ltd CD-ROM interface.

- Sociofile indexes the literature of sociology from 1800 journals published worldwide. It includes abstracts of journal articles published in *Sociological Abstracts* from 1974 onwards and the enhanced bibliographic citations for relevant dissertations that have been added from 1986. It also includes the *Social Planning and Development Abstracts (SOPODA)* database with detailed journal article abstracts from 1980 to Dec 1997.
- Psyclit is the CD-ROM version of Psychological Abstracts and provides summaries of the international literature in psychology and related fields compiled from the psycInfo database. It covers more than 1300 journals and monographic series from approximately 45 countries, in more than 24 languages, from 1974 to Dec 1997.

### Attributes

These particular Silver Platter CD-ROM databases do not have provisions for inserting MeSH terms or exploding keywords. Using the database thesaurus, relevant terms were identified and a modified search strategy was used.

### Difficulties encountered

- The Silver Platter databases are not very sophisticated or modern and hence take a rather long time to identify 'hits'. This and the fact that each term is individually entered renders the whole process time consuming and laborious.
- The databases do not make provisions for applying age limits to the search. In order to differentiate between age groups, crude search terms are used. *eg. elderly or senior citizen or child\* or adolescent*. This 'search term' is assigned a line which is incorporated into the actual search using the NOT option. If the number of 'hits' still exceeds 500 another limiting search 'term' is used and again incorporated using the AND option. The term used was *m?n or wom?n or adult\* or male\* or female\**. Although this is not ideal, without this limitation some of the blocks were found to contain over 1000 references.
- The CD-ROM system posed problems with regards to searching the desired time frame. The current CD is indexed only to December 1997. Therefore some inconsistencies exist with the searches performed using CD ROM and those that are available online, especially for the mental morbidity block. Year limits applied to this block will result in only the years 1996 and 1997 being searched (and not a further 3 or 4 months for 1998).
- There is a limit in the extent of the search or, rather, the size and volume of any search performed. After approximately 250 lines or 250 search terms it seems that the database cannot search the CD effectively and demands that previous search lines are deleted to create more space. This is a difficult situation as some of the previous searches are actually required. As a result it is not possible to conduct the whole search in one session. Instead each employment block was run one at a time.
- In order to discourage 'lifting' or downloading large amounts of information from their database, it seems the manufacturer has built within it an internal security device which comes into effect when a substantial number of references (> 300) are downloaded. If this approximate number of 300 is exceeded, then the physical text of some of the references is found in places to become totally incoherent or unreadable. This causes obvious problems, but fortunately in our case, the relevant references were not affected.
- The CD ROM databases do not have any provisions for e-mailing the results of any 'sets' which mean that all relevant references have to be 'downloaded' to floppy disk. This was very time consuming especially for any set which had over 50 references. It also takes up a very large amount of disc space.

### CINAHL

The Nursing and Allied Health database produced by CINAHL Information Systems is designed specifically for nursing and allied health professionals, including dental hygiene, emergency services, occupational therapy, optometry, speech language pathology and some others. It is available either Online or as CD-ROM with coverage from 1982 onwards. Materials indexed include: abstracts from more than 230 regularly indexed journals, nursing dissertations, conference proceedings, pamphlets and books.

### Attributes

The OVID version of CINAHL is very similar in layout to Medline. It contains a thesaurus and also similar Medline MeSH terms. For this reason the search strategy used was similar to the Medline strategy.

### Difficulties encountered

Edinburgh University does not subscribe to this database. It was therefore accessed at the Health Promotion Library within the Health Education Board for Scotland. The results of any search from this database cannot be e-mailed but have to be either downloaded to floppy disk or printed. In this case as each combined set contained such a small number of 'hits' these were first 'viewed' online and any references which seemed relevant were subsequently 'marked' and printed. The format of each printed reference contained all the relevant information including author, journal, title and the abstract. The printed references were then evaluated for inclusion into the review.

### **2.2.2 Searching for grey literature**

Grey literature is "literature which is not readily available through normal book selling channels, and therefore difficult to identify and obtain". Examples of grey literature include reports, technical notes, conference proceedings, official publications etc.

### **SIGLE - System for Information on Grey Literature in Europe**

SIGLE is an electronic database available via CD-ROM or Online through the British Library's Automated Information Service (BLAISE). Only one institution in Scotland was found to subscribe to this database. Access was however denied to it due to copyright laws. After consultation with the British Library a one hour free use of the database via BLAISE was allowed.

Unlike other electronic databases SIGLE is limited in its capability of performing elaborate searches particularly where sets have to be combined. It also uses very crude subject headings for indexing (eg. terms such as 'redundancy and downsizing' do not generate any 'hits' themselves but are indexed under the broader definition of 'labour markets'.) If 'hits' are identified there is still a problem in viewing them. Two options are given for the format in which the 'hits' can be viewed:

1. The short display only gives minimum information, ie. title of article and the author.
2. The full display gives all the above information including the corporate source, the language of publication, its cost and availability, but does not give an abstract. This makes it difficult to assess if the report is of value for the purposes of the review. Due to the time constraints in using SIGLE via BLAISE and the difficulties it posed in conducting a thorough systematic search, it was decided to abandon searching on this database.

### **British Reports, Translations and Theses (BRTT)**

BRTT is the national grey literature bibliography, and is the only publication to provide a detailed listing of research and practice reports produced by non-commercial publishers, national and local government departments, industry, universities, research institutes, charities etc. Doctoral theses accepted at British Universities since 1970 and translations are also included. This document is printed annually and contains roughly the same information as SIGLE. (BRTT contains about 25% less foreign literature than SIGLE.) No potential references/studies were identified from BRTT.

### **The Internet**

The Internet search engines *YAHOO* and *ALTA VISTA* were both utilised to search for relevant literature using the keywords that have already been described. Five specialist university research units conducting labour market research were identified. A letter was written to each research unit director detailing the purpose and nature of the review and requesting unit publications (particularly ‘grey literature’) which were relevant to this review.

Two research institutions, the Institute of Work Psychology at the University of Sheffield and The Centre For labour Market & Social Research in Denmark, supplied recent publications/working papers that had not been identified from other sources. Three studies in total satisfied the inclusion criteria.

### **Research institutions**

The current edition of CRIB (Current Research in Britain) is the national register of current research being carried out in universities, colleges and other institutions within the UK. Although a number of research institutions researching into labour markets were identified, none were able to help other than those already contacted from the Internet search.

#### **2.2.3. Hand searching**

The five journals which had given the most ‘hits’ relevant to this review were hand searched for the years 1993-1998 to see if any further articles could be identified that may have been missed from the search on the electronic databases. These journals were:

*Social Science and Medicine* - 1993-1998

*Work and Stress* - 1993-1996 (the years 1997/98 were not available for hand searching due to expiry of subscription to the journal.)

*Ergonomics* -1993 -1997 (1998 volume not available, sent away for binding)

*Journal of Psychoactive Research* - 1993-1998

*Stress Medicine* - 1993-1998

A further six articles were identified in this way for inclusion in the review.

### **2.3 Criteria for choosing relevant references**

A checklist was developed by which all references were assessed to determine which studies were eligible for inclusion in the review. As mentioned in section 2.1, only those studies reporting data from 1986 onwards were considered and only those reporting data from Northern America, Europe, Japan and Australia.

Other criteria for inclusion or exclusion were as follows:

1. Only studies investigating health effects caused by NEW labour market conditions OR new technology eg VDU usage were utilised. Studies investigating occupational health hazards of older established industries (mining) were not included.
2. Theoretical studies which did not include empirical data, or methodological articles which were not focused on the substantive issues under review, were NOT included.
3. Studies about retirement were included only if they were concerned with ‘early retirement’ caused by the shift in labour market conditions (downsizing) and if the study sample was within the set age limits.

4. Studies investigating the health consequences of unemployment were NOT included *unless* they investigated the effects of being unemployed over time and in connection with changes in labour markets, OR if they compared data from different countries.
5. Studies investigating variation in the labour market participation for different ethnic groups or disadvantaged sections of the population (the disabled, mentally ill) or between genders were NOT included.
6. Studies reporting on the ‘positive effects’ of being in employment, such as employer smoking cessation programs or work based screening programs, WERE included.
7. Studies investigating suicidal trends/mental health problems in populations which are affected by *current* labour market conditions were included. Studies that report suicide and/or mental disorders as risk factors for unemployment (reverse causation) were NOT included.
8. All studies investigating job insecurity were included due to the lack of information on this subject area.
9. Studies about shiftwork were included if the shift patterns were caused by changes in labour market conditions (eg. teleworking or other 24 hour service industries) OR if the study was investigating the effects of shift work over time (longitudinal design data.)
10. Studies investigating health problems, which also briefly mention respondents’ employment status or social class, were NOT included. eg those studies where the health problem is the major factor under investigation and the respondent’s employment status is of incidental importance.

## 2.4 Choosing studies for inclusion

All references (with or without abstracts) that were generated for each of the databases were stored in the bibliographic database ‘**Procite**’. Each reference was then evaluated against the checklist to see if it warranted inclusion.

Although the original search strategy was refined and concise, it did generate a rather large number of references that were not required. These included studies that investigated health outcomes of certain treatments which had used certain employment keywords in the abstract, mainly when describing respondents’ demographic features; extensive American literature on employee assistance programmes for the disabled or mentally ill and their evaluation; and many studies concerned with ‘inequalities in health’ which on close inspection were not focusing upon new labour market conditions. At this stage it was easy to eliminate those references that were not appropriate by reading their titles.

Those references that seemed possibly relevant were randomly assigned to the grant holders who independently recommended inclusion into, or exclusion from, the final sample. Where there was disagreement between the grant holders, the paper was discussed by all members of the team and a final consensus was reached. In 91% of cases full agreement was reached without further discussion. All ‘approved’ studies were ordered for subsequent data extraction and detailed analysis.

Of the 150 articles that were ordered, four articles were ‘unavailable’ even though they were ordered from The British Library, via its *Inter Library Loan scheme*.



Once all 146 articles were gathered, a further 15 articles were excluded. The reasons for exclusion were the same as above but these had not been so obvious in the abstracts at the time of ordering and only became apparent once reading the article.

#### ***2.4.1 Data extraction document***

All studies were read and evaluated using a data extraction form (see Appendix 2). This allowed all relevant and important information to be documented in a standardised manner. (Information gathered on these extraction documents was subsequently used to prepare the summaries of each study which are found in sections 3-7.)



### **3. Workplace reorganisation: downsizing, reorganisation and job insecurity**

#### **3.1 Introduction**

The combination of increased international competition, the introduction of new technologies, de-industrialisation, repeated recessions and the privatisation of previously state owned industries, have led many industries and individual companies to engage in reorganisation, restructuring and/or downsizing. In this section we review studies which have sought to chart the relationships between the health of employees and workplace reorganisation and/or company or industry downsizing. The chapter is organised under three subheadings. The first presents the evidence for a relationship between ill health and threatened job loss or job change. The second reviews studies that have sought to uncover the factors that mediate between health and threatened job loss or change. The third looks at the evidence in relation to the health of employees who have survived company downsizing and/or significant organisational restructuring.

#### **3.2 Health and the threat of job change or job loss**

##### ***Physical health***

The British Whitehall II study has evaluated clinical, self-reported health and health behaviours during a period of civil service privatisation (ie movement toward ‘executive agency’ status). The study found that men in both exposure groups (pre and post change) showed a significant decline in self-rated health and an increase in reported symptoms during the preceding fortnight, when compared to the control group. There was also a significant relative increase in long-standing illness amongst those men anticipating job change. Women showed generally less adverse trends. However, women in the pre change (job threatened) group did report a significant increase in the mean number of symptoms experienced in the last fortnight.

In relation to the clinical measures, men in both exposure groups (pre and post change) showed adverse changes in their body mass index (BMI) compared to the control group. A relative significant increase in systolic and diastolic blood pressure was only found in the post change group compared to the control group. Amongst women, adverse relative changes were found in both exposure groups (pre and post change) in all clinical measures, apart from diastolic blood pressure.

In a second study of privatisation (of a British water company) Nelson *et al* (1995) monitored the health of employees during the period of privatisation and subsequent organisational restructuring. The study looked at differences in health between employees in three different groups, (management, white-collar/administrative and manual staff), at three points in time (prior to privatisation, 8 months post privatisation and 21 months post privatisation). In relation to physical health (as measured by OSI -a questionnaire that contained a list of 12 psychosomatic symptoms) during the period leading up to privatisation manual workers experienced the greatest health decline, although the health of managers also fell; white-collar/administrative staff showed no variation. Interestingly, these relationships were not

repeated during the post privatisation period which involved considerable reorganisation, when there was a slight (although non significant) increase in all employees health.

Wahlstedt and Edling (1997) in a study of a Swedish postal sorting terminal, looked at the effects of workplace reorganisation on gastrointestinal complaints and sleep disturbance. The results show that the company's reorganisation actually led to a reduction in both gastrointestinal complaints and difficulties in sleeping. The authors suggest that this was because the reorganisation led to an increase in employee 'skill discretion' and perceived 'autonomy over decisions' (see below).

In a study of American motor industry workers Heaney and colleagues (1994) looked at the relationship between the duration of job insecurity and its effects on physical health (using a self report scale of 17 symptoms). The team report that feeling insecure about one's job was predictive of job satisfaction at both baseline and follow-up, however a chronic level of job insecurity (at T1 and T2) was the best predicted of increased symptomology.

In a representative study of the Finnish workforce, Kinnunen and Natti (1994) looked at the relationship between perceived insecurity and 'psychosomatic symptoms and various aches and pains' (p312). The findings show that those experiencing 'high insecurity', (defined as the threat of lay off, dismissal or unemployment), were significantly more likely to suffer ill-health than people who perceived no job threat or low levels of threat (defined as feeling they may be transferred or redeployed).

### ***Psychological/emotional health***

With regard to psychological/emotional health the Whitehall II study (Ferrie *et al* 1998) found that GHQ caseness increased significantly for men in both exposure groups (pre and post change) compared to the control group. It was also found that there was a significant increase in the number of men sleeping <5 hours per night in the group anticipating change, and an increase in the number sleeping >9 hours per night in the post change group; these relationships were not found for women.

Nelson and colleagues found that during the period leading up to privatisation, manual and white-collar staff showed an increase in mental ill-health as measured by an 18 item scale gauging various affective symptoms such as reactive depression, free-floating anxiety, inability to cope and low self-esteem. Managers showed hardly any change during the same period. These relationships were not found for the post-privatisation reorganisation period when the mental health of all employees improved.

### ***Health behaviours***

In the Whitehall II study (Ferrie *et al* 1998) it was found that there was very little difference in health behaviours between the three employee groups; ie control group, those anticipating job change, and those already working in an 'executive agency' (post change). The exceptions were that for women those anticipating change showed a significant increase in smoking and a decrease in daily exercise; for males there was a significant decrease in smoking in the post change group, but not an increase in those anticipating change.

### ***Summary***

In sum there is some evidence that job insecurity leads to worse self-rated physical health and an increase in some clinical symptoms; although, the lack of consistency in both study design

and the measures used means that comparison between studies is difficult and meta analysis impossible. The Whitehall II study suggests that the relationships between physical health and job insecurity may be stronger for men than women. Heaney and colleagues work suggests that the negative effects on physical health of job insecurity may also increase with time, whilst Kinnunen and Natti point to the intensity of the insecurity as being most likely to increase symptomology. In relation to emotional/psychological health the literature again suggests that insecurity in the period leading up to organisational change is related to worse health. Only the Whitehall II study has looked at job insecurity and health behaviours. The team report that they found hardly any relationship. However, women who were anticipating job change did show increased levels of smoking and a reduction of daily exercise.

### **3.3 Factors which explain or mediate the effects of threatened job change and/or job loss**

#### ***The employee's position within the organisation***

Kinnunen and Natti (1994) in a study of Finnish workers provide information on the positional factors that are related to workers perceiving their employment as insecure. Unsurprisingly, the best predictors of feeling insecure was found to be having previously experienced unemployment and being in a temporary employment relationship (ie short term contract). 'The role of demographic factors in predicting job insecurity was strikingly minor' (p297).

Zeitlin (1995) has reported on the types of illnesses experienced by employees of differing ranks in the US merchant fleet. This is an industry that has lost 75% of its jobs during the last generation's working lives. Zeitlin's analysis shows that the distribution of illness is correlated to an employees hierarchical position within the industry. The data point to mid-level managers having significantly higher rates of stress related illness (cardiovascular disease, heart attack, psychoneurosis, suicide and asthma) compared to lower level workers. Zeitlin argues that this is due to higher stress levels, declining job opportunity and end of career anxiety, although he provides no empirical evidence to support these hypotheses.

Nelson *et al* (1995) looked at the perceived levels of control and uncertainty of three groups of workers during water company privatisation (management, white-collar/administration and manual staff). They conclude that 'those in positions of less control (manual workers) and high uncertainty suffer the greatest negative effects of major organisational change, particularly when the change is one that is outside of their control and the implications and consequences of the change are less clear, as in the case of privatisations' (p68). As noted above, Wahlstedt *et al* (1997) provides an example of a carefully managed company reorganisation that actually proved health through increasing employee 'skill discretion' and perceived 'autonomy over decisions'.

#### ***Co-worker, supervisor trade union support***

Shaw *et al* (1993) studied American Telephone and Telegraph employees during a period of major reorganisation and looked at the relationships between personal coping resources, social support, external coping resources and job stressors and strains. The findings suggest that increased perceived personal control and the provision of knowledge about what is happening and who is taking key decisions within and outside the organisation, are crucial to minimising the harmful effects of organisational change. In addition, the team note that 'it seems that

simply knowing that someone is in control, even if the employee does not feel personally in control, may help alleviate some the negative effects of organisational restructuring (p245).

Lim (1996 & 1997), in a follow-up study of MBA graduates, has looked at the relationships between job satisfaction, proactive job search, non-compliant job behaviours, and life dissatisfaction. Her findings show that employees who experience job insecurity and also perceive low levels of work based support are most likely to report high levels of job dissatisfaction and proactive job search. At times of job insecurity low levels of perceived work based support were also found to be correlated to higher levels of life dissatisfaction.

Abramis (1994) has looked at the relationship between job stressors, job strains and job performance and reports that role conflict and role ambiguity are detrimental to job performance. The study also found that job insecurity did not affect an employee's ability to get on with their co-workers (either in the short or long term). Abramis also reports that job insecurity produced small improvements in workers' technical performance in the short term (6 weeks) and small decrements in technical performance in the longer term (12 weeks).

### ***Personality characteristics***

Roskies *et al* (1993) have looked at the relationships between positive and negative affectivity and coping with job insecurity. Two studies were conducted. The first involved employees experiencing acute job insecurity (ie a company which had been taken over and 44% of jobs lost during the preceding six months). The second study involved two companies in which workers were subject to longer term insecurity (one company was in a declining traditional industry, the other a high tech industry where managers constantly hired and fired workers depending on the specific needs of current projects). The findings show that for both acute and chronic job insecurity a person's affectivity is highly related to psychological distress. Those with positive affectivity experience less distress than those with negative affectivity. Further analyses reveal that in relation to chronic job insecurity the primary mechanism lying between personal affectivity and psychological distress is 'perception of job risk'. However, this association did not hold for acute job insecurity. The various coping styles of the two personality groups were also examined but were found to hold little explanatory power in relation to the observed differences in psychological distress.

Orphen (1994) in a study of employees of an Australian manufacturer, looked at the relationship between job insecurity, self-esteem, personal control and psychological distress. His finding show that 'the personal attributes of self-esteem and personal control moderated the impact of job insecurity on psychological well-being ... with low self-esteem and external control employees being significantly more adversely affected by insecurity than their high self-esteem and internal control counterparts'.

### ***Physiological/hormonal mechanisms***

Toivanen *et al* (1996) have sought to understand the physiological mechanisms involved in the relationships between job insecurity and illness. They report that stress and especially the threat of unemployment influenced the levels of adrenal hormones. The impact of regular relaxation training was positive in reducing these hormonal levels

### ***Summary***

In sum, the studies in this section suggest that people who have been previously unemployed or who are in short term contracts are most likely to perceive their employment as insecure. It

is those personnel who are at the lower levels within organisations and who have little knowledge about the likely effects of organisational change who are most at risk of ill-health; these employees have low levels of decision latitude. There is also some evidence that personality characteristics are important in perception of and coping with, insecure-employment. Orphen reports that having low self-esteem and an external locus of control means that one is more likely to be affected by job insecurity than someone with high self-esteem and an internal locus of control. Roskies *et al* (1993) show that with regard to long term insecurity people with 'positive affectivity' fair better; however, this relationship does not hold for those experiencing acute job insecurity. As Roskies and colleagues note, when the flames are licking round your heels it is hard to ignore them purely through selective perception! High levels of perceived co-worker, supervisor or trade union support can help to off-set some of the negative affects of job insecurity; although this is at best a partial solution. Having information about the changes that are taking place and feeling that one has some control of the situation can also be helpful. In relation to physiology one study has reported a relationship between job insecurity and changes in certain hormonal levels.

### **3.4 The health of employees who survive organisational change**

#### ***Physical health***

Vahtera *et al* (1997) report on the downsizing of local government in south-west Finland and the health of those who remained employed. The results show that overall certificated long term sick leave increased after downsizing. The risk of long periods of absence varied by workplace but was 1.9 - 6.9 times greater after major (>18% of the workforce) than minor (<8% of the workforce) downsizing. Individuals older than 44 years and those in workplaces with a high proportion of older employees were at greatest risk of long periods of sick leave. 'In a place of work with a low proportion of older employees, downsizing does not increase risks to employees' health' (p1127).

#### ***Psychological/emotional health***

Parker *et al* (1997) report on the downsizing of a UK based chemical plant and the effects on surviving employees' well-being. During the study period the number of workers was reduced by 60 per cent from 455 to 283. Well-being was operationalised through scales measuring strain and job satisfaction. The findings show that changes in job demand were not significantly associated with either strain or job satisfaction. However, higher levels of demand were found to be associated with decreases in job satisfaction. 'This suggests that demand is an important predictor of well-being, but it is the pre-existing level of demand (rather than the degree of change in demand) that is the key determinant (p297).

In a study of Canadian unionised production workers, Armstrong-Stassen (1993) compared the reactions of those who were transferred to a new plant with those who remained in a plant that was scheduled for closure. Her findings show that the transferred workers reported significantly higher levels of job security, job performance, and greater trust in and commitment to the company, than non-transferred workers. Workers who remained in the plant that was closing reported greater trust in their union. Armstrong-Stassen (1993) also reports that those employees who perceived plant closure as most stressful (ie high perceived injustice and high perceived job insecurity) also reported most strain, lower job performance, less trust in the company and less commitment to the company.

### ***Factors that mediate the health impact of surviving organisational downsizing***

Parker *et al* (1997), in seeking to explain why their study's downsizing survivors did not experience worse psychological health, show that the company's reorganisation was associated with several factors known to have a positive effect on health. Thus although the demands on workers increased, so too did worker control, participation and clarity. 'Clarity and participation were particularly important predictors, suggesting that the negative consequences of demand can be offset by efforts to establish clear roles and responsibilities (ie increase clarity) and to inform and involve employees (ie increase participation). ... a further important route for facilitating well-being is to enhance levels of control over the timing and methods of work' p299.

In a second study Armstrong-Stassen (1994) looked at the determinants of lay-off survivors' coping strategies. Two types of coping were assessed: 'control coping' which consists of actions and cognitive appraisals that are proactive and take charge, and 'escape coping' which involves actions and cognitive appraisals that are escapist and avoidance orientated. The personality characteristics of optimism and a strong sense of environmental mastery were both found to be related to the more positive 'control coping' strategies. However, personality characteristics were not found to be related to escape coping strategies. Escape coping was most strongly related to stress appraisal. 'Control and escape coping were differentially associated with the outcome variables. Survivors who engaged in control coping reported higher organisational commitment, higher job performance and lower intent to leave the organisation. Survivors who resorted to escape coping reported lower organisational commitment, lower job performance, and higher intent to leave the company.

Armstrong-Stassen (1994) also reports that survivors with high perceived supervisor support reported greater commitment to the company, higher job performance and were less likely to be considering leaving the company than those with low perceived supervisor support. However, co-worker support was a significant predictor only in relation to an employee's intention to leave the company. Armstrong-Stassen explains this finding by highlighting the fact that co-workers' are often under similar levels of stress and insecurity and argues that this may well inhibit their ability to provide adequate support to each other.

### ***Summary***

In this review only one study was found that has specifically looked at the relationship between surviving downsizing and physical health. Parker *et al's* work suggests that downsizing can lead to increased levels of certificated sick leave and that this is most likely in workplaces that shed a large proportion of the workforce and where there is a high proportion of older workers (>44 years). In relation to psychological/emotional health the effects of downsizing are unclear. The studies reviewed here highlight the ways that both the process of downsizing and its implications for the remaining workforce are important mediating factors. Parker *et al's* work draws attention to the ways that carefully managed downsizing can actually lead to clearer roles and responsibilities for workers and result in increased worker participation. In addition, the personality characteristics of optimism and having a strong sense of mastery of one's environment have been found to be important in the processes of perceiving job threat and the coping strategies that survivors employ. These factors appear (within limits) to be able to offset the negative psychological effects of having survived downsizing.



**Workplace reorganisation: summaries of research studies**

<b>Study</b>	<u>Authors:</u> Abramis D. 1994. <u>Study aim:</u> Evaluate the potential positive effects of stressors on job performance by examining the shape of the relation between stressors and job performance.
<b>Sample attributes</b>	<i>N:</i> 281 <i>Age:</i> (average) 41 yrs <i>Sex:</i> 129 female & 152 male <i>Country:</i> USA <i>Data collection years:</i> Not Given.
<b>Method</b>	Longitudinal survey using face to face interviews. 281 respondents interviewed 4 times about 6 weeks apart over a period of 5 months. 75% of respondents provided a 'significant other' from their work lives, who provided information about the focal respondents job performance. Continuation rates for the 3 rounds were 98%, 96% and 91%.
<b>Health variables</b>	Stress
<b>Labour market variables</b>	Work demands/job performance
<b>Findings</b>	All zero order Pearson correlations were either statistically significant and in predicted directions or essentially zero. These results suggest that for the stressors measured the optimal level for best job performance is either zero or they have no effect.
<b>Comments/ limitations</b>	

<b>Study</b>	<u>Authors:</u> Armstrong-Stassen M, 1993 <u>Study aim:</u> To compare the reactions of transferred workers to those of workers who remained at a manufacturing plant facing eventual shutdown.
<b>Sample attributes</b>	<i>N:</i> 74 (24 transferred & 50 remaining) <i>Age:</i> 19-62 (mean 47 yrs) <i>Sex:</i> 89% male & 11% female <i>Country:</i> Ontario, Canada <i>Data collection period:</i> Not Given
<b>Method</b>	Cross-sectional survey using self-administered questionnaires. Surveys randomly distributed by union. Response rate 37%.
<b>Health variables</b>	Stress (anxiety and depression), coping
<b>Labour market variables</b>	Supervisor support, perceived union support, company commitment.
<b>Findings</b>	Workers who had been transferred reported significantly greater job security, more trust in the company, greater commitment, higher job performance and also less trust in their union than the remaining workers. Perceived supervisor support was positively related to company trust and company commitment. Perceived union support was positively associated with union trust and union commitment. High stress appraisal was associated with increased strain, lower job performance, reduced trust in the company and reduced company commitment but had no significant effect on the union related outcomes.
<b>Comments/ limitations</b>	Limitations include possible selection bias in the respondents (a union representative distributed the questionnaire), and low response rate.

<b>Study</b>	<u>Authors:</u> Armstrong-Stassen M, 1994 <u>Study aim:</u> To examine how layoff survivors (in this case blue-collar technicians) cope with a workforce reduction involving permanent layoffs. Also investigates those factors that are associated with the use of control-orientated and escape coping strategies.
<b>Sample attributes</b>	<i>N:</i> 200 <i>Age:</i> 32-63 (mean 42 yrs) <i>Sex:</i> 151male & 49 female <i>Country:</i> USA <i>Data collection period:</i> Not Given
<b>Method</b>	Cross-sectional survey (6 weeks after workforce reduction occurred) using self-administered questionnaires and structured interviews. Response rate was 73%. In-depth interviews conducted with 12 technicians.
<b>Health variables</b>	Coping, stress
<b>Labour market variables</b>	Downsizing, organisational commitment
<b>Findings</b>	Survivors with high optimistic predispositions and a strong sense of mastery were more likely to engage in control-oriented coping. Perceived threat of job loss was positively related to the use of both control and escape coping, whereas sense of powerlessness was negatively related to the use of control coping. Control coping was associated with positive outcomes and escape coping with negative outcomes
<b>Comments/ limitations</b>	

<b>Study</b>	<u>Authors:</u> Ferrie <i>et al.</i> 1995. <u>Study aim:</u> To assess the effect of anticipating job change or non-employment on self-reported health status in a group of middle aged male and female white-collar civil servants.
<b>Sample attributes</b>	<i>N:</i> cases 526 & controls 7607 (at follow up) <i>Age:</i> (mean) cases 44 yrs & controls 44 yrs. <i>Sex:</i> men 410 cases & 5123 controls. Women 116 cases and 2484 controls. <i>Country:</i> UK <i>Data collection years:</i> 1985 - 1994
<b>Method</b>	Longitudinal case control study using self-administered questionnaires and clinical examinations. 79% response rate at follow up.
<b>Health variables</b>	Psychosocial health, self-rated physical health, health behaviours
<b>Labour market variables</b>	Privatisation, reorganisation, job insecurity.
<b>Findings</b>	Employees anticipating privatisation experienced an increase in self-reported morbidity during the anticipation phase, with men reporting significantly more symptoms during the past two weeks and greater health problems in the last year. Women only differed in the number of reported symptoms compared to control women. Health related behaviours did not vary significantly between those who were anticipating change and those who were not.
<b>Comments/ limitations</b>	This paper forms part of the Whitehall 11 study, which is one of the best in this area.

<b>Study</b>	<u>Authors:</u> Ferrie J <i>et al.</i> , 1998 <u>Study aim:</u> Examine the effects of job insecurity and major organisational change on health and health behaviours in the Whitehall II cohort.
<b>Sample attributes</b>	<i>N:</i> 7149 <i>Age:</i> (mean ages)men 43 yrs & women 44yrs <i>Sex:</i> 4958 men & 2191 women <i>Country:</i> UK <i>Data collection years:</i> 1985-1993
<b>Method</b>	Longitudinal case control study using self-administered questionnaires and clinical examinations.
<b>Health variables</b>	Morbidity (using cardiovascular questionnaire and GHQ), health behaviours (smoking, alcohol consumption and exercise patterns)
<b>Labour market variables</b>	Reorganisation, insecurity
<b>Findings</b>	Compared with controls, men both already working in and anticipating transfer experienced significant increases in health self-rated as 'average or worse', long standing illness, adverse sleep patterns, mean number of symptoms in the fortnight before questionnaire completion and minor psychiatric morbidity. Significant relative increases in body mass index were seen in both exposure groups while exposure to agency status was also associated with significant relative increases in blood pressure. Health related behaviours, where they differed between exposure and control groups, tended to favour those in the exposure groups. Compared with controls, women in both exposure groups reported small increases in most self-reported morbidity measures and most clinical measurements, accompanied by slight beneficial changes in some health related behaviours and small adverse changes in others. Significant relative increases were seen in mean number of symptoms and ischaemia among women anticipating exposure and in body mass index among those exposed to agency status.
<b>Comments/ limitations</b>	This is part of the Whitehall II series which is one of the best studies in the field

<b>Study</b>	<u>Authors:</u> Heaney <i>et al.</i> , 1994 <u>Study aim:</u> To examine the effects of job insecurity on physical health and job satisfaction
<b>Sample attributes</b>	<i>N:</i> 630 at T1, 300 at T2 (207 respondents completed both rounds of questionnaires) <i>Age:</i> 20-42 (mean 41yrs) <i>Sex:</i> 92% male <i>Country:</i> USA <i>Data collection years:</i> April 1986- June 1987
<b>Method</b>	Longitudinal survey (2 time points) using self-administered questionnaires. Response rates at T1 was 61% and at T2 41% of all employees
<b>Health variables</b>	Physical symptoms
<b>Labour market variables</b>	Job insecurity
<b>Findings</b>	During the study period mean levels of job insecurity increased and job satisfaction decreased. Extended periods of job insecurity were found to decrease job satisfaction and increase physical symptomology, over and above the effects of job insecurity at any single time point
<b>Comments/ limitations</b>	The sampling involved administering questionnaires to all employees, however, only 207 completed both rounds. No information is present on how those who responded to both rounds differed from those who only responded to one round

<b>Study</b>	<u>Authors:</u> Kinnunen and Natti. 1994. <u>Study aim:</u> To examine the prevalence, antecedents and consequences of job insecurity in a representative sample of Finnish wage and salary earners
<b>Sample attributes</b>	<i>N:</i> 3503 <i>Age:</i> 28% 15-29 yrs, 29% 30-39 yrs, 27% 40-49 yrs and 16% 50-64 yrs. <i>Sex:</i> 49% male & 51 female. <i>Country:</i> Finland <i>Data collection years:</i> August - November 1990.
<b>Method</b>	Secondary data analysis of the monthly labour force survey. Data is collected using face-to-face or telephone interviews
<b>Health variables</b>	psychosomatic symptoms, repeated aches and pains
<b>Labour market variables</b>	Job insecurity and job satisfaction
<b>Findings</b>	Perceived job insecurity was best explained by previous experience of unemployment and the temporary nature of the employment relationship. Men and manual workers more often felt job insecurity compared to women and non-manual workers. Young workers and private sector employees felt the risk of unemployment more often than the others. Older workers and public sector employees more often felt the threat of the inability to work. According to hierarchical regression analysis job insecurity was statistically insignificant to gender, age, marital status and job tenure.
<b>Comments/ limitations</b>	The strength of the study lies in its large sample size and ability to generalise to the wider workforce.

<b>Study</b>	<u>Authors:</u> Lim VK. 1996 and 1997 (two papers referring to the same data) <u>Study aim:</u> To examine whether work based social support (i.e. support from supervisors and work colleagues) moderates the relationship between job insecurity and job dissatisfaction and non-compliant job behaviours.
<b>Sample attributes</b>	<i>N:</i> 306 <i>Age:</i> (mean) 37 yrs <i>Sex:</i> 68% male <i>Country:</i> USA <i>Data collection years:</i> Not Given.
<b>Method</b>	Cross-sectional postal survey of randomly chosen MBA alumni using self-administered questionnaires. Response rate of 50%.
<b>Health variables</b>	Stress
<b>Labour market variables</b>	Job Insecurity
<b>Findings</b>	The relationship between job insecurity and job dissatisfaction was stronger for those who perceived low levels of supervisor and work colleague support and weaker for those who perceived high levels of supervisor and work colleague support. Job dissatisfaction and non compliant job behaviours can be seen as individual responses to an inequitable employment relationship.
<b>Comments/ limitations</b>	MBA alumni are not representative of workers affected by new labour market changes; their education etc make them a rather elite/privileged cohort. The response rate was low at 50% and no information is give about non-respondents

<b>Study</b>	Authors: Nelson A et al. 1995 Study aim: To assess the impact of privatisation and reorganisation on employees' morale and well-being. To test the proposition that such organisational change would cause changes in stress related symptoms reported by employees.
<b>Sample attributes</b>	N: 620 at T1, 397 at T3 [ at T3 Age: 18-65yrs (mean 41yrs) Sex: 84%male] Country: UK Data collection years: Nov 1989-July 1991
<b>Method</b>	Longitudinal cohort study (3 rounds) using self-administered questionnaire distributed to random sample of 4501 employees from 9 divisions of a British water company. 98 managers, 166 staff & admin and 133 manual workers.
<b>Health variables</b>	Occupational stress & satisfaction, mental & physical health symptoms
<b>Labour market variables</b>	Privatisation, reorganisation, insecurity
<b>Findings</b>	The three occupational groups show significant differences in measures of job satisfaction, during the periods prior to and following reorganisation. There were also variations in physical symptoms prior to and following privatisation
<b>Comments/ limitations</b>	1500 hundred employees were initially approached of these only 620 agreed to take part, by round 3 only 397 were still involved in the study. This attrition rate limits generalisability and the general usefulness of the study.

<b>Study</b>	<u>Authors:</u> Orpen C. 1994. <u>Study aim:</u> To test whether the relationship between job insecurity and psychological well-being is moderated by (1) employee and (2) by employee personal control in a medium sized manufacturing company.
<b>Sample attributes</b>	N: 129 Age: Not Given Sex: Not Given Country: Australia Data collection years: Not Given.
<b>Method</b>	Cross-sectional design. Not told if self-administered questionnaires or interviewed.
<b>Health variables</b>	Stress, anxiety, depression
<b>Labour market variables</b>	Job Insecurity.
<b>Findings</b>	Personal attributes of self-esteem and personal control moderate the impact of job insecurity on psychological well-being, as predicted, with low self-esteem and external control employees being significantly more adversely affected by insecurity than their high self-esteem and internal control counterparts.
<b>Comments/ limitations</b>	No information given on recruitment of subjects. The reliability of the measures used are also unclear.

<b>Study</b>	<u>Authors:</u> Parker,S <i>et al</i> , 1997 <u>Study aim:</u> To investigate the effect of strategic downsizing on work characteristics and well-being. Also the extent to which well-being is mediated by change in work characteristics during downsizing.
<b>Sample attributes</b>	N: 139 Age: 21-60 yrs (mean 42.5yrs) Sex: 95% male Country: UK Data collection period: Not Given
<b>Method</b>	4 year longitudinal survey using self-administered questionnaires. Number of respondents at wave 1 was 346 and at wave 2 was 223. Response rate 75%.
<b>Health variables</b>	Well-being (anxiety/depression), coping.
<b>Labour market variables</b>	Downsizing, work demands/control, job satisfaction.
<b>Findings</b>	No overall decrease in well-being was found because of downsizing, despite an increase in work demands. The potential detrimental effects increasing demands appears to have been offset by improvements in work characteristics.
<b>Comments/ limitations</b>	The findings from this study stand in contrast to Karasek's. His demand-control model suggests that in situations where there has been a large increase in demand, a simultaneous increase in control makes little difference to job satisfaction.

<b>Study</b>	<u>Authors:</u> Roskies <i>et al.</i> 1993. <u>Study aim:</u> To determine if personality makes a difference to the ways that people cope with job insecurity, and to understand how different coping styles translate into symptoms.
<b>Sample attributes</b>	<i>N:</i> 1081 (2 studies conducted at the same time ) <i>Age:</i> not given <i>Sex:</i> Acute study 58% female, long term study not given <i>Country:</i> Canada <i>Data collection years:</i> Not Given
<b>Method</b>	Both studies were cross-sectional in design using self-administered questionnaires. Response rate (Acute study) 73%, (Long term study) 49%
<b>Health variables</b>	Coping, well-being.
<b>Labour market variables</b>	Job Insecurity.
<b>Findings</b>	Positive personality attributes impact as strongly on mental health as does negative personality disposition, albeit in the opposite direction. Thus personality can cushion as well as aggravate the impact of occupational stress. However, once socio-demographic factors and perceptions of risk are controlled, the direct impact of coping is significantly diminished.
<b>Comments/ limitations</b>	A complicated design has been used with four different companies, in 3 different industries making up the sample. Not enough information is given about the companies to discount possible co-founders. The second round of questionnaires was distributed by a union member, it is not clear whether they went only to union members of the total workforce. This may have introduced some bias to the data.

<b>Study</b>	<u>Authors:</u> Shaw <i>et al.</i> 1993 <u>Study aim:</u> Examines the relationships among personal coping resources, social support, external coping resources, job stresses and job strain in a sample employees undergoing a major organisational restructuring
<b>Sample attributes</b>	<i>N:</i> 110 <i>Age:</i> Not Given <i>Sex:</i> Not Given <i>Country:</i> USA <i>Data collection years:</i> 1985-1986
<b>Method</b>	Longitudinal survey before and after reorganisation occurred. (Data were collected as part of a larger study on employee participation)
<b>Health variables</b>	Well-being, stress, strain
<b>Labour market variables</b>	Downsizing, restructuring
<b>Findings</b>	Personal coping resources, social support and external coping resources had a direct effect upon job stressor and strain levels. The coping resources acted directly upon perceived levels of job stressors and strain rather than serving to 'buffer' the stressor-strain relationship
<b>Comments/ limitations</b>	Limited information on respondents and recruitment method.

<b>Study</b>	<u>Authors:</u> Toivanen <i>et al.</i> 1996 <u>Study aim:</u> Examine the impact of regular relaxation training, perceived work related stressors and the impact of unemployment on hormone levels
<b>Sample attributes</b>	<i>N:</i> 162 <i>Age:</i> 20-60 yrs <i>Sex:</i> Female. <i>Country:</i> Finland <i>Data collection years:</i> Not Given.
<b>Method</b>	Longitudinal case control study of three groups of workers. Subjects were arranged in age matched pairs and then randomly chosen for either the control or intervention group.
<b>Health variables</b>	Stress.
<b>Labour market variables</b>	Job insecurity, anticipation of job loss/change.
<b>Findings</b>	Distress and especially the threat of unemployment influenced the levels of adrenal hormones. The impact of regular relaxation training was positive in reducing these hormonal levels
<b>Comments/ limitations</b>	

<b>Study</b>	<u>Authors:</u> Vahtera, J. 1997 <u>Study aim:</u> Investigate the relationship between downsizing and subsequent absenteeism because of ill health during a period of economic decline.
<b>Sample attributes</b>	<i>N:</i> 981 <i>Age:</i> (only as age ranges) 18-35, 36-45, 46-63. <i>Sex:</i> 263 male & 717 female. <i>Country:</i> Finland <i>Data collection period:</i> 1991-1995
<b>Method</b>	Longitudinal survey using employer records kept by the occupational health care unit on employee sick leave.
<b>Health variables</b>	Sickness, morbidity (any)
<b>Labour market variables</b>	Downsizing
<b>Findings</b>	There was a significant linear relation between downsizing classified by occupation or by workplace and medically certified sick leave, irrespective of cause, and separately with regard to absence because of musculoskeletal disorder or trauma ( $p < 0.001$ ). The relation between degree of downsizing by workplace and short periods of absence was linear and inverse ( $p < 0.01$ ). The relation between downsizing by occupation and short periods of absence was U shaped ( $p = 0.032$ ). The rate of absenteeism was 2.3 times greater (95% CI 2.0-2.7) after major downsizing, classified by occupation, than after minor downsizing (major downsizing is a reduction in hours worked of more than 18% and minor downsizing as a reduction of less than 8%). Other factors associated with high rates of sick leave: low socio-economic status; ill health before downsizing; age over 44yrs; a small size of household; a large workplace; and a low proportion of employees older than 50yrs of age. When the proportion of employees who were older than 50 yr. was high, downsizing increased the individual risk of absence because of ill health by 3.2-14.0 times, depending on diagnostic category. When the proportion of employees over 50 yrs of age was low, downsizing had only slight effects on health. The effect of downsizing on short term sick leave (1-3 days) did not depend on variables associated with the individual or workplace.
<b>Comments/ limitations</b>	This is one of the best studies in the field

<b>Study</b>	<u>Authors:</u> Wahlsted and Edling 1997 <u>Study aim:</u> To assess the effects of organisational change on psychosocial factors, sleep disturbances and gastrointestinal complaints
<b>Sample attributes</b>	N: 136 at T1, 100 at T3 [At T1 Mean age (men) 34yrs (women) 32yrs Sex distribution 105 men 31 women] <i>Country:</i> Sweden <i>Data collection years:</i> Sept 1987 - October 1988
<b>Method</b>	Longitudinal survey (3 rounds) using self-administered questionnaires
<b>Health variables</b>	Sleep disturbance, gastrointestinal complaints, absenteeism
<b>Labour market variables</b>	Company reorganisation
<b>Findings</b>	A significant increase in skill discretion and in authority over decisions occurred, this correlated with a reduction in sleep difficulties and gastrointestinal complaints. There was also significant reduction in sick leave.
<b>Comments/ limitations</b>	An interesting study which highlights the way that company reorganisation is not always negative to health. The small number of women in the study limits any comparison between genders.

<b>Study</b>	<u>Authors:</u> Zeitlin L. 1995. <u>Study aim:</u> To ascertain the relationship between job related and situational stress factors and the occurrence of eight stress related diseases in seamen of the US Merchant fleet.
<b>Sample attributes</b>	N: 82100 illness reports. <i>Age:</i> Not Given. <i>Sex:</i> Male <i>Country:</i> USA <i>Data collection years:</i> Not Given, records started 'mid 70's.'
<b>Method</b>	Illness report records extracted from the Merchant Marine Accident data base which documents all career long injuries and illness reports of men who sail on US flagships.
<b>Health variables</b>	Cardiovascular disease, hypertension, heart attack, psychoneurosis, suicide, peptic ulcers, arthritis and asthma
<b>Labour market variables</b>	Merchant fleet downsizing
<b>Findings</b>	A total of 11 903 (14.5%) of all illness were considered. These illness were chosen because they are believed to be stress related. The mean age differences between the collections of illness reports representing the four groups of personnel (licensed deck, licensed engine, unlicensed deck and unlicensed engine) were not significant. Rank difference was the only significant factor in determining stress related illness distribution. Licensed deck personnel showed higher rates of CV disease, heart attack, psycho neurosis, suicide and asthma. Licensed engine personnel showed higher rates of heart attack and asthma. Licensed engine personnel appear to be under the highest stress level of all. Individuals who have supervisory responsibilities suffer more from stress related illness than do others exposed to the same occupational and physical environment.
<b>Comments/ limitations</b>	No information is available about individuals levels job insecurity, the 'measure' is the reduction in the size of the merchant fleet. Limited in information with regards to demographics of subjects. Lacking in generalisability and ability to make any casual inferences.



## **4. Moving into and out of the new labour market**

### **4.1 Introduction**

This chapter looks at some of the key ways that people enter and exit the 'new labour market' and the impacts upon health. The first section focuses on redundancy, the impacts of different coping styles and the factors that affect subsequent re-employment. The second section looks at two social groups that have been disproportionately affected by recent changes in the labour market; ie young people and women. The final section focuses on older workers and looks at the relationships between early retirement and health.

### **4.2 Redundancy and its impact on health**

In a study of American blue-collar autoworkers, Hamilton *et al* (1993) looked at the relationships between being made redundant, coping styles and subsequent depression. The findings show that unemployment is associated with depression and also that depression is associated with subsequent unemployment. However, in relation to ways of coping with unemployment and its effects on subsequent depression, the authors argue that it is not coping style per se that is important but rather the degree of fit between what the worker seeks to achieve and what they actually achieve. 'Workers who wanted a job and got one, did not want a job and didn't get one, or did not like the job and lost it, showed the most noticeable improvement in depression' (p 243) during the period one to two years after plant closure.

Allingham (1995) examined the General Practice consultation rates of 58 British soldiers prior to and following voluntary redundancy. His findings show no significant variation in consultation patterns between those taking voluntary redundancy and the control group. Allingham suggests that for his sample leaving the army was relatively stress free because of the combination of having eight months notice, a good redundancy award and well organised re-settlement training.

In an American study, Catalano *et al* (1993) report on the relationship between job loss and alcohol abuse. The findings suggest that clinically significant alcohol abuse rises in workers who are laid-off, not working and claiming unemployment insurance, compared to those who remain in work. Those with a history of alcohol abuse prior to becoming unemployed were found to be most at risk.

Goldenberg and Kline (1997) report on qualitative work with Canadian white-collar workers who had recently been made redundant. The sample was recruited through multiple means and no information is given on the proportion of respondents who volunteered for redundancy rather than being made compulsory redundant. However, the authors do report that 82 per cent of the sample (n=61) received some form of severance package and 67 per cent felt either 'very' or 'somewhat' financially secure. Thirty-one per cent of the sample said that their initial reaction to being 'let go' was to feel upset or depressed, while eleven per cent were 'excited' by the opportunities it would provide. Most respondents (80%) reported that their self-confidence had changed since being laid off, but this pattern was complex. Less than 20 per cent felt that their self-confidence had steadily declined, 25 per cent felt that it had steadily

increased, 25 per cent felt there had been ups and downs and another 25 per cent felt that it had initially been lowered but then increased as they adjusted to their new situation.

### ***Coping with redundancy and becoming re-employed***

In a study of a closing American steel plant, Leana and Feldman (1995) report on the factors that contribute to an individual finding new employment and their subsequent life satisfaction. The findings show that those workers who felt the greatest pressure to find re-employment were those with most responsibilities (eg in terms of number of children). This group were the most likely to end up feeling dissatisfied with their new employment. The people who were most likely to find work were those who were most optimistic after layoff and those who engaged in the most coping behaviours; ie both ‘problem focused coping’, eg self-initiated job search, investigating geographical relocation or retraining and ‘symptom-focused’ coping, eg asking friends and relatives for financial assistance or joining social support groups. ‘Unsatisfactorily re-employed workers reported significantly higher levels of anxiety and psychological distress than those who were satisfactorily re-employed; they also report significantly lower levels of life satisfaction than those who were unemployed’ (p1398).

Bennett *et al* (1995) have looked at the factors that affect layoff victims’ choice of coping strategies. Their results suggest that perceived fairness with the layoff procedures and satisfaction with government assistance programmes are negatively associated with ‘problem focused coping’; ie self-initiated job search, investigating geographical relocation or retraining. Self-blame after losing one’s job was found to be positively related to ‘symptom-focused’ coping; ie asking friends and relatives for financial assistance or joining social support groups. Bennett *et al* conclude that companies ‘being fair may be a ‘double-edged sword’ in that while fairness may influence survivors to respond more positively to the layoff victims, it may paradoxically lead victims to react more negatively’ (p1038).

In a Finnish study of the long term unemployed, Virtanen (1993) has looked at the impact of compulsory re-employment (state initiated ‘workfare’) on primary care visits. The findings show that compulsory re-employment is associated with increased primary care visits for people of all ages and both sexes; whilst re-unemployment is associated with decreased primary care visits. Virtanen explains these finding by reference to the Finnish social security system and notes ‘employees are required to submit a certificate even for one day’s sickness leave. On the other hand, unemployment benefits are better than sickness allowance for the unemployed’ (p232).

Claussen *et al* (1993), via the use of a representative sample of Norwegian long term unemployed people, has looked at the relationships between mental health and re-employment. The results show that the baseline prevalence of depression, anxiety and somatic illness was four to ten times higher in the unemployed group than the control group. At the two year follow-up a considerable health selection effect was found. Those with a psychiatric diagnosis experienced a 70 per cent reduction in their chances of finding a job.

### ***Summary***

Limited work has looked at health changes during the period immediately following redundancy, (far more work has been undertaken in relation to longer term unemployment and health). However, the literature shows that there are important differences between voluntary redundancy that involves a good financial package, exit counselling and training for future-employment, and compulsory redundancy against a background of high unemployment, often

involving short notice and limited financial remuneration. This draws attention to the importance of understanding the meaning that being made redundant has for the individual. In relation to gaining re-employment it appears that 'problem focused' coping has a positive effect, whilst the effects of 'symptom focused' coping are unclear. Leana and Feldman provide evidence which suggests that poor quality re-employment can actually be more detrimental to psychological health than unemployment.

### **4.3 Labour market participation, unemployment and health in young people and women**

#### ***Young people***

In a prospective study of young people in northern Sweden, Hammarstrom (1994) has looked at long term unemployment (defined as being unemployed for 24 weeks during a 5 year period) and its effects upon health. His findings show that those who later become unemployed already exhibited poorer health and health behaviours while still at school. In regard to physical health he found that compared to those in employment systolic blood pressure increased for the unemployed group; however this did not reach statistical significance. In relation to psychological health, he reports that over the five year follow up females' psychological symptoms decreased in general but increased in relation to those who were unemployed. Males experienced a general increase psychological symptoms and this was particularly marked for unemployed males. In addition Hammarstrom found that both tobacco and cannabis use increased among long term unemployed young people of both sexes. Alcohol consumption and involvement in crime increased for long term unemployed young men but not young women.

Graetz (1993) reports on the effects of different types of employment on psychological health in Australian youth (18-25 years). His findings show that after controlling for demographic attributes and socioeconomic status, employed young people report significantly lower levels of mental distress than either students or the unemployed. Further analyses reveal that the health consequences of employment and unemployment are directly contingent upon the quality of work. He concludes that 'the benefits of employment are confined to those, albeit a majority, who manage to find a satisfying job. ... those who do not find satisfying jobs - approx. 1 in every 5 workers - report the highest levels of health disorders' (p722).

Goldsmith *et al* (1996) have used a subset of a large (n=12,686) American National Longitudinal Survey of Youth (NLSY) to examine the relationship between youth unemployment and changes in locus of control. Their findings show that the longer the duration of unemployment the more young women tend to become external in their locus of control; these findings are not repeated for young men who show no change.

#### ***Women***

Elstad (1996) reports on a Norwegian study of the relationships between women's marital, parental and employment situations and their impacts on health. The findings show that during the 70s and 80s the health gap (measured as long standing disease) between employed and non-employed women increased, with those in full-time work experiencing the best health. Marital and parental statuses were not found to be significant independent predictors of health difference. When discussing the findings Elstad draws attention to the changes that have taken place in the Norwegian labour market during the 70s and 80s. He points out that in

the 70s the non-employed category largely consisted of 'housewives', but in contrast by the late 80s it had become dominated by people who were unemployed and seeking work.

Arber and Lahelma (1993) report on the differences in health between British and Finnish women. In both countries white-collar women report the best health, with skilled and unemployed women reporting the worst health. However, class differences are far greater for Finnish than British women, reflecting Finnish women's greater attachment to the labour market. Finnish women are more likely to be in full-time employment without long breaks for child rearing, and are therefore more exposed to the impact of poor working conditions. In Britain family roles impact on women's ill-health but this is not the case in Finland. Previously married women have particularly poor health in Britain, especially if they are not employed. Arber and Lahelma conclude that 'these findings suggest that paid employment is crucial for both financial and physical well-being, and that British employment and childcare policies which do not facilitate the economic independence of women may have adverse health consequences' (p135).

Bromberger and Matthews (1994) provide both cross-sectional and longitudinal information on the relationship middle aged women's employment status and depression. The cross-sectional data show that women who work are psychologically better off than those who do not. Non-employed women who were low on perceived support (from family and friends), education or marital satisfaction were more symptomatic than those who were high on these dimensions. The longitudinal data show that 'irrespective of the women's psychosocial characteristics at baseline, depressive symptoms decreased among the newly employed but increased for the others' (p205). Bromberger and Matthews conclude that new paid employment is likely to have a positive effect on mood for middle aged women.

### ***Summary***

The studies in this section have looked specifically at two social groups who have experienced particular changes in employment patterns as a result of the emerging new labour market (ie. young people and women). There is currently limited work in relation to these two groups, but it does appear that, in line with the experiences of other social groups, unemployment has a negative effect and employment a positive effect on health.

## **4.4 Early retirement**

### ***Taking early retirement***

Couch (1998) presents data on American workers aged between 51 and 60 who were 'displaced' in 1992. Although the paper does not provide a breakdown of the various types of displacement (eg compulsory and voluntary redundancy, retirement, extended sick leave etc) it does provide some useful summary information. The average displaced worker experienced a 39 per cent reduction in income. Households containing a displaced worker had incomes 24 per cent lower than average households. The rate of health insurance was 16 per cent lower among displaced workers. Non-white workers tended to be the most economically vulnerable following displacement.

Poole (1997) reports on early retirement due to ill-health in six large organisations (four public sector and two private sector). His findings show large variations in the rate of early retirement both across organisations and between geographical regions within the same

organisation. Two organisations provided data differentiated by sex and, in these, women retired at greater rate than men under age 40 and over age 50. Four organisations provided information on the medical reasons for early retirement and musculoskeletal and minor psychiatric illness (stress, anxiety and depression) were found to be the most common diagnoses. Poole notes that the health criteria for applying for early retirement varied considerably across organisations in terms of the duration and severity of illness, and the number of doctors who were required to confirm the diagnosis. He concludes that 'variations between organisations in the proportion of employees ... retiring on the grounds of ill-health may simply be a reflection of the different ways in which employment contracts are terminated (and) ... applications for ill health retirement may be motivated more by financial benefits than by ill health' (p931).

Burke *et al* (1997) report on the medical reasons for early retirement in dentists. Their findings show that musculoskeletal (29.5%) and cardiovascular disease (21.1%) were the most common reasons for early retirement. However, neurotic symptoms were cited as the reason for 16.5 per cent of early retirements.

In a study of American auto industry workers, Hardy and Quandagno (1995) compared the decision making processes of two groups of early retiree and compared these to retirees' subsequent levels of satisfaction. The first group 'normal early retirees' had 30 years service and were entitled take retirement under their standard contractual agreement. The second group were 'special retirees' who were offered early retirement as a way of downsizing the company without instigating compulsory redundancies. The findings show that compared to 'normal retirees', 'special retirees' were most commonly motivated by job related 'push factors', primarily the fear of being permanently laid off. Hardy and Quandagno conclude that different groups experienced different risks, 'for some delaying retirement meant continuing to work in the same job at the same plant: for others it meant changing jobs, changing plants, or the possibility of indefinite layoff. They were presented with limited options, limited time and limited information' (p228).

### ***The health impact of early retirement***

In relation to satisfaction with retirement Hardy and Quandagno's (1995) findings show that there were important variations in their two study groups. In both 'normal' and 'special' early retirees poor health was the most consistent predictor of post retirement dissatisfaction. However, although the majority of workers (from both groups) who retired in good health and with good financial packages were satisfied with their retirement, it was the 'special retirees' who were most likely to voice some level of dissatisfaction. For Hardy and Quandagno 'this discontent is linked to the framing of their retirement transitions' (p228).

Isaksson (1997) looked at early retirement caused by downsizing in a Swedish insurance company. The results show that the mean levels of psychological well-being were good and remained stable over the 1.5 year study period. Physical health showed a general improvement. However, a small group of retirees who claimed that they had been urged to retire by their employers did show both high distress scores and low satisfaction with retirement. None of the findings showed significant variation by gender.

Reitzes *et al* (1996) compared the mental health (self-esteem and depression) of retirees with those who continue in work. The findings show that at the two year follow-up there were no significant changes in self-esteem scores, but depression scores had actually declined in the

retired group. Further analyses that looked specifically at those retired workers who had had the greatest level of commitment to their previous work roles and who perceived themselves as confident, competent and sociable workers, again showed no negative affects mental health (either self-esteem or depression scores).

In an article entitled 'Under the wife's feet' Cliff (1993) uses qualitative data to explore the renegotiating of gender roles following male early retirement. He argues that retirement led to some kind of marital adjustment in a third of his sample (n=40). Two broad patterns of adjustment were found. Some men renegotiated the domestic division of labour and entered into a more sharing relationship with their wives. This involved a more equal distribution of household chores and increased shared leisure activities. A second group were found to have extended their traditional gender divisions into the worlds of leisure. This group spent increased amounts of time out of the home and engaged in single sex leisure. Their wives continued to be primarily home based. Cliff notes that there was a slight tendency for white-collar men to have adopted the former strategy and blue-collar men the later, although he acknowledges that his small sample size places limits on generalisability.

### ***Summary***

The preceding literature suggests that the processes leading to early retirement are multifaceted and complex. Many people retire ostensibly on the grounds of ill-health, however, various organisations have different criteria for granting ill-health retirement, eg in relation to the type and duration of illness, one's ability to perform the same or any job within the company, the number of doctors required to confirm the diagnosis. It may be that some 'ill-health' early retirements are motivated by factors other than ill-health (eg financial or social desires). Some organisations use early retirement as a method of company downsizing. In this situation individuals are forced to weigh up the benefits of taking retirement against such factors as the threat of compulsory lay-off, the possibility of job transfer, the chances of securing another job etc. In these situations the notion of 'choosing' early retirement takes on an ambiguous meaning. There is no evidence that early retirement has a negative effect on either physical or mental health. However, those who retire because of ill-health do report less satisfaction with their retirement. Early retirement often requires individuals to renegotiate some aspects of their marital relationship and their domestic division of labour.

**Moving into and out of the new labour market: summaries of research studies**

<b>Study</b>	<u>Authors:</u> Allingham, 1995 <u>Study aim:</u> To examine the effect of voluntary redundancy on health seeking behaviour
<b>Sample attributes</b>	<i>N:</i> cases 56, controls 58 <i>Age:</i> mean age cases 33.6 yrs, controls 33.5 yrs <i>Sex:</i> male <i>Country:</i> UK <i>Time period:</i> Oct 1992 - July 1993
<b>Method</b>	Cross-sectional case control study using a retrospective review of GP records
<b>Health measure</b>	GP consultation rates
<b>Labour market measure</b>	Voluntary redundancy
<b>Findings</b>	There was no substantial difference between consultations before and after the announcement of the redundancy.
<b>Comments/ limitations</b>	Limited generalisability, the army has certain features which cushion the impact of redundancy. This study is perhaps not that useful in understanding the impacts of the new labour market.

<b>Study</b>	<u>Authors:</u> Arber & Lahelma. 1993 <u>Study aim:</u> To disentangle how similarities and differences between women's employment position in Britain and Finland are associated with inequalities in women's ill health, using national surveys from 1986.
<b>Sample attributes</b>	<i>N:</i> Britain 6723, Finland 4285 <i>Age:</i> 20-59 <i>Sex:</i> Female <i>Country:</i> Britain & Finland. <i>Data collection years:</i> 1986
<b>Method</b>	Cross-sectional aggregate analysis of data collected by (1) British General Household Survey, 86% response rate and (2) Finnish Level of Living Survey, 87% response rate., using self-administered questionnaires.
<b>Health variables</b>	Morbidity (limiting long-standing illness)
<b>Labour market variables</b>	Employment, unemployment, economically inactive.
<b>Findings</b>	Unemployed women in both countries report illness levels above the national average. British and Finnish white-collar workers report equivalent low levels of limiting long-standing illness. Finnish women in manual occupations report poorer health than their British counterparts. Unemployed British women are more likely to report chronic illness than any group of employed women, whereas there is little difference between the illness level of unemployed and skilled manual women in Finland. In Britain housewives report the worst health from all groups, whereas Finnish housewives are comparable with women in lower white-collar occupations. In Finland, only age and class significantly effects illness rates. In Britain, housing tenure and family roles (both marital status and parental status) have significant effects on women's health.
<b>Comments/ limitations</b>	An interesting study which highlights the importance of socio-cultural factors in the production of health and illness

<b>Study</b>	<u>Authors:</u> Bennett <i>et al</i> , 1995 <u>Study aim:</u> To investigate factors that influence how victims cope with layoffs, and their choice of coping strategies.
<b>Sample attributes</b>	<i>N:</i> (final number in all three waves) 50 <i>Age:</i> (average)44 yrs <i>Sex:</i> 76% female <i>Country:</i> US <i>Time period:</i> 18 months
<b>Method</b>	Longitudinal survey using self-administered questionnaires. 87 contactable employees were made redundant, 58% of these took part in the study.
<b>Health measure</b>	coping
<b>Labour market measure</b>	redundancy, problem focused and symptom focused strategies
<b>Findings</b>	Perceptions of the fairness of the layoff procedures and adequacy of government assistance programs were negatively related with problem focused coping strategies. There was no relationship between corporate assistance programs and the choice of copying strategy. Individuals who blamed themselves for the layoffs were less likely to engage in problem focused and symptom focused copying strategies. There was no significant differences in the frequency with which women and men engaged in the two copying strategies. There was also no difference in copying strategies used by married and unmarried women.
<b>Comments/ limitations</b>	High rate of attrition and small sample size

<b>Study</b>	<u>Authors:</u> Bromberger J & Matthews A. 1994. <u>Study aim:</u> To investigate the psychological effects of paid employment and non-employment in women cross-sectionally and longitudinally.
<b>Sample attributes</b>	<i>N:</i> 541 at T1, 524 at T3 <i>Age:</i> at T3, 212 women < 50yrs & 312 women > 50 yrs. <i>Sex:</i> Female <i>Country:</i> USA. <i>Data collection years:</i> 1983/85 recruitment + 3yr follow up.
<b>Method</b>	Longitudinal cohort study using self report inventory and physical examination methodology. 2045 women were randomly selected from area Zip codes. 901 were eligible for inclusion and 541(60%) agreed to participate.
<b>Health variables</b>	Depression. Job satisfaction.
<b>Labour market variables</b>	Employment, non-employed.
<b>Findings</b>	At baseline, non-employed women reported higher levels of depressive symptoms than employed women, with non-employed women with less education, low support from family and friends, or low marital satisfaction the most symptomatic. Symptoms decreased in women who were non-employed at the later exam; in all other groups, symptoms increased. The longitudinal findings show that women who were non-employed at baseline and had low levels of education, social support or marital satisfaction did not benefit more from subsequent employment than did their counterparts who had high levels of these factors.
<b>Comments/ limitations</b>	



<b>Study</b>	<u>Authors:</u> Burke F <i>et al.</i> 1997 <u>Study aim:</u> To assess reasons for premature retirement among practising dentists and to evaluate their association with occupational stress.
<b>Sample attributes</b>	<i>N:</i> 393 <i>Age:</i> 30-65 <i>Sex:</i> Not Given <i>Country:</i> UK <i>Data collection years:</i> 1981-1992
<b>Method</b>	Retrospective analysis of records from one organisation operating in the private medical industry in the UK.
<b>Health variables</b>	Morbidity (all medical reasons for retirement)
<b>Labour market variables</b>	Early retirement.
<b>Findings</b>	The most frequent causes of premature retirement were musculoskeletal disorders (29.5%), cardiovascular disease (21.1%) and neurotic symptoms (16.5%). 82.7% of cases examined were in the >50 years age group.
<b>Comments/ limitations</b>	Data used is only from one company this limits generalisability.

<b>Study</b>	<u>Authors:</u> Catalano, R <i>et al.</i> 1993. <u>Study aim:</u> That job loss affects the incidence of clinically significant alcohol abuse.
<b>Sample attributes</b>	<i>N:</i> 7532 <i>Age:</i> mean 37-38 yrs <i>Sex:</i> Not Given. <i>Country:</i> USA <i>Data collection years:</i> 1981-1986
<b>Method</b>	Longitudinal survey using face to face interviews. Data taken from the Epidemiologic Catchment Area project which collected data from several US cities. Response at follow up (after one year) was 79%.
<b>Health variables</b>	Alcohol drinking using Diagnostic Interview Schedule.
<b>Labour Market variables</b>	Unemployment.
<b>Findings</b>	Incidence of clinically significant alcohol abuse is greater among those who have been laid off than among those who have not. Being young, male and having had an earlier episode of alcohol disorder significantly increases the likelihood of alcohol disorder. Being employed in a community in which employment is unexpectedly low at follow up will be related to the likelihood of alcohol disorder. This was significant for married males who had a previous episode of alcohol disorder.
<b>Comments/ limitations</b>	Limited information about the recruitment of subjects.

<b>Study</b>	<u>Authors:</u> Claussen B <i>et al.</i> 1993. <u>Study aim:</u> To examine re-employment and changes in health during a two year follow up of a representative sample of Norwegian long term unemployed
<b>Sample attributes</b>	<i>N:</i> 277 <i>Age:</i> 16-63 yrs. <i>Sex:</i> female 42% <i>Country:</i> Norway. <i>Data collection years:</i> 1988-1990.
<b>Method</b>	Cross-sectional study with 2 year follow up in four municipalities in Southern Norway. A random sample of a quarter of those registered unemployed for more than 12 weeks identified and offered a health examination. 83% response rate. At follow up response rate 78%.
<b>Health variables</b>	Morbidity measures by psychometric testing, Hopkins symptom checklist, GHQ and medical examination.
<b>Labour market variables</b>	Unemployment, re-employment.
<b>Findings</b>	In the cross-sectional study, the prevalence of depression, anxiety and somatic illness was from 4 to 10 times higher than in a control group of employed people. In the follow up study, there was considerable health related selection to re-employment. A psychiatric diagnosis was associated with a 70% reduction in chances of obtaining a job. Normal performance on psychometric testing showed a 2 to 3 times increased chance of re-employment. Human capital variables, other than health (for example education or work experience) did not predict re-employment. Recovery of health following re-employment was less than expected from previous studies.
<b>Comments/ limitations</b>	A well designed careful study.

<b>Study</b>	<u>Authors:</u> Cliff D . 1993 <u>Study aim:</u> To explore changes in domestic relationships brought about by early retirement
<b>Sample attributes</b>	<i>N:</i> 40 <i>Age:</i> not given but all were retired <i>Sex:</i> male <i>Country:</i> UK <i>Data collection years:</i> not given
<b>Method</b>	Qualitative interviews with 40 men who had retired early (before 65 years)
<b>Health variables</b>	respondents' own accounts of satisfaction with retirement
<b>Labour market variables</b>	retirement
<b>Findings</b>	Retirement led to some kind of marital adjustment in a third of his sample. Two broad patterns of adjustment were found. Some men renegotiated the domestic division of labour and entered into a more sharing relationship with their wives. This involved a more equal distribution of household chores and increased shared leisure activities. A second group were found to have extended their traditional gender divisions into the worlds of leisure. This group spent increased amounts of time out of the home and engaged in single sex leisure. Their wives continued to be primarily home based.
<b>Comments/ limitations</b>	One of the few qualitative studies found by this review. The small sample size limits generalisability

<b>Study</b>	<u>Authors:</u> Couch K. 1998. <u>Study aim:</u> To examine the incidence of job displacement among workers ages 51 through 60.
<b>Sample attributes</b>	<i>N:</i> <i>Age:</i> average <i>Sex:</i> <i>Country:</i> <i>Data collection years:</i> .
<b>Method</b>	Longitudinal survey using self-administered questionnaires.
<b>Health variables</b>	
<b>Labour market variables</b>	Re-employment, downsizing.
<b>Findings</b>	The average displaced worker experiences a loss of earnings of 39%. Households which contain a displaced worker have incomes 24% lower than the household of an average worker. Little of these lost earnings are replaced through pension income. The rate of health insurance coverage is 16% lower among displaced workers. As with other labour market outcomes, non-whites on average are the most economically vulnerable following displacement.
<b>Comments/limitations</b>	High attrition at Time 2 and no breakdown of the different types of worker displacement.

<b>Study</b>	<u>Authors:</u> Elstad J. 1996 <u>Study aim:</u> To examine whether patterns of ill health vary according to women's statuses (marital, parental and employment) in Norway.
<b>Sample attributes</b>	<i>N:</i> Not Given <i>Age:</i> 31-60 yrs <i>Sex:</i> Female <i>Country:</i> Norway <i>Data collection years:</i> 1968 - 1991
<b>Method</b>	Longitudinal secondary data analyses using data from 5 national surveys. Data were collected by personal or telephone interviews.
<b>Health variables</b>	Morbidity (long-standing disease)
<b>Labour market variables</b>	Employment, economically (in)active.
<b>Findings</b>	The results indicate that health differences between full time employed women and other employment statuses have increased during the 70s and 80s. In the 1970s women without full-time employment had approx. 0.20 more long standing diseases than women in full time employment, by the 1980s this difference had increased to 0.32. The inequalities between married and divorced women have not changed significantly.
<b>Comments/limitations</b>	

<b>Study</b>	<u>Authors:</u> Graetz B. 1993. <u>Study aim:</u> To trace health changes over time for a variety of groups with different labour market experiences. To identify the primary sources of health risk in the context of the labour market.
<b>Sample attributes</b>	<i>N:</i> 6151 at wave 4. <i>Age:</i> 16-25 yrs <i>Sex:</i> Both genders <i>Country:</i> Australia. <i>Data collection years:</i> 1985 - 1988.
<b>Method</b>	Longitudinal cohort study of 16-25 yr olds using self-administered questionnaires.
<b>Health variables</b>	GHQ/ morbidity.
<b>Labour market variables</b>	Employment, unemployment, economic (in)activity.
<b>Findings</b>	Employed people report significantly lower levels of health disorder than students or the unemployed. These differences are largely unaffected by such demographics factors as living arrangements, socio-economic status and can be attributed to the employment status. However, the health consequences of employment and unemployment are directly contingent upon the quality of work. The highest levels of health risk are found amongst dissatisfied workers and the lowest levels amongst satisfied workers. In between these two extremes lie employed people neither satisfied nor dissatisfied with their jobs, unemployed people neither satisfied nor dissatisfied with their jobs, unemployed people irrespective of duration and students.
<b>Comments/ limitations</b>	Fairly representative sample with modest rates of attrition, 10.7% at Wave 4.

<b>Study</b>	<u>Authors:</u> Goldenberg S & Kline T, 1997 <u>Study aim:</u> To explore white-collar experiences of being laid off because of downsizing
<b>Sample attributes</b>	<i>N:</i> 144 <i>Age:</i> 21-61 yrs (mean 42 yrs) <i>Sex:</i> 66% male <i>Country:</i> Canada <i>Time period:</i> 1992- 93
<b>Method</b>	Cross-sectional qualitative study with respondents recruited through newspaper advertisements and 'snowballing'.
<b>Health measure</b>	No standard measurements used, rather reports respondents' own descriptions and terms - anxiety, depression, optimism
<b>Labour market measure</b>	Downsizing, unemployment.
<b>Findings</b>	This paper attempts to provide contextualised accounts of workers experiences. These are found to be varied and cannot be adequately summarised here.
<b>Comments/ limitations</b>	Poor qualitative study, with an overuse of percentages. There is limited information on analyses procedures

<b>Study</b>	<u>Authors:</u> Goldsmith, A <i>et al</i> 1996 <u>Study aim:</u> To investigate the effects of joblessness on personal locus of control
<b>Sample attributes</b>	<i>N:</i> 1457 <i>Age:</i> 14-22 in 1979 <i>Sex:</i> both but no breakdown given <i>Country:</i> America <i>Data collection years:</i> not stated
<b>Method</b>	Secondary analyses of data from the American National Longitudinal Survey of Youth (NLSY) (n=12,686).
<b>Health variables</b>	Locus of control
<b>Labour market variables</b>	Employment and unemployment
<b>Findings</b>	The longer the duration of unemployment extends young women tend to become more external in their locus of control; these findings are not repeated for young men who show no change.
<b>Comments/ limitations</b>	

<b>Study</b>	<u>Authors:</u> Hammarstrom A. 1994. <u>Study aim:</u> To examine the effect of unemployment on the health of young people, particularly somatic health and health behaviour.
<b>Sample attributes</b>	<i>N:</i> 1083 (atT1) <i>Age:</i> 16 yrs old at T1. <i>Sex:</i> Approx. equal numbers of males and females but exact figures not given <i>Country:</i> Sweden. <i>Data collection years:</i> 1981-1986.
<b>Method</b>	A mixed methods prospective study of 1083 school pupils in a Northern Swedish town. Follow up at 2 and 5 years. Self-administered questionnaires were used for all respondents, with semi-structured taped interviews during the last follow up study on those who had been long term unemployed. Blood pressure measurements were also taken for all respondents.
<b>Health variables</b>	Morbidity (mental & physical), health behaviours.
<b>Labour market variables</b>	Employment, unemployment.
<b>Findings</b>	The long term unemployed young showed more physical and psychological symptoms as well as higher levels of smoking and use of cannabis. In addition systolic blood pressure, alcohol consumption and crime rate increase more among long term unemployed males but not females.
<b>Comments/ limitations</b>	The Swedish labour market has certain unique features, for example, schools have a responsibility to arrange studies or activities for all young people until they are 18 yrs old. For the 18-20 yr olds everyone must have at least four hours work per day. These factors limit the generalisability to other countries.

<b>Study</b>	<u>Authors:</u> Hamilton <i>et al</i> , 1993 <u>Study aim:</u> To look at distress levels in closing and non-closing plants, and to understand how different coping styles affect distress outcomes
<b>Sample attributes</b>	<i>N:</i> 1136 <i>Age:</i> Not given <i>Sex:</i> Not given <i>Country:</i> Michigan USA <i>Time period:</i> Aug 1987 - Winter 1989
<b>Method</b>	Prospective (longitudinal) Quasi experiment using both face to face and telephone interviews on a random samples of workers from 4 closing plants and 12 non-closing plants surveyed at 3 time points : 3 months before the plant closes, one year after closure and two years after closure.
<b>Health measure</b>	depression , anxiety, distress
<b>Labour market measure</b>	unemployment, job insecurity
<b>Findings</b>	Unemployment at waves 2 and 3 was related to prior frequency of symptoms of depression. Depression was alleviated for workers whose work choices at wave 2 fitted their wave 3 outcomes; these groups were those who both wanted and found a job, lost a job they disliked or remained unemployed as planned. The findings show that unemployment and depression predict one another.
<b>Comments/ limitations</b>	

<b>Study</b>	<u>Authors:</u> Hardy & Quadagno. 1995. <u>Study aim:</u> To examine how the structure of the early retirement programmes shapes the way male autoworkers evaluate retirement.
<b>Sample attributes</b>	<i>N:</i> 1148 <i>Age:</i> median age 58yrs <i>Sex:</i> Male <i>Country:</i> USA <i>Data collection years:</i> 1989 - 1990
<b>Method</b>	Cross-sectional telephone survey using a random sample of male retirees. Response rate 66%.
<b>Health variables</b>	Satisfaction with retirement.
<b>Labour market variables</b>	Retirement.
<b>Findings</b>	Respondents citing push factors (eg. plant closing, relocation, declining health and unpleasant working conditions) as factors contributing to their retirement were more likely to believe they had retired too soon, as were those who experienced lay offs prior to retirement. The level of pension benefits was positively associated with satisfaction.
<b>Comments/ limitations</b>	The cross-sectional design means that only retrospective accounts were available.

<b>Study</b>	<u>Authors:</u> Isaksson, K 1997 <u>Study aim:</u> To examine whether the transition from work to early retirement is a cause of distress
<b>Sample attributes</b>	<i>N:</i> 237 at T1 224 at T2 <i>Age:</i> 55 yrs or more <i>Sex:</i> both but no breakdown given <i>Country:</i> Sweden <i>Data collection years:</i> Dec 1992 to July 1994
<b>Method</b>	Longitudinal study of worker who retired from a Swedish insurance company during downsizing (T1 0-9 months post retirement, T2 1.5 years post retirement)
<b>Health variables</b>	GHQ12, 7 item symptom check list,
<b>Labour market variables</b>	Retirement satisfaction
<b>Findings</b>	There were no signs of a general retirement crisis. Health problems were significantly lower 1.5 year following retirement. Most respondents retired voluntarily, but those who perceived their retirement as forced showed the worst health outcomes.
<b>Comments/ limitations</b>	

<b>Study</b>	<u>Authors:</u> Leana & Feldman. 1995. <u>Study aim:</u> To examine the factors which influence whether individuals get re-employed after a plant closing, and the factors that influence satisfaction with re-employed
<b>Sample attributes</b>	<i>N:</i> 59 (at both time points) <i>Age:</i> average 40 yrs <i>Sex:</i> Male 57, Females 2 <i>Country:</i> USA <i>Data collection years:</i> Not Given (11 months)
<b>Method</b>	Longitudinal study using self-administered questionnaires at two time points. Data first collected one month after plant closure had been announced but 2 months before it took place. Second data collection nine months after the lay off took effect. Response rate at T2 was 64%
<b>Health variables</b>	Coping strategies, motivational factors.
<b>Labour market variables</b>	Downsizing, unemployment, re-employment.
<b>Findings</b>	The re-employed were found to have more children to support, greater feelings of optimism, engaged in more problem and symptom focused coping behaviours than the unemployed. The unemployed experienced more psychological distress and anxiety than the re-employed. Differences were also found between the satisfactorily and unsatisfactorily employed. The satisfactorily re-employed had earlier reported a greater need to find re-employment and had a more pessimistic view of the job market. Unsatisfactorily employed reported more psychological distancing, poorer adjustment at T2, greater levels of psychological distress and anxiety. They also scored lower on life satisfaction and physiological health; showing much closer response patterns to the unemployed than the satisfactorily re-employed.
<b>Comments/ limitations</b>	High attrition at T2. The study originally started with 102 respondents.

<b>Study</b>	<u>Authors:</u> Poole C. 1997 <u>Study aim:</u> To assess the process and the outcome of retirement due to ill health in six large organisations.
<b>Sample attributes</b>	<i>N:</i> 6 organisations <i>Age:</i> 21-60 <i>Sex:</i> Both <i>Country:</i> UK <i>Data collection years:</i> 1990 -95
<b>Method</b>	Cross-sectional retrospective study using data on retirement rates because of ill-health, supplied by a car manufacturer, the fire, police and ambulance services, the post office and the teachers' Pensions Agency. Data were requested on numbers, age, sex, length of service and principal diagnosis.
<b>Health variables</b>	Morbidity
<b>Labour market variables</b>	Retirement
<b>Findings</b>	Rates of ill health retirement varied from 20 to 250 per 10 000 contributing members, and in two organisations the rate varied geographically within the same organisation. In the two organisations that provided data by sex, women retired at a greater rate than men under age 40 and over age 50. In four organisations the modal age or length of service coincided with enhancements in benefits. In the four that provided information on diagnosis, musculoskeletal and minor psychiatric illnesses were the most common reasons for retirement.
<b>Comments/ limitations</b>	Interesting study that highlights some of the complexities that surround early retirement.

<b>Study</b>	<u>Authors:</u> Reitzes D <i>et al.</i> 1996 <u>Study aim:</u> To explore the social psychological consequences of retirement.
<b>Sample attributes</b>	<i>N:</i> 757 <i>Age:</i> 58-64 yrs <i>Sex:</i> 52% female <i>Country:</i> USA <i>Data collection years:</i> 1992 - 94
<b>Method</b>	Longitudinal telephone survey of a random sample selected from driver history files of North Carolina Department of Motor Vehicles. 826 (62% of those contacted) consented to participate. All 826 persons were working at T1, they were then tracked at 6 month intervals over two years. 438 persons were still employed and 299 retired at T 2. The attrition rate was 8.2%
<b>Health variables</b>	Self-esteem, depression, worker commitment.
<b>Labour market variables</b>	Retirement.
<b>Findings</b>	There were no significant changes to self-esteem scores between retirees and those who continued to work, but depression scores did declined for those who retired. Regression analysis reveals that retirement had a positive influence on self-esteem and a negative influence on depression. Earlier worker identity scores had a stronger negative effect on depression scores in respondents who continued to work than in those who retired.
<b>Comments/limitations</b>	No distinction is made between retirement caused by downsizing, voluntary retirement and compulsory (age related) retirement.

<b>Study</b>	<u>Authors:</u> Virtanen P. 1993. <u>Study aim:</u> To examine the association between re-employment and the use of primary health care services
<b>Sample attributes</b>	<i>N:</i> 309 <i>Age:</i> teens - >50 yrs <i>Sex:</i> 89 male & 54 female <i>Country:</i> Finland. <i>Data collection years:</i> 1988-1989
<b>Method</b>	A cohort study of unemployed teenagers and a 'natural experiment' with long term unemployed adults. The 'intervention group' were re-employed under a government sponsored scheme, the control group remained unemployed. Frequencies of health care visits were recorded.
<b>Health variables</b>	GP visits and morbidity.
<b>Labour market variables</b>	Re-employment, unemployment
<b>Findings</b>	Primary health care visits increased during re-employment among both teenage and adult re-employed (n=82), but not the control group of 61 long term unemployed. A comparison with persons in regular wage employment indicated that when re-employed GP visits increased from a very low level to the population norm.
<b>Comments/limitations</b>	An interesting well designed study, charting the effects of returning to work on health care visits.



## **5. Workplace health promotion interventions**

### **5.1 Introduction**

As a major site of physical and psychological morbidity, the workplace has become a recognised setting for health promotion programme interventions which are designed to alter policy or practice at individual and/or organisational levels. In this section we review studies which have examined the effects of such interventions on stress; health behaviours, such as smoking, alcohol consumption, nutrition and exercise; and direct health outcomes, such as sick days and absenteeism.

### **5.2 Stress reduction**

During the period covered by this report two relevant literature reviews were uncovered. Burke (1993) differentiates between two approaches to minimise the adverse consequences of occupational stress: the strengthening of individuals and the minimisation of workplace stressors. His review considers 10 studies reporting the findings of organisational-level interventions designed to reduce stress at work experienced by managers and professionals. Each focuses upon a distinct approach, including reduction in role stress, increased job autonomy, reduced work-family conflict and reduction in stress following downsizing and rationalisation (eg mergers). Overall, the author concludes that the interventions have a beneficial effect and points out that targeting of “individual coping responses may be less useful than higher-level strategies involving groups of workers or entire units or organizations.”

The review by Murphy (1996) covers only stress-management interventions, ie techniques designed to help employees modify their appraisal of stressful situations or deal more effectively with stress symptoms. Sixty-four studies met the criteria for inclusion: workplace based, assessing a health outcome and published after peer-review. Most common techniques were muscle relaxation, meditation, biofeedback, cognitive-behavioural skills and combinations of these techniques. While effectiveness was found to vary according to the health outcome that was addressed (eg cognitive-behavioural programmes were more effective for psychological outcomes, but muscle relaxation was more effective for physiological outcomes), combined techniques were more effective across health outcome measures than single techniques. It is interesting to note that none of the interventions was consistently effective in producing effects on job- or organisation-relevant outcomes, such as absenteeism or job satisfaction. The authors conclude: “To produce changes on these types of measures, stress interventions will need to alter or modify the sources of stress in the work environment.”

Three empirical studies report the effects of workplace interventions on stress. Arnetz (1996 and 1997) evaluated the impact of a controlled stress-management programme on psychosocial well-being, efficiency and physiological stress among employees working in advanced telecommunication systems design. The findings suggest that the group which took advantage of the stress-reduction training programmes showed improvements in circulating levels of the stress-sensitive hormone prolactin, compared to employees in the ‘reference’ groups. Although there was a low response rate, the likelihood of sample bias (which might

invalidate the findings) is reported to be low. Reynolds (1997) describes the implementation and evaluation of an organisational stress management strategy, based on a quasi-experimental design. Unfortunately, the impact of the two interventions (brief counselling and organisational change) on psychological well-being is unclear: the evidence presented in graphic form shows that both interventions reduced psychological symptoms, while the comparison group's mental health deteriorated over time; the text, however, states otherwise.

Barrios-Chaplin *et al* (1997) examine the impact of an Inner Quality Management (IQM) programme on the health and well-being of a group of Motorola employees (executives, software engineers and factory workers). IQM is a training programme designed to help people increase productivity through improved health, communication, goal clarity, positive mood and job satisfaction, and through the reduction of tension, burnout, physical symptoms of stress and negative mood. The study found a reduction in negative, stress-related symptoms, and an increase in contentment, job satisfaction and communication, following the implementation of the IQM programme. However, as a result of the methodological limitations of the study, some caution should be exercised about generalising the findings to other contexts.

### ***Summary***

The conclusions to be drawn from the empirical studies are limited due to methodological weaknesses. Nevertheless, the findings from these studies, taken together with the conclusions of the two field reviews, suggest that stress management interventions targeted at individuals can be effective in reducing physical and psychological symptoms. Organisational outcomes, however, require to be tackled using interventions which address the sources of stress in the total work setting.

## **5.3 Health behaviours**

A comprehensive review of the effects of workplace health promotion (Wilson *et al* 1996) concludes that evidence of impact on exercise, nutrition and weight control are “suggestive” or “indicative”, rather than “acceptable” or “conclusive”. The main reason for these ratings is that somewhat weak designs were used to evaluate programme impact and potential or plausible alternatives (other than a causal impact of the programme) cannot be ruled out. A separate review of the benefits of employee exercise programmes has been carried out by Griffiths (1996). The evidence suggests that these programmes may be more effective in producing physical health benefits than improvements in psychological well-being; and that “the evidence for benefits to organizations remains promising but largely inconclusive.” However, the author issues a warning about the methodological limitations and theoretical inadequacy of much research in this area, as a result of which confidence in the empirical findings is considerably undermined.

### ***Cardiovascular risk factors***

Murza *et al* (1994) undertook an evaluation of a worksite health promotion programme intended to reduce cardiovascular risk factors, in particular hypertension, high cholesterol and smoking. There was a reported reduction in blood pressure and cholesterol levels, but no data are presented on smoking. Findings from this study should be treated with great caution, however, in view of the fact that there was no control group and only 3% of employees across 10 companies participated in the programme.

### ***Smoking***

Six studies consider the association between the regulation of workplace smoking and actual smoking behaviour among exposed employees. All provide, at best, only limited support for such an association. Brenner and Fleischle (1994) found that smokers employed in workplaces with smoking restrictions smoked significantly fewer cigarettes than those employed in workplaces without any such restrictions. However, differences in actual smoking prevalence among employees in workplaces with total, limited and no restrictions did not differ significantly. In a later study Brenner *et al* (1997) also found that the prevalence of smoking and the average amount of smoking were not significantly different (after adjusting for other, possibly confounding, factors) among employees who were not allowed to smoke at work compared to other employees.

Broder *et al* (1993) failed to discover changes in smoking prevalence among office workers one year after the introduction of a smoking ban, while Jeffery *et al* (1994) found that worksites with restrictive smoking policies are associated with lower cigarette consumption among smokers, but not with lower cigarette smoking prevalence or frequency of quit attempts. Glasgow *et al* (1993), using a randomised controlled design, could not distinguish between the smoking cessation rates of worksites which had received a smoking-cessation incentives programme and worksites which had not received the programme. Finally, Conrad *et al* (1996) employed a quasi-experimental design to test whether exposure of smokers to a worksite health-promoting environment alters their smoking behaviour. Although the authors claim that the intervention “reduced smoking behavio[u]r”, the indicator used to measure this outcome included only cigarette consumption and degree of smoke inhalation. Surprisingly, no data about changes (reductions) in actual smoking prevalence are provided.

### ***Alcohol consumption***

Cook *et al* (1996) assessed the effectiveness of a four week programme designed to prevent alcohol misuse among adults employed in a printing company. There was evidence that those receiving the *Working People* programme, based on a social learning model, reduced their alcohol consumption and experienced fewer problem consequences of drinking, in comparison with those who did not receive the programme. However, possible selection bias (as a result of using volunteers) and sample bias (due to high attrition between baseline and follow-up) reduces confidence in these findings.

### ***Summary***

Again, definitive conclusions are difficult in view of the methodological limitations of many of the empirical studies reported above. This point is also made by the authors of the two reviews. The only conclusion that can be stated with any confidence is that the regulation of smoking in the workplace appears to modify the amount of smoking among smokers but to have little effect on the overall prevalence of smoking.

## 5.4 Absenteeism

Five studies were located which report the impact of workplace health promotion interventions upon absenteeism among employees. In terms of research design, the strongest study was conducted by Jeffery *et al* (1993), who evaluated the outcomes of a programme designed to improve weight control and reduce smoking. In a comparison of 16 worksites receiving the intervention with 16 control sites, it was found that there was a reduction of over 3% in the proportion of workers reporting a sick day in the former, compared to the latter, sites. In another well designed study (a controlled trial, albeit with non-random allocation), designed to evaluate the effectiveness of an employee fitness programme at a Dutch bank, Kerr and Vos (1993) examined possible changes in absenteeism (and other outcomes) among four groups: regular and irregular participants in the programme (experimental groups); and regular exercisers (but not programme participants) and non-exercisers (control groups). Participation in the programme (both experimental groups) was associated with a significant decrease in absenteeism, especially long-term (but not in general well-being or self-confidence).

The other three studies used more problematic research designs. Lechner *et al* (1997) used a pre-test/post-test design (with non-random allocation to three groups: high, low and no participation) to assess the effectiveness of an employee fitness programme on reducing absenteeism. The high participation group showed a significant decline in 'sick days'; the other two groups did not. The possibility of volunteer effects and reverse causation explanation limits confidence in the findings. The impact of a stress counselling service for hospital-based health workers on absenteeism rates was measured using a pre-test/post-test design (without control group) by Michie (1996). Number of days and episodes of sickness absence were significantly lower in the six months following counselling compared to the equivalent period before counselling. Measures of psychological well-being also improved over this period. Possible sample bias and the absence of a control group constitute limitations in this study's methodology.

Two papers by Shi (1993a and 1993b) report the findings of an evaluation to assess the effectiveness of different levels of health promotion interventions (high, medium, low and no [assessment only] intensity) on medical care use and 'sick days'. The low intensity programme consisted of access to a health resource centre and free self-care books; the medium intensity programme offered, in addition, behaviour change workshops and health promotion volunteers; and the high intensity programme added case management and an environmental policy. The authors report an association between high-intensity health promotion and improvements in these outcomes, as well as evidence of increasing financial benefits with greater intensification of the programme. However, this study is marred by a number of methodological weaknesses, such as unknown sample representativeness, possible sample bias and unknown reliability of self-report measures.

### **Summary**

The empirical studies included under this heading varied considerably in terms of the soundness of the adopted research design. Nevertheless, all the findings point to a major impact of workplace health promotion activity on absenteeism. Given the lack of uniformity among the interventions on offer, there must be some question about which particular elements within an overall intervention actually produce the effect on absenteeism rates.

**Workplace health promotion interventions: summaries of research studies**

<b>Study</b>	<u>Authors:</u> Arnetz 1996  <u>Study aim:</u> (1) To develop an instrument for assessing occupational stress in modern IT companies; (2) To evaluate impact of controlled stress-reduction programme on psychosocial well-being, efficiency and physiological stress.
<b>Sample attributes</b>	<i>N:</i> 116 <i>Age:</i> Not stated <i>Sex:</i> 91M; 25F <i>Country:</i> Sweden  <i>Data collection years:</i> “1990s”. Employees in two departments at telecommunications systems design company. In permanent employment at company or on temporary assignment to last at least another year.
<b>Method</b>	One department offered participation in one of 3 stress-reduction training programmes (intervention (I) group) while other department acted as reference (R) group. Measures of stressors in modern IT workplace taken at baseline, at end of formal training (+3 months) and again 5 months later (+8 months).
<b>Health variables</b>	Psychosocial health. Biological measures (eg prolactin, testosterone, blood pressure).
<b>Labour market variables</b>	Employment New technology
<b>Findings</b>	Significant improvement in I group with regard to circulating levels of stress-sensitive hormone prolactin as well as alteration in mental strain. Cardiovascular risk indicators were also improved. Type of stress-reduction programmes chosen or intensity of participation did not affect results. No beneficial effects were observed with regard to psychological characteristics of the work.
<b>Comments/ limitations</b>	Low (43.3%) response rate but no evidence of sample bias.

<b>Study</b>	<u>Authors:</u> Arnetz 1997  <u>Study aim:</u> To evaluate prospectively the impact of a controlled stress-management programme on psychosocial well-being, efficiency, and physiological stress indicators.
<b>Sample attributes</b>	<i>N:</i> 116 <i>Age:</i> N/A <i>Sex:</i> 91M; 25F <i>Country:</i> Sweden  <i>Data collection years:</i> “1990s”
<b>Method</b>	One department offered participation in one of 3 stress-reduction programmes (intervention (I) group), while other department acted as reference (R) group. Measures of stressors in modern IT workplace taken at baseline, at end of training (+3 months) and again 5 months later (+8 months).
<b>Health variables</b>	Psychosocial health Biological measures (eg serum prolactin)
<b>Labour market variables</b>	Employment New technology
<b>Findings</b>	The stress-reduction programme attenuated the time-associated increase in mental strain as compared to that of the reference group. The programme also had a significant and beneficial effect on the circulatory levels of prolactin.
<b>Comments/ limitations</b>	Low (43.3%) response rate but no evidence of sample bias.

<b>Study</b>	<p><u>Authors:</u> Barrios-Choplin <i>et al</i> 1997</p> <p><u>Study aim:</u> To examine the impact of an Inner Quality management (IQM) programme on employee health and well-being.</p> <p>Motorola employees.</p>
<b>Sample attributes</b>	<p><i>N:</i> 48 <i>Age:</i>21-68 years (mean 42 years) <i>Sex</i> Not stated Country USA</p> <p><i>Data collection years:</i> Not stated</p>
<b>Method</b>	Pre-post design with no control/comparison group. Subjects divided into three groups: executives (N=9), software engineers (N=9) and factory workers (N=30). First two groups followed up after 6 months, factory workers after 3 months
<b>Health variables</b>	Psychological measures (eg happiness, burnout); heart rate variability; blood pressure.
<b>Labour market variables</b>	Stress management approaches.
<b>Findings</b>	Among managers and engineers, contentment increased following the implementation of the IQM programme, while nervousness and physical stress decreased. Among employees, tension and anxiety decreased, while communication and job satisfaction increased. Blood pressure in hypertensive individuals decreased and there was a reduction in sympathetic nervous activity.
<b>Comments/ limitations</b>	The authors claim that the results are encouraging but also draw attention to methodological deficiencies, including the lack of control group and the problems of inferring a causal link between the IQM programme and the changes in health status.

<b>Study</b>	<p><u>Authors:</u> Brenner and Fleischle 1994</p> <p><u>Study aim:</u> To analyse association between workplace smoking regulations and smoking habits of active smokers.</p>
<b>Sample attributes</b>	<p><i>N:</i> 931 <i>Age:</i> 20-59 <i>Sex:</i> Not stated <i>Country:</i> Germany</p> <p><i>Data collection years:</i> 1992</p> <p>Employed for minimum of 15 hours/week.</p>
<b>Method</b>	Cross-sectional study comparing smoking behaviour under 3 conditions: no restrictions on smoking, smoking by agreement of those sharing office, and total smoking ban.
<b>Health variables</b>	Smoking, quitting smoking
<b>Labour market variables</b>	Workplace smoking policy
<b>Findings</b>	Smoking prevalence lower among employees at workplaces with smoking restrictions than among other employees, but differences not significant. Average number of cigarettes smoked per day significantly lower among employees working under restricted smoking arrangements.
<b>Comments/ limitations</b>	Cross-sectional design limits ability to make definitive causal statements, but evidence that regulation of smoking at workplace may help active smokers reduce daily cigarette consumption.

<b>Study</b>	<u>Authors:</u> Brenner <i>et al</i> 1997  <u>Study aim:</u> To assess smoking behaviour and attitudes toward smoking regulations and passive smoking in the workplace
<b>Sample attributes</b>	<i>N:</i> 974 <i>Age:</i> 19-65 years <i>Sex:</i> 86% male, 14% female <i>Country:</i> Germany  <i>Data collection years:</i> 1995  Employees in a company mainly engaged in the processing of copper.
<b>Method</b>	Cross-sectional survey of mainly blue-collar employees. Response rate 64.9%
<b>Health variables</b>	Smoking; environmental tobacco smoke (ETS).
<b>Labour market variables</b>	Occupation; workplace smoking regulation.
<b>Findings</b>	31% reported that they were not allowed to smoke in their immediate work area. Most agreed with this smoking policy. The prevalence of active smoking and average amount of smoking was considerably lower among employees who were not allowed to smoke at work than among other employees. This difference was not, however, statistically significant. After adjustment for potential confounders.
<b>Comments/ limitations</b>	Although cross-sectional in design, the study's findings are more consistent with an interpretation which emphasises the potential effectiveness of smoking regulations in the workplace than with alternative explanations (eg reverse causation).

<b>Study</b>	<u>Authors:</u> Broder <i>et al</i> 1993  <u>Study aim:</u> To explore the possible adverse effects of environmental tobacco smoke (ETS) in office buildings, before and after the introduction of a smoking ban.
<b>Sample attributes</b>	<i>N:</i> 179 (reduced to 137) <i>Age:</i> 42 years (mean) <i>Sex:</i> 61% male, 39% female <i>Country:</i> Canada  <i>Data collection years:</i> 1989-1990
<b>Method</b>	Pre-post design, with voluntary participation (estimated at 20% of employees receiving an information package).
<b>Health variables</b>	Measures of well-being Smoking and ETS exposure
<b>Labour market variables</b>	Indoor environment Satisfaction with work environment
<b>Findings</b>	One year after the introduction of a smoking ban, the prevalence of smoking was unchanged. There was some reduction in symptom frequency (but not in diary reports) and a trend (non-significant) towards reduced salivary cotinine levels. Measured (but not perceived) environmental quality showed some improvement.
<b>Comments/ limitations</b>	Comparison of study completers with dropouts and other subjects suggests possible sample bias.

<b>Study</b>	<u>Authors:</u> Conrad <i>et al</i> 1996  <u>Study aim:</u> To test the hypothesis that exposure to a worksite health-promoting environment can act as a cure to smoking reduction.
<b>Sample attributes</b>	<i>N:</i> 391 (reduced to 310 after 1 year) <i>Age:</i> modal age 25-34 years <i>Sex:</i> 69% female <i>Country:</i> USA  <i>Data collection years:</i> early 1980s (“the data are over a decade old”) All subjects were smokers at baseline
<b>Method</b>	1 year pre-test/post-test quasi-experimental design. One group (N = 82) was exposed to health-promoting environmental cues (eg personal health counselling), while the other (N = 228) were in comparison group located at another site.
<b>Health variables</b>	Smoking
<b>Labour market variables</b>	Health-promoting worksite environment.
<b>Findings</b>	Exposure to the health-promoting environment had statistically significant direct and indirect effects on post-test smoking.
<b>Comments/ limitations</b>	“Selection bias remains a major validity threat ...” (author). No data on change in smoking prevalence are provided.

<b>Study</b>	<u>Authors:</u> Cook <i>et al</i> 1996  <u>Study aim:</u> To assess the effectiveness of a 4 week programme designed to prevent alcohol misuse among working adults.
<b>Sample attributes</b>	<i>N:</i> 200 (pre-test); 108 (post-test) <i>Age:</i> 58% aged 26-45 years <i>Sex:</i> 56% male, 44 female <i>Country:</i> USA  <i>Data collection years:</i> 1993-1994  Medium sized printing company of approximately 900 employees
<b>Method</b>	Pre-test, post-test quasi-experimental design. One experimental and two control groups.
<b>Health variables</b>	Alcohol consumption
<b>Labour market variables</b>	Printing company
<b>Findings</b>	Programme effects were demonstrated with respect of alcohol consumption, motivation to reduce consumption and problem consequences of drinking. No effects were found on health beliefs or self-efficacy to reduce drinking.
<b>Comments/ limitations</b>	Possible selection bias due to ‘voluntary’ nature of samples. Sample bias due to attrition also evident.



<b>Study</b>	<u>Authors:</u> Glasgow <i>et al</i> 1993  <u>Study aim:</u> To evaluate the short- and longer-term effects of a practical worksite smoking-cessation incentives programme.
<b>Sample attributes</b>	<i>N:</i> 19 sites (1097 subjects) <i>Age:</i> 40-41 years (mean) <i>Sex:</i> 62-64% female <i>Country:</i> USA  <i>Data collection years:</i>  19 medium-sized diverse, government worksites
<b>Method</b>	Randomised controlled trial with worksite as key unit of analysis. Randomised to incentive or no incentive conditions, following stratification by number of employees and estimated smoking prevalence. Cohort of smokers followed up in each worksite; follow up over 2 years.
<b>Health variables</b>	Readiness to change Quit smoking attempts Smoking cessation
<b>Labour market variables</b>	Government worksites
<b>Findings</b>	The incentive programme did not significantly improve cessation rates at either 1 year or 2 year follow-up assessments.
<b>Comments/ limitations</b>	Conservative assumption about smoking among cohort members not followed up. Extensive checks on internal and external validity.

<b>Study</b>	<u>Authors:</u> Jeffery <i>et al</i> 1993  <u>Study aim:</u> To assess the effectiveness of work-site health promotion in reducing employee absenteeism.
<b>Sample attributes</b>	<i>N:</i> 32 sites (1242 employees) <i>Age:</i> 38 years (mean) <i>Sex:</i> 46% male; 54% female <i>Country:</i> USA  <i>Data collection years:</i> 1987-1990
<b>Method</b>	Randomised controlled trial (RCT) of worksite health promotion programmes designed to improve weight control and reduce smoking (N = 16 intervention and 16 control sites).
<b>Health variables</b>	Weight control; Smoking
<b>Labour market variables</b>	Absenteeism
<b>Findings</b>	Using worksite as unit of analysis, there was a reduction in % of workers reporting a sick day in the last month in treatment versus control worksites of 3.7% and 3.4% in cross-sectional and cohort analysis, respectively.
<b>Comments/ limitations</b>	Strengths of study lie in its use of RCT method, selection of worksite as unit of analysis and inclusion of cross-sectional and cohort samples. Use of self-reports to obtain data on sick days is a weakness.

<b>Study</b>	<p><u>Authors:</u> Jeffery <i>et al</i> 1994</p> <p><u>Study aim:</u> To provide additional information about the effects of worksite smoking policies on the behaviours of smoking employees. To test whether worksites with restrictive smoking policies have lower prevalence of smoking and more attempts to quit than worksites without such policies.</p>
<b>Sample attributes</b>	<p><i>N:</i> 32 sites (1242 employees) <i>Age:</i> Not stated <i>Sex:</i> 46% male; 54% female <i>Country:</i> USA</p> <p><i>Data collection years:</i> 1987-1990</p>
<b>Method</b>	Observational design encompassing both cross-sectional and longitudinal (cohort) elements. Conducted in conjunction with a two-year randomised controlled trial of worksite health promotion programme (see Jeffery <i>et al</i> 1993).
<b>Health variables</b>	Smoking prevalence; cigarette consumption.
<b>Labour market variables</b>	Worksite smoking policy.
<b>Findings</b>	At baseline 15 sites had restrictive smoking policies while 17 had unrestrictive policies. Smoking restrictions were associated with significantly lower smoking prevalence and higher lifetime quit rates. Between baseline and two year follow-up, 9 of 17 unrestrictive worksites became restrictive. Neither baseline smoking policies nor changes in smoking policy predicted change in smoking prevalence or frequency of quit attempts. However, smokers in sites changing from unrestrictive to restrictive policies reported a significant reduction in daily cigarette consumption.
<b>Comments/ limitations</b>	Observational study with small sample size. Consequently difficult to determine whether policies were causally related to smoking behaviour or findings are artefactual (eg as a result of selection bias).

<b>Study</b>	<p><u>Authors:</u> Kerr and Vos 1993</p> <p><u>Study aim:</u> To evaluate the effectiveness of an Employee Fitness Programme (EFP) at a Dutch bank by examining possible changes in employee absenteeism, general well-being, self-confidence, perceived physical fitness.</p>
<b>Sample attributes</b>	<p><i>N:</i> 152 <i>Age:</i> 38-39 years (mean) <i>Sex:</i> Not stated <i>Country:</i> Netherlands</p> <p><i>Data collection years:</i> 1988-1989</p> <p>White-collar employees</p>
<b>Method</b>	Controlled trial: two experimental groups (regular and irregular participants) and two control groups (regular exercisers and non-exercisers). Non-random allocation (but control group subjects taken from EFP waiting list).
<b>Health variables</b>	General well-being; Self-confidence; Perceived physical fitness
<b>Labour market variables</b>	Absenteeism
<b>Findings</b>	Participation in an EFP led to a significant decrease in absenteeism among both regular and irregular participants. Main difference found with respect to long-term absence (>2 days). There were no significant differences in general well-being and self-confidence between groups, but perceived physical fitness was highest among regular EFP participants.
<b>Comments/ limitations</b>	Improved methodology compared to earlier studies.

<b>Study</b>	<u>Authors:</u> Lechner <i>et al</i> 1997  <u>Study aim:</u> To evaluate the effectiveness of different levels of participation in an employee fitness programme on reducing sick days.
<b>Sample attributes</b>	<i>N:</i> 884 <i>Age:</i> 37.9 years (mean) <i>Sex:</i> 86% male, 14% female <i>Country:</i> Netherlands <i>Data collection years:</i> Not stated
<b>Method</b>	Longitudinal pre-test/post-test design. Three participation groups (high, low, none) followed over one year (non-random allocation).
<b>Health variables</b>	Sick days (ie days of work on sick leave)
<b>Labour market variables</b>	Police force Chemical industry Banking firm
<b>Findings</b>	The high participation group showed a significant decline in sick days, while the other two groups showed no change.
<b>Comments/ limitations</b>	Possible alternative explanations for the main finding include volunteer effects (self-selection) and reverse causation (sickness causing low participation, rather than vice versa).

<b>Study</b>	<u>Authors:</u> Michie 1996  <u>Study aim:</u> To assess whether absenteeism rates were reduced as a result of the introduction of a stress counselling service for hospital-based health service workers.
<b>Sample attributes</b>	<i>N:</i> 163 <i>Age:</i> N/A <i>Sex:</i> 83% women, 17% men <i>Country:</i> UK <i>Data collection years:</i> Not stated
<b>Method</b>	Pre-test/post-test design with no control group. Of total sample (N = 163), 92 (56%) followed up at variable times, 41 (25%) completed 6 month follow-up questionnaire.
<b>Health variables</b>	Anxiety, depression, satisfaction, functioning
<b>Labour market variables</b>	Absenteeism
<b>Findings</b>	Number of days and episodes of sickness absence were significantly lower in the 6 months following counselling compared to the equivalent period prior to counselling. Anxiety, depression, satisfaction with work, satisfaction with life outside work and perceived function at work were improved at 6 month follow-up.
<b>Comments/ limitations</b>	Absence of control group makes it difficult to interpret findings. Representativeness of followed-up sample unknown, therefore possibility of sample bias.

<b>Study</b>	<u>Authors:</u> Murza <i>et al</i> 1994  <u>Study aim:</u> To describe and evaluate worksite health promotion programme focused on cardiovascular risk factor reduction.
<b>Sample attributes</b>	<i>N:</i> 535 <i>Age:</i> 15-64 <i>Sex:</i> Not stated <i>Country:</i> Germany <i>Data collection years:</i> 1988-91
<b>Method</b>	Pre-post design without control group. Participants evaluated before and after the programme.
<b>Health variables</b>	Hypertension, cholesterol, smoking
<b>Labour market variables</b>	Employees
<b>Findings</b>	There was a reduction in blood pressure and cholesterol in the followed-up sample. Overall 66% of programme participants reported changes in health behaviour.
<b>Comments/ limitations</b>	Data covers less than 3% of total number of employees (ca 20,000) involved in the programme. Representativeness of followed-up sample unknown, therefore generalisability of findings unclear. No control group.

<b>Study</b>	<u>Authors:</u> Reynolds 1997  <u>Study aim:</u> To describe the implementation and outcomes of an organisational stress management strategy.
<b>Sample attributes</b>	<i>N:</i> 156 <i>Age:</i> Not stated <i>Sex:</i> Not stated <i>Country:</i> UK  <i>Data collection years:</i> Not stated  City council department
<b>Method</b>	Quasi-experimental design. Two sections received an intervention (brief counselling or organisational change), while a third area served as a non-intervention control. Follow up after 1/2 years.
<b>Health variables</b>	Psychological well-being and mood; Job satisfaction; Non-job satisfaction
<b>Labour market variables</b>	Absence from work Job characteristics
<b>Findings</b>	Neither intervention had any impact on perceptions of work characteristics or absenteeism. Inferential changes were found in respect of physical symptoms: decrease in the counselling area but increases in the organisational change and comparison areas. Impact on psychological health unclear.
<b>Comments/ limitations</b>	Authors state that the findings are consistent with growing body of evidence that organisational interventions do not enhance employee's mental health. Evaluation of study quality hampered by lack of information about possible biases, eg sample bias and attrition. Also discrepancy between text and graph in respect of mental health findings.

<b>Study</b>	<u>Authors:</u> Shi 1993a  <u>Study aim:</u> To evaluate the relative effectiveness of different levels of health promotion interventions on changes in medical care use and sick days.
<b>Sample attributes</b>	<i>N:</i> 1188 (both health risk assessments) <i>Age:</i> 69-74% aged 30-49 years <i>Sex:</i> 71-75% male <i>Country:</i> USA  <i>Data collection years:</i> 1988-1990.  N. California utility company
<b>Method</b>	Non-equivalent multiple comparison group quasi-experimental design comparing high intensity, medium intensity, low intensity or assessment-only control groups.
<b>Health variables</b>	Doctor visits; Hospitalisation; Injuries; Sick days
<b>Labour market variables</b>	Utility company
<b>Findings</b>	Findings indicate a reliable and consistent association between high-intensity health promotion and declines in doctor visits, hospitalisation, injuries and sick days. Less impressive results for medium intensity programme, while low-intensity programme was not significantly better than the control condition.
<b>Comments/ limitations</b>	Interpretation of findings hampered by unknown sample representativeness, possible sample bias, unknown reliability of self-report measures. However, findings are broadly consistent with those from other studies.

<b>Study</b>	<u>Authors:</u> Shi 1993b  <u>Study aim:</u> To provide a cost-benefit analysis of a health promotion intervention programme designed to reduce medical case use and sick days.
<b>Sample attributes</b>	<i>N:</i> 1188 (both health risk assessments) <i>Age:</i> 69-74% aged 30-49 years <i>Sex:</i> 71-75% male <i>Country:</i> USA  <i>Data collection years:</i> 1988-1990  N. California utility company
<b>Method</b>	Non-equivalent multiple comparison group quasi-experimental design comparing high intensity, medium intensity, low intensity or assessment-only control groups.
<b>Health variables</b>	Doctor visits – costs; hospitalisation – costs; injuries – costs; sick days – costs
<b>Labour market variables</b>	Utility company
<b>Findings</b>	Benefits increased with greater intensification of the health promotion intervention, from \$145 in the assessment-only group to \$421 in the high intensity group (medium cost estimate). Cost-benefit analysis shows that the medium-intensity intervention contributed to a greater level of medical cost reduction, per dollar spent, than all other intervention groups.
<b>Comments/ limitations</b>	Unknown sample representativeness. Possible sample bias and unknown reliability of self-report measures.



## **6. New technology and the impact on health**

### **6.1 Introduction**

Since the mid 1980s the office workplace has been transformed by rapid and extensive growth of computer technology, particularly for the storage and retrieval of information. Computers have not only improved productivity and competitive advantage, but also introduced new methods for work management and the surveillance and control of employee behaviour. Computer-based tasks make physical and mental demands that are different from those associated with old technology office activity. In particular, computerised jobs are likely to be more sedentary, require more cognitive processing and demand less expenditure of physical energy. Concomitant with the spread of this new office technology a considerable literature has developed about the possible implications for the health and well-being of employees who are exposed to computers. During the period covered by this literature review, we found four relevant reviews and 20 empirical papers which have examined the relationship between new technology in the office (particularly the use of the video display terminal [VDT]) and employee health. The findings are summarised below.

### **6.2 Review papers**

Carter and Bannister (1994) examine musculoskeletal (MS) problems in VDT work. They quote many studies which report evidence of a high prevalence of MS complaints among VDT users. However, MS strain is also claimed to be common in other types of work. While some studies indicate that the VDT operator experiences more discomfort than the non-VDT office worker, and the frequency of their discomfort increases with the degree of VDT work, other studies have reported few differences in MS problems between VDT and non-VDT workers. Overall, some 25-35% of VDT operators report MS pain, but disability due to MS disorder is much less common. Sites where MS complaints are most reported include the back, shoulders and neck, and, to a lesser extent, the arms and legs.

Arnetz and Wiholm (1997) consider the evidence relating to “technostress”, ie “mental and physiological arousal observed in certain employees who are heavily dependent on computers in their work.” Studies of employees in high-technology industries suggest that psychosomatic symptoms are related in part to high perceived mental demands in combination with lack of sufficient skills. Employees with symptoms more commonly report that they are not sufficiently recognised by their employer, as compared with nonsymptomatic peers. Low perceived organisational efficiency correlates with high mental stress among employees. In a controlled stress management programme, the authors observed lower mental stress levels among participants, as compared with controls, and lower physiological arousal. They suggest that organisational reengineering and the introduction of information technologies constitute potential stressors challenging employees’ cognitive resources. It is predicted that psychosomatic syndromes in the workplace will most likely increase in the foreseeable future due to the rapid changes currently transcending working life.

Sharit and Czaja (1994) consider issues and challenges of computer-interactive tasks for older workers. Their concerns are driven by the twin trends of rapid computerisation within the workplace setting and the increasing age of the workforce. In respect of age-related performance effects, the authors cite evidence of a slowing in information processing, declines

in working memory, reduced attentional capacity and changes in perception. Unfortunately, research findings do not appear to support the conjecture that age differences in cognitive abilities can be eliminated or even attenuated with practice or experience. Considering age and stress-related effects, Sharit and Czaja conclude that paced computer-interactive tasks are likely to elevate stress among older people. Ergonomic intervention strategies designed to offset some of the difficulties experienced by older people in the computerised office include: training, job design (workplace design, rest breaks and input devices) and interface design.

Smith (1997) looks at psychosocial aspects of working with VDTs. While some early studies indicated an association between VDT use and greater job dissatisfaction and distress, others failed to find such an association. More up to date research suggests that the introduction of computers and the design of computerised office work systems influence work processes, job tasks and design, social relationships at work, organisational policies, management practices and career opportunities in ways that can be both beneficial and harmful to physical and mental health. The author's summary of the research evidence on VDT use, psychosocial factors and stress is as follows:

- Lower paid, less skilled computer users are more psychologically distressed than higher paid, more skilled computer users
- The stress associated with the move to new technology is greater among lower paid, less skilled and older employees than among higher paid, more skilled and younger employees
- Seven job factors tend to produce high stress (across a range of job categories): (1) high job demands, such as heavy workload, work pressure and increased work pace; (2) lack of control over the work process and/or inability to participate in decisions; (3) high level of task difficulty coupled with inadequate skills; (4) monotony, lack of variety or lack of task content; (5) poor supervisory relations or lack of supervisory support; (6) technology problems, such as computer slowdowns or breakdowns, which increase the perception of higher workload and less control; and (7) a fear of job security.

Smith suggests work organisation improvements for healthier VDT jobs, including organisational support, employee participation, improved task content, increased job control, reasonable production standards, career development, enhanced peer socialisation and improved workstation ergonomics.

### **6.3 Association between VDT use and health: comparison of VDT users and non-VDT users**

Only two studies were found which attempted to assess the health consequences of VDT use by comparing exposed and non-exposed groups. Unfortunately, in the study by Bergqvist *et al* (1995a) the non-VDT user group consisted of persons using a VDT for less than 5 hours a week as well as those not using a VDT at all. Nevertheless, the authors failed to find differences in muscle problems between this group and the group of VDT users. Use of VDT for more than 20 hours a week and the presence of other factors (such as limited rest breaks, repetitive movements and the presence of specular glare) were associated with the risk of excessive muscle problems. Sanchez-Roman *et al* (1996) claim to have found differences between computer terminal operators and unexposed administrative workers in respect of the risk of asthenopia, highlighting the impact of working at a VDT for over four hours a day. While the findings of these two studies concur in the identification of a similar risk period for VDT use (more than 20 hours a week), caution should be taken in extrapolating the findings to other settings and employee groups as a result of methodological limitations.



#### 6.4 Association between VDT use and health: other studies

The remaining 18 empirical studies addressing this topic broadly examine the prevalence of physical and/or psychological symptoms and conditions among VDT users, and a subset of studies seeks to examine the association between employee health and workplace conditions. Widespread evidence of musculoskeletal problems among VDT workers is to be found in the studies reported by Arnetz and Berg (1997), Bergqvist *et al* (1995b), Bernard *et al* (1994), Boucsein and Thum (1997), Eckberg *et al* (1995), Faucett and Rempel (1994, 1996), Hales *et al* (1994), Hochanadel (1995), Kamienska-Zyla and Prynck-Skotniczy (1996), Marcus and Gerr (1996), Polyani *et al* (1997), Westlander (1994) and Wiholm and Arnetz (1997). An association between skin problems and VDT use is uncovered in the reports by Arnetz and Berg (1997), Berg and Arnetz (1996) and Bergqvist and Wahlberg (1994), while Arnetz and Berg (1997), Kamienska-Zyla and Prynck-Skotniczy (1996), Leodolter *et al* (1996) and Sanchez-Roman *et al* (1996) provide evidence of a link between ocular problems (including 'visual fatigue') and VDT use. With respect to psychological or psychosomatic symptoms, Aronsson *et al* (1994) report a high prevalence of psychological complaints (eg anxiety, depression), stomach disorders and headaches.

Several papers have examined the association between physical and psychological symptoms and the psychosocial and organisational work environment. Berg and Arnetz (1996) report that persons with VDT associated skin symptoms had *more* control over work content and work organisation than those without such symptoms. Bergqvist and Wahlberg (1994) found that skin problems were more likely among those who perceived work pace or workload as high and work break opportunities as more limited (the latter also reported by Bergqvist *et al* (1995a)). In the study by Bernard *et al* (1994) musculoskeletal disorder was found to be associated with perceived increase in workload variability, lack of support from immediate supervisors, increased job pressure and lack of participation in decision-making, but not with job control or job insecurity. Faucett and Rempel (1994) conclude that the relationship between ergonomic aspects of VDT work and musculoskeletal symptoms are modified by psychological workload, decision latitude and relationship with one's supervisor. Hales *et al* (1994) report modest associations between musculoskeletal disorders and seven psychosocial variables, including lacking decision-making opportunities, increased work pressure and surges in workload. Marcus and Gerr (1996) failed to find an association between the prevalence of musculoskeletal symptoms and occupational psychosocial strain or occupational social support; however, they do report an association with job stress and job insecurity. Polyani *et al* (1997) discover a relationship between the reporting of moderate to severe symptoms of musculoskeletal disorder and fast pace, conflicting demands, low skills discretion and social support. Finally, Wiholm and Arnetz (1997) found a significant correlation between musculoskeletal symptoms and low autonomy.

On the whole these findings support the cumulative evidence from previous empirical research (see section 6.2 above), although there are some discrepant findings.

**New technology and the impact of health: summaries of research studies**

<b>Study</b>	<u>Authors:</u> Arnetz & Berg 1997 <u>Study aim:</u> To assess what physical and psychosocial factors, if any, are associated with health complaints in a modern and highly computerised insurance company office.
<b>Sample attributes</b>	<i>N:</i> 133 <i>Age:</i> mean 42yrs <i>Sex:</i> 29% male,71% female <i>Country:</i> Sweden. <i>Data collection years:</i> Not stated.
<b>Method</b>	Cross-sectional survey of employees in an office block. 145 received a self-administered questionnaire, of whom 133 responded (response rate 92%).
<b>Health variables</b>	Health behaviours, morbidity, stress.
<b>Labour market variables</b>	Work environment, job related skills.
<b>Findings</b>	The psychosocial work environment was generally seen to be favourable, although 40% reported too much work to do. More than 50% of those who worked with computers reported that they had some type of health symptom allegedly induced by VDU related work. Only 13% of respondents could work an entire day at a computer and remain free of symptoms. 75% reported their health as being excellent or good during the preceding month. During the past year 43% of employees had symptoms in the neck, 49% in the shoulders and 44% in the lower back. 14% reported eye irritation or eye fatigue. 18% reported skin symptoms or eczema. 10% reported hypersensitivity to electricity and VDUs. Results point to the importance of looking at the psychosocial and physical environments when health complaints arise in the modern office.
<b>Comments/ limitations</b>	Cross-sectional design limits claims about causality..

<b>Study</b>	<u>Authors:</u> Aronsson <i>et al</i> 1994 <u>Study aim:</u> To analyse the relationship between work organisation and mental/somatic symptoms.
<b>Sample attributes</b>	<i>N:</i> 1738 <i>Age:</i> mean 39 yrs <i>Sex:</i> 25% male, 75% female <i>Country:</i> Sweden <i>Data collection years:</i> 1985 -1987
<b>Method</b>	Questionnaire issued by Swedish Foundation for Occupational Health and Safety for State employees. Data were collected through local occupational health care centres. These covered 52 administrative departments and authorities. Subjects not recruited randomly or systematically.
<b>Health variables</b>	Psychological complaints, stomach disorders, headaches.
<b>Labour market variables</b>	Job demands, control, social support, computer use.
<b>Findings</b>	Work conditions vary greatly both between users and between genders. Data entry tasks and a combination of data entry and data acquisition tasks were more common among women. The data entry group reported a greater number of somatic and psychological problems and contained the greatest percentage of people spending more than 6 hours per day at a terminal. There appeared to be a critical limit of 5 to 6 hours per day beyond which the incidence of symptoms rose sharply.
<b>Comments/ limitations</b>	Exogenous causes of health impacts cannot be ruled out. Representativeness of sample and generalisability of findings unknown.

<b>Study</b>	<u>Authors:</u> Berg & Arnetz 1996 <u>Study aim:</u> To investigate the association between psychosocial factors and visual display unit (VDU) associated skin problems.
<b>Sample attributes</b>	<i>N:</i> 47 <i>Age:</i> Not stated <i>Sex:</i> Not stated <i>Country:</i> Sweden. <i>Data collection years:</i> Not stated.
<b>Method</b>	47 persons randomly selected from a cohort of 809 office employees. Prerequisite for inclusion was that a person spent 50% or more of their working time with computers during a regular work day. Study group (N=19) consisted of a random selection of those who had reported work related facial skin symptoms in the initial questionnaire and those who had no such symptoms (N=28).
<b>Health variables</b>	Stress, skin symptoms.
<b>Labour market variables</b>	New technology, work demands/environment.
<b>Findings</b>	Significantly more people in the group with skin symptoms reported more extreme occupational mental stress. VDU workers with skin symptoms reported higher control over work processes but nevertheless experienced more extreme job stress. There were no systematic differences between the groups with and without skin symptoms with regard to age, gender, job functions, computer literacy, alcohol and coffee consumption or smoking habits.
<b>Comments/limitations</b>	Cross-sectional design limits making causal inferences. Results must be considered preliminary due to small sample size.

<b>Study</b>	<u>Authors:</u> Bergqvist <i>et al</i> 1995a <u>Study aim:</u> To examine the relationship between visual display terminal (VDT) use and musculoskeletal problems.
<b>Sample attributes</b>	<i>N:</i> 353 <i>Age:</i> Not stated <i>Sex:</i> Not stated <i>Country:</i> Sweden <i>Data collection years:</i> 1987
<b>Method</b>	Of the original cohort of 535 (1981) 353 were followed up. Same self-administered questionnaire used as in 1981 and another to report changes in work conditions between 1981 and 1987 (enabling estimates of bias due to 'healthy worker effect' or VDT work changes). Individuals not using a VDT or using a VDT for < 5hrs a week comprised the non-VDT user group.
<b>Health variables</b>	Musculoskeletal disorders.
<b>Labour market variables</b>	New technology, work environment.
<b>Findings</b>	VDT users did not show greater likelihood of muscle problems compared to non-VDT users. Combinations of specific VDT work situations, such as data entry work or work with a VDT for more than 20h/week <i>and</i> the presence of some other factors were, however, associated with excess risks of certain muscle problems. The extraneous factors involved in the definitions of such risk groups were: use of bifocal or progressive glasses at a VDT; stomach related stress reactions; limited rest break opportunity; repetitive movements; non use of lower arm support; and possibly the vertical position of the keyboard; non use of lower arm support and possibly the vertical position of the keyboard; and the presence of specular glare.
<b>Comments/limitations</b>	No indication of bias due to 'healthy worker effect' for neck and shoulder discomforts.

<b>Study</b>	<u>Authors:</u> Bergqvist <i>et al</i> 1995b <u>Study aim:</u> To investigate associations between musculoskeletal problems and various factors relating to individual, ergonomic and organisational workplace conditions.
<b>Sample attributes</b>	<i>N:</i> 260 <i>Age:</i> Not stated <i>Sex:</i> 24% male, 76% female <i>Country:</i> Sweden <i>Data collection years:</i> 1987
<b>Method</b>	Cohort of 260 current visual display terminal (VDT) users (taken from larger cohort of 535 recruited in 1981). Data collected using self-administered questionnaire, physiotherapeutic examination (75% response rate) and worksite investigators (88% response rate).
<b>Health variables</b>	Musculoskeletal disorders
<b>Labour market variables</b>	Work characteristics (organisational and ergonomic).
<b>Findings</b>	The most common locations for muscular problems were reported as the neck, shoulder and lower back regions. Associations were found between several musculoskeletal problems and gender, women with children at home, age, and stomach-related stress reactions. Some effects were also associated with use of spectacles or tiredness-related stress reactions and smoking. Limited rest breaks and peer contacts also given increased the risk of musculoskeletal problems, as did limited work task flexibility and frequent overtime. Neck/shoulder discomforts were associated with static work posture, insufficient table space and with keyboard and VDT in a high position.
<b>Comments/ limitations</b>	Cross-sectional design poses limitations on making causal inferences.

<b>Study</b>	<u>Authors:</u> Bergqvist & Wahlberg 1994 <u>Study aim:</u> To test whether visual display terminal (VDT) users have higher prevalence of skin disease/symptoms and if there are specific subgroups of VDT users, defined by physical and/or organisational variables, with an increased occurrence of skin disease/symptoms.
<b>Sample attributes</b>	<i>N:</i> 323 <i>Age:</i> 24-64 yrs <i>Sex:</i> 23% male, 77% female <i>Country:</i> Sweden <i>Data collection years:</i> 1987
<b>Method</b>	Cohort of routine office workers followed up after cross-sectional investigation in 1981. Data collected using a self-administered questionnaires with response rate of 92%.
<b>Health variables</b>	Skin problems eg seborrhoeic eczema, acne, rosacea and lentigo
<b>Labour market variables</b>	Computer use, new technology
<b>Findings</b>	Symptoms or current symptoms were reported by about 20%. Of 73 individuals who reported skin symptoms, 24 (33%) were given a definite diagnosis. Of the 74 individuals with a skin diagnosis, only 24 reported skin symptoms and 21 reported current symptoms. 95% of the diagnoses referred to the face region. The severity of the diseases were mostly (86%) judged to be mild, none were considered severe. There was a tendency for increased occurrence of seborrhoeic eczema, non specific erythema and symptoms among VDT compared to non VDT users. Organizational conditions during VDT work, i.e perceived high work pace/load and inability to take rest breaks, were associated with skin symptoms. Low relative air humidity at the workplace in the week before the examination was associated with an increased occurrence of seborrhoeic eczema. The variables describing exposure to electric/magnetic fields did not show any association with skin problems.
<b>Comments/ limitations</b>	Cross-sectional design poses limitations on making causal inferences.

<b>Study</b>	<u>Authors:</u> Bernard <i>et al</i> 1994 <u>Study aim:</u> To assess the association of upper extremity <i>musculoskeletal</i> disorders and work related factors among newspaper employees using visual display terminals (VDTs)
<b>Sample attributes</b>	<i>N:</i> 973 <i>Age:</i> mean 39.2 yrs <i>Sex:</i> 41% male, 59% female <i>Country:</i> USA <i>Data collection years:</i> Not stated.
<b>Method</b>	Cross-sectional study, where 1050 randomly selected full time employees approached from four newspaper departments and encouraged to partake. Persons under 18yrs and pregnant women were excluded. Response rate of 93%. Self-administered questionnaire used to collect data.
<b>Health variables</b>	<i>Musculoskeletal</i> disorders, job stress
<b>Labour market variables</b>	Job tasks, work organisation, computer use.
<b>Findings</b>	41% of sample reported significant work related symptoms of the neck, shoulder, elbow, hand or wrist in the past year. The only significant job history risk factor was the number of years employed at the newspaper (associated with shoulder symptoms). The number of hours spent under a deadline was an important predictor for neck and hand or wrist work related <i>musculoskeletal</i> disorders. The risk of a work related <i>musculoskeletal</i> disorder of the hand or wrist increased in a dose response fashion as the number of hours typing increased. Psychosocial variables (such as job control, worker participation, job security and interaction with co-workers or customers, group conflict, and lack of social support) were not significant predictors of work related musculoskeletal disorders.
<b>Comments/ limitations</b>	Cross-sectional design limits possibility of making causal inferences. Self reporting of symptoms may result in over-representation of <i>musculoskeletal</i> disorders. Non-work related variables that could affect prevalence of musculoskeletal disorders were not ascertained.

<b>Study</b>	<u>Authors:</u> Boucsein & Thum 1997 <u>Study aim:</u> To determine the optimal break schedule for a complex and highly demanding computer task in the workplace. Also to compare psychophysiological changes during scheduled rest breaks with those during involuntary breaks.
<b>Sample attributes</b>	<i>N:</i> 11 <i>Age:</i> mean 32.6 yrs <i>Sex:</i> 90% male, 10% female <i>Country:</i> Holland <i>Data collection years:</i> Not stated
<b>Method</b>	Cross-sectional design. Volunteer sample of office workers using new computer system.
<b>Health variables</b>	Physical strain, heart rate variability, emotional strain
<b>Labour market variables</b>	Work environment, new technology
<b>Findings</b>	Short breaks were more effective in promoting recovery from both mental and emotional strain until the early afternoon, while the long break was more effective in reducing fatigue and emotional strain in the late afternoon. Recovery from muscular strain was greater during scheduled rest breaks compared to unpredictable breaks such as system breakdowns and interruptions by colleagues, but the increase of electrodermal activity was also higher, pointing to the possibility of increased emotional strain as a consequence of a rigid break schedule.
<b>Comments/ limitations</b>	Given very small sample size and selection of subjects who are performing very specialised computer work, the generalisability of this findings are quite limited. In addition, there is only have one female in the sample, whereas it is generally found that females are more likely to be involved in VDT data entry type work.

<b>Study</b>	<u>Authors:</u> Eckberg <i>et al</i> 1995 <u>Study aim:</u> To evaluate whether the effects of muscle demands or stress cause increased muscle activity, especially static muscle activity in the right and left upper trapezius muscles during VDU work.
<b>Sample attributes</b>	<i>N:</i> 20 <i>Age:</i> 19-56 yrs <i>Sex:</i> Female <i>Country:</i> Sweden <i>Data collection years:</i> Not stated
<b>Method</b>	Subjects were seated at a VDU screen in an office environment. Tasks to perform were ordinary data entry and one involving intensive mental arithmetic (MA) whilst inputting data. A total of 4 X 30 min work sessions were performed by each subject in one day, two in the morning and two in the afternoon. Breaks of 15min were taken between sessions. Half of the subjects performed the MA task in the morning and the other half performed the data entry task.
<b>Health variables</b>	Stress (heart rate, urinary hormone excretion, ratings of mood and the occurrence of symptoms), muscular problems
<b>Labour market variables</b>	Work environment, computer use, new technology
<b>Findings</b>	Subjects rated themselves as more activated, less relaxed and less motivated during the MA task compared to the ordinary data entry. Pain and discomfort from the stomach increased during the MA task. No difference occurred between body symptoms between the sessions. The excretion of adrenaline and noradrenaline was unaffected by the experimental conditions. Statistically significant increases were obtained for the myoelectric activity of the left (resting) trapezius muscle when the results of the pilot and main study were pooled. It appears that the increase in muscle activity from this type of muscle stress is small and other factors may come into play.
<b>Comments/ limitations</b>	A small clinical study with unknown generalisability to real life conditions.

<b>Study</b>	<u>Authors:</u> Faucett & Rempel 1994 <u>Study aim:</u> To estimate the frequency of symptoms amongst visual display terminal (VDT) users, and the contributions of work posture, job characteristics and interpersonal relationships to the severity of musculoskeletal symptoms.
<b>Sample attributes</b>	<i>N:</i> 150 <i>Age:</i> mean 40.8yrs <i>Sex:</i> 55% male, 45% female <i>Country:</i> USA <i>Data collection years:</i> Not stated.
<b>Method</b>	Cross-sectional survey of newspaper employees in editorial department. Of 297 eligible employees, 166 (response rate 56%) returned questionnaires, of which 150 were usable. 70 of these also agreed to an evaluation of workstation ergonomics.
<b>Health variables</b>	Musculoskeletal symptoms, psychosocial work stress
<b>Labour market variables</b>	Job content, interpersonal relationships at work
<b>Findings</b>	Pain during the last week was reported by 59% (n=88) of respondents and 28% (n=42) were categorised by symptom criteria potentially to have musculoskeletal disorders. More hours per day of VDT use and less decision latitude on the job were significant risk factors for potential musculoskeletal symptoms. Head rotation and relative keyboard height were significantly related to more severe pain and stiffness in the shoulders, neck and upper back. Lower levels of co-worker support were associated with more severe hand and arm numbness. For the region of the shoulders, neck and upper back and the hand and arm region, however, the contributions of relative keyboard and seat back heights to symptom severity were modified by psychological workload, decision latitude and relationship with supervisor.
<b>Comments/ limitations</b>	Cross-sectional design places limitations on making causal inferences

<b>Study</b>	<u>Authors:</u> Faucett & Rempel 1996 <u>Study aim:</u> To investigate the association between visual display terminal (VDT) use and psychosocial characteristics of the job and employee characteristics, including musculoskeletal symptoms and supervisor relationships
<b>Sample attributes</b>	<i>N:</i> 83 <i>Age:</i> mean 42yrs <i>Sex:</i> 57% male, 43% female <i>Country:</i> USA <i>Data collection years:</i> Not stated
<b>Method</b>	Part of a larger study of VDT use amongst newspaper employees. Two subsamples: reporters (N=38) and copy editors (N=45). Data collected using self-administered questionnaires and objective behavioural sampling techniques.
<b>Health variables</b>	Musculoskeletal symptoms
<b>Labour market variables</b>	Job characteristics of work load, decision autonomy , supervisor support
<b>Findings</b>	Both samples (reporters, copy editors) differed in terms of their reported job characteristics. Reporters reported more skill diversity, decision autonomy/latitude and less supervisor support than copy editors. Copy editors, who were observed to work longer hours at a VDT than reporters, experienced musculoskeletal symptoms at a greater number of body sites. This was also significant for self-reported VDT use. They did not differ on severity of hand/wrist pain or numbness, or neck shoulder pain and stiffness.
<b>Comments/limitations</b>	Cross-sectional design limits making causal inferences. Details about sample selection are lacking.

<b>Study</b>	<u>Authors:</u> Hales <i>et al</i> 1994 <u>Study aim:</u> To investigate a suspected high rate of work related upper extremity musculoskeletal disorders among a group of telecommunication workers using visual display terminals (VDTs).
<b>Sample attributes</b>	<i>N:</i> 518 <i>Age:</i> mean 37.5 yrs <i>Sex:</i> 22% male, 78% female <i>Country:</i> USA <i>Data collection years:</i> Not stated
<b>Method</b>	Cross-sectional design. Three cities were selected, two with reportedly high musculoskeletal disease prevalence and one with relatively low. Five job titles were represented at each site. 533 (93%) employees agreed to participate, of whom 15 were excluded.
<b>Health variables</b>	Musculoskeletal disorders, stress
<b>Labour market variables</b>	Psychosocial work environment
<b>Findings</b>	111 (22%) of participants met the case definition for musculoskeletal disorders. Probable tendon related disorders were the most common (15%). The hand/wrist was the area most affected (12%). The following variables had associations with at least one of four disorders (neck, shoulder, elbow, hand/wrists), although the strength of these associations were modest: non white race, a diagnosis of a thyroid condition (self-reported), use of bifocals at work and seven psychosocial variables (fear of being replaced by computers, increasing work pressure, surges in workload, routine work lacking decision making opportunities, high information processing demands, jobs which required a variety of tasks and lack of a production standard).
<b>Comments/limitations</b>	Self-report of medical conditions, which may be influenced by recall bias, not validated by physician records or observation. Similarly there may have been disease misclassification or diagnosis by respondents. Cross-sectional study design limits causal inferences being made.

<b>Study</b>	<u>Authors:</u> Hochanadel 1995 <u>Study aim:</u> To describe the effectiveness of a new automated process for computer workstation adjustment
<b>Sample attributes</b>	<i>N:</i> 3326 <i>Age:</i> Not stated <i>Sex:</i> 51% male, 49% female <i>Country:</i> USA. <i>Data collection years:</i> Not stated.
<b>Method</b>	Cross-sectional survey using self-administered questionnaires voluntarily completed and returned.
<b>Health variables</b>	Musculoskeletal symptoms (cumulative trauma disorders)
<b>Labour market variables</b>	Computer use, computer workstation, new technology.
<b>Findings</b>	49% described symptoms associated with computer use. 76% of continuous computer users complained of symptoms compared with 45% of the intermittent computer users. The percentage of symptomatic respondents increased in each group as the average hours and years of computer use increased. The most frequently reported symptom locations were the neck and low back.
<b>Comments/ limitations</b>	Voluntary participation and non-random sample may result in bias, especially in the reporting of symptoms. Questions used to elicit information about symptoms had not been used previously or validated, nor were any recognised scales used. All symptom reporting was subjective and not validated by a physician.

<b>Study</b>	<u>Authors:</u> Kamienska-Zyla & Prynck-Skotniczny 1996 <u>Study aim:</u> To examine subjective fatigue symptoms occurring among computer users.
<b>Sample attributes</b>	<i>N:</i> >600 <i>Age:</i> 20-60yrs <i>Sex:</i> Both genders <i>Country:</i> Poland <i>Data collection years:</i> Not stated.
<b>Method</b>	Cross-sectional survey using self-administered questionnaire of 26 symptoms of subjective fatigue. Sample consisted of employees working with computers in industry, at railway stations, design offices and in university schools. No other details about sampling are provided.
<b>Health variables</b>	Subjective fatigue symptoms
<b>Labour market variables</b>	Computer use
<b>Findings</b>	Visual fatigue proved to be the greatest discomfort (reported by 70-90% of the sample). All symptoms except that of visual fatigue were more strongly experienced by women than men. Among symptoms relating to musculoskeletal strain, back pain predominated; more than 50% of younger women complained of this discomfort (compared to only 20% of older women). Headaches and symptoms resulting from mental fatigue were also highly prevalent.
<b>Comments/ limitations</b>	Lack of detail about recruitment procedure. Failure to test for significance of differences with regards to gender and cross-sectional design limit usefulness of the study.



<b>Study</b>	<u>Authors:</u> Leodolter <i>et al</i> 1996 <u>Study aim:</u> To investigate the relationship between health complaints and workplace conditions, environmental factors and duration and type of visual display terminal (VDT) work
<b>Sample attributes</b>	<i>N:</i> 260 <i>Age:</i> 33.6 years (mean) <i>Sex:</i> 63% male, 37% female <i>Country:</i> Germany <i>Data collection years:</i> Not stated
<b>Method</b>	Cross-sectional survey of workers in a telecommunications group
<b>Health variables</b>	Asthenopic ocular discomfort, tiredness, headache
<b>Labour market variables</b>	VDT use, working time, new technology
<b>Findings</b>	Health complaints were associated with reflection and dazzle from use of terminal screen filters, and non-ergonomic keyboards and chairs; and with passive smoking and artificial lights. Failure to take 10 minute break each hour and working at the screen for more than four hours a day were associated with complaints.
<b>Comments/ limitations</b>	Cross-sectional design limits causal inferences being made.

<b>Study</b>	<u>Authors:</u> Marcus & Gerr 1996 <u>Study aim:</u> To assess the relationship between musculoskeletal symptoms, video display terminal (VDT) use and occupational psychosocial stress.
<b>Sample attributes</b>	<i>N:</i> 416 <i>Age:</i> <40 yrs <i>Sex:</i> Female <i>Country:</i> USA <i>Data collection years:</i> 1990
<b>Method</b>	Cross-sectional survey of office workers in three companies. 645 women invited to participate, of whom 449 completed questionnaires (response rate 70%). A further 33 women excluded as a result of incomplete data.
<b>Health variables</b>	Musculoskeletal symptoms, health behaviours, anxiety
<b>Labour market variables</b>	Occupational psychosocial stress, job tasks, job demands, environment.
<b>Findings</b>	Significantly increased risks for neck or shoulder symptoms were found among subjects who had ever used a VDT, had less job security and had more stressful work during the 2 weeks prior to completion of the questionnaire. Significantly increased risks for arm and hand symptoms were found for subjects who had used a VDT for more than 6 years, reported a very crowded workplace or reported very stressful work during the 2 weeks prior to completion of the questionnaire. Among current non-users, those who had previously used VDTs were more likely to report upper extremity musculoskeletal symptoms than those who had never used VDTs. This suggests that individuals with symptoms may be more likely to reduce their VDT usage, distorting results of cross-sectional studies.
<b>Comments/ limitations</b>	Study highlights problems assessing the association between current VDT use and musculoskeletal symptoms by means of cross-sectional design. Another limitation is the use of self-reported symptom measures.

<b>Study</b>	<u>Authors:</u> Polanyi <i>et al</i> 1997 <u>Study aim:</u> To determine the prevalence of work related <i>musculoskeletal</i> disorders (WMSDs), to identify possible risk factors associated with WMSD, and to assess employee awareness of WMSDs and management initiatives to deal with them.
<b>Sample attributes</b>	<i>N:</i> 1007 <i>Age:</i> most>40ys <i>Sex:</i> 56% male, 43% female <i>Country:</i> Canada <i>Data collection years:</i> Not stated
<b>Method</b>	1203 eligible employees of a newspaper company were sent self-administered questionnaires of whom 84% responded. (Those not attending work during the distribution period were mailed their questionnaire to include those who may be off work due to ill health.)
<b>Health variables</b>	Stress, musculoskeletal disorders
<b>Labour market variables</b>	Job characteristics, computer use
<b>Findings</b>	One fifth of respondents reported moderate or worse upper limb pain occurring at least monthly or lasting more than a week over the previous year. Employees who faced frequent deadlines and high psychological demands (fast work pace and conflicting demands) had low skill discretion and social support, spent more time keyboarding or who had their screen in a non optimal position were more likely to report moderate to severe symptoms. Women reported significantly higher levels of symptoms than men.
<b>Comments/ limitations</b>	Self-reported symptoms and conditions may over-represent extent of problems. Cross-sectional design increases risk of survivor bias and complicates interpretation of cause and effect.

<b>Study</b>	<u>Authors:</u> Sanchez-Roman <i>et al</i> 1996 <u>Study aim:</u> To examine the incidence of asthenopia among computer terminal operators as compared to an unexposed group, and to identify the risk factors associated with this condition
<b>Sample attributes</b>	<i>N:</i> 105 <i>Age:</i> 18-35 years <i>Sex:</i> 53% male, 47% female <i>Country:</i> Mexico <i>Data collection years:</i> Not stated
<b>Method</b>	Cross-sectional design. Sample consists of 35 computer terminal operators and 70 unexposed administrative workers recruited from an educational institute
<b>Health variables</b>	Asthenopia
<b>Labour market variables</b>	Computer systems, new technology
<b>Findings</b>	Asthenopia was found in 68.5% of the exposed group and 47.7% of the unexposed group. Working for more than four hours a day at a visual display terminal was associated significantly with asthenopia
<b>Comments/ limitations</b>	No details about sampling or response rate are provided. The cross-sectional study design makes it difficult to draw causal inferences.

<b>Study</b>	<u>Authors:</u> Westlander 1994 <u>Study aim:</u> To explore the situations and activities associated with musculoskeletal discomforts among video display terminal (VDT) operators
<b>Sample attributes</b>	<i>N:</i> 36 <i>Age:</i> Various <i>Sex:</i> Female <i>Country:</i> Sweden <i>Data collection years:</i> Not stated.
<b>Method</b>	25 routine data entry & 11 data dialogue work subjects working in highly computerised offices with routine, standardised job tasks were chosen. Data were collected using self-administered questionnaires and also using participant observation and record sheets for certain tasks. In depth qualitative interviews were held with each subject.
<b>Health variables</b>	Musculoskeletal discomfort
<b>Labour market variables</b>	Job satisfaction, job demands/control, absenteeism
<b>Findings</b>	44% suffered from complaints of the neck, 58% shoulder blades, 44% shoulders, 36% arms and 11% back. The complaints linked to VDT work were of a particular nature, but the subjects also found it possible to specify clearly how other job tasks and activities at home constituted a strain. VDT work is a greater source of strain than other job tasks but it alone as a source of muscular discomfort is less common than a combination of VDT work and other activities. Over 50% of subjects stated that they had a positive attitude towards their job tasks. The lower level of muscular discomfort the greater the level of agreement over the positive nature of job tasks. A majority of persons suffering from VDT-related muscular discomfort did not regard this as a reason for taking sick leave. Persons who coped with musculoskeletal difficulties through work absenteeism were mainly in the 'severe discomfort' category.
<b>Comments/limitations</b>	Generalisability of findings limited in terms of the type of VDT operator and the Swedish context (high contribution to family support by both partners).

<b>Study</b>	<u>Authors:</u> Wiholm & Arnetz 1997 <u>Study aim:</u> To investigate psychosocial and physiological environments and their possible relationship to musculoskeletal symptoms (MSS) and headaches at a high tech telecommunications company.
<b>Sample attributes</b>	<i>N:</i> 116 <i>Age:</i> most aged 30-39 yrs <i>Sex:</i> 80% male, 20% female <i>Country:</i> Sweden <i>Data collection years:</i> Not stated
<b>Method</b>	Of 268 potential employees, 116 chose to participate (response rate 43%). (Participation required joining stress management programme.) Data were collected using self-administered questionnaires and from blood samples taken at two time points after overnight fasting. Blood pressure and heart rate were measured at the time of blood sampling.
<b>Health variables</b>	Well-being, coping styles, musculoskeletal problems
<b>Labour market variables</b>	Job environment, job control/demands, computer use
<b>Findings</b>	A significant correlation was found between MSS and low skills utilisation as well as poor balance between job autonomy and workload. Correlations were also found between: workload and symptoms in the lower arm, symptoms in the lower arm and perceived lack of skills and lower workload autonomy. Younger employees had more symptoms in the neck and back regions. Those with lower levels of circulating testosterone levels also had more symptoms as did those who were less satisfied with their immediate line management. A significant correlation was found between lower work satisfaction and frequency of headaches and higher frequency of headaches and lower testosterone levels.
<b>Comments/limitations</b>	Cross-sectional design and low response rate pose limitations.



## 7. Features of the work environment

### 7.1 Introduction

Although there are major methodological problems involved in untangling the relationship between the work environment and employee health (Marmot, 1994), a massive body of evidence has accumulated which demonstrates the fallacy of assuming that work is necessarily beneficial for well-being and quality of life. Relevant findings from empirical studies, published over the period under review, are reported below. Section 7.2 considers recent attempts to test the adequacy of the job demand-control model, while section 7.3 examines the relationship between job satisfaction/involvement and health. In the final section (7.4) findings from a variety of other studies which explore health-related features of the work environment are reported.

### 7.2 Job control/demand

The job demand-control model (Karasek and Theorell, 1990) proposes that the combination of heavy demands and limited decision latitude (control) to moderate these demands results in job strain, which in turn leads to negative health consequences. Undoubtedly the most extreme health-related outcome of job strain is premature death. In Japan death from overwork (*karoshi* or *karoushi*) has been recognised for three decades, with the major medical causes being cardiovascular disease (heart attack and stroke) (Nishiyama and Johnson, 1997). Tubbs (1993) suggests that *karoshi* should be conceptualised as ‘stress-death’ (rather than ‘death from overwork’) and that “the real cause ... is *helplessness*, and the related mental states of hopelessness, depression, and despair.” In other words, Tubbs (1993) would put the stress on the decision latitude, rather than the work demands, element in the Karasek/Theorell model.

Most of the large-scale tests of the model have examined cardiovascular outcomes. Schauerbroek and Merritt (1997) report that support for the model has been mixed, with some studies successfully predicting cardiovascular disease and elevated blood pressure, while others have failed to do so. On the basis of a review of the literature they conclude that the evidence supports the job demands-control model, but only among people who experience a sense of high self-efficacy in their work. Among people with low(er) self-efficacy, increasing control may exacerbate the stress of demanding jobs.

We identified 11 studies (Bosma *et al*, 1997, Carayon, 1993, Hardy *et al*, 1997, Hemingway *et al*, 1997, Houtman *et al*, 1994, Marshall *et al*, 1997, Mullarkey *et al*, 1997, Reynolds, 1997, Schauerbroek and Merritt, 1997, Sorensen *et al*, 1996 and Stansfeld *et al*, 1997) which provide (directly or indirectly) empirical evidence relating to the job demands-control model. The studies are extremely heterogeneous in terms of both outcome measures (three are concerned with the risk of coronary heart disease (CHD), five with psychological health or ill-health, one with fatigue and one with back pain) and the approach to operationalising the model. The findings typically provide partial confirmation of the model (although Mullarkey *et al*, 1997 claim that their findings provide “little support”). Thus, Carayon (1993), Hardy *et al* (1997) and Stansfeld *et al* (1997) report that health outcomes are related to job demands but not to job control; Bosma *et al* (1997) conclude that low job control is associated with a higher risk

of newly reported CHD, while job demands are not; and Hemingway *et al* (1997) find that low control predicts short and long absences due to back pain, but note that the effect of low control is reversed (ie protective) among lower grade men and higher grade women. Schauerbroek and Merritt (1997) report empirical evidence to support their hypothesis that the job demands-control model holds true only among workers reporting high self-efficacy. However, Houtman *et al* (1994) conclude that their study fully supports the Karasek model through finding an association between a high work pace and poor intellectual discretion, and several indicators of health in a cross-sectional survey of the Dutch working population.

A further five studies, while not setting out to test the Karasek/Theorell model, provide some relevant data, in respect of the relationship between work demands and employee health. Melamed *et al* (1995) report an association between hectic (short cycle) repetitive work and raised blood pressure, while Rasanen *et al* (1997) found that psychosocial and work organisational factors (especially increased workplace) and work-related mental symptoms were highly correlated. Stenberg *et al* (1994) report that psychosocial work conditions (two of the three items tapping demands and control) were related to an increased prevalence of sick building syndrome (SBS) symptoms. Using a longitudinal design, Nygard *et al* (1997) report changing perceptions in work demands over time among Finnish employees, particularly an increase in the physical (muscular effort) and mental (use of knowledge) demands of work. The remaining study of nurses and attendants working in psychiatric care (Samuelsson *et al* 1997) suggests that a negative work environment is associated with burnout/depression, which in turn is related to suicidality.

### **7.3 Job satisfaction/involvement**

Findings relating to job satisfaction and job involvement are reported in six studies. Job satisfaction is reported to be positively associated with a variety of health conditions, including the symptoms of Sick Building Syndrome (Eriksson *et al* 1996; Hedge *et al*, 1996) and neck and shoulder symptoms (Levoska and Keinanen-Kiukaanniemi (1994). Peterson and Wilson (1996) find a strong relationship between health perception measures (including current health, resistance/susceptibility and health outlook) and satisfaction with co-workers, and more modest associations with autonomy, pay and the work itself. Williamson *et al* (1994) examined the effects of a change in shiftwork hours and found improvements in health at no cost to workers' feelings of job satisfaction. In the only study (identified during the period under review) of job involvement and well-being, Riipinen (1997) found that job involvement was correlated with positive affect and a low level of negative affect in subjects with strong needs related to job involvement. However, if needs were not related to job involvement, there was a negative correlation between involvement and positive affect.

### **7.4 Other studies**

A heterogeneous set of 10 papers reports findings on various aspects of the work environment and their relationship with employee health. It is variously reported that: among women, there is a relationship between work-role quality and quality of life and self-reported health (Bergman *et al*, 1996); a major stressor for mental health nurses is inadequate staffing cover in potentially dangerous situations (Fagin *et al*, 1996); job-related life events have a significant effect on depression (Fujigaki, 1996); workers in more global industrial sectors have only

average levels of occupational hazard exposure but a greater likelihood of occupational injury and illness than workers in other sectors of the economy (Greenlund and Elling, 1995); there is an association between overtime work and elevated blood pressure (Hayashi *et al*, 1996); women report poorer psychosocial work characteristics than men, primarily because of differences in learning opportunities and monotonous work (Matthews *et al*, 1998); levels of work support and job stress are both significant predictors of burnout (Parker and Kulik, 1995); among certain groups of workers, the quality of human relationships in the workplace is associated with increasing stress levels (Shimizu *et al*, 1997); risk indicators for SBS symptoms (including psychosocial workload) are elevated among women, compared to men, and are probably due to factors outside the work environment (Stenberg and Wall, 1995); and occupational health and safety problems are widespread among home-based 'outworkers' (Tassie, 1997).

**Features of the work environment: summaries of research studies**

<b>Study</b>	<u>Authors:</u> Bergman <i>et al</i> 1996 <u>Study aim:</u> To evaluate within individual changes over time in work role quality and quality of life and the relationship of these qualities to self-reported health.
<b>Sample attributes</b>	<i>N:</i> 47 <i>Age:</i> 26-62 yrs <i>Sex:</i> female <i>Country:</i> Sweden <i>Data collection years:</i> not stated
<b>Method</b>	Questionnaire completed at two time points, a clinical examination and interview of 4 strategically selected women.
<b>Health variables</b>	Medical symptoms, psychological stress, quality of life
<b>Labour market variables</b>	Physical work environment, job satisfaction.
<b>Findings</b>	There was a connection between changes in environmental demands and changes in musculoskeletal symptoms and between changes in quality of life and changes in gastro-intestinal symptoms, except for psychological distress.
<b>Comments/ limitations</b>	

<b>Study</b>	<u>Authors:</u> Bosma <i>et al</i> 1997 <u>Study aim:</u> To determine the association between adverse psychosocial characteristics at work and risk of coronary heart disease among male and female civil servants.
<b>Sample attributes</b>	<i>N:</i> 7372 (participating in all 3 phases) <i>Age:</i> 35-55 yrs <i>Sex:</i> 69% male and 31% female in 1991-3. <i>Country:</i> UK <i>Data collection years:</i> 1985-93
<b>Method</b>	Prospective cohort study of civil servants established between 1985 and 1988 (phase 1) in 20 London based civil service departments. Initial response rate was 73%. Approached again in 1989-90 and 1991-93. Length of follow up was on average 5.3 yrs.
<b>Health variables</b>	Symptoms of coronary heart disease.
<b>Labour market variables</b>	Employment, job control, decision latitude.
<b>Findings</b>	Men and women in low job control, either self-reported or independently assessed, had a higher risk of newly reported coronary heart disease during follow up. Job control assessed on two occasions three years apart, although inter-correlated, had cumulative effects on newly reported disease. Subjects with low job control on both occasions had a greater risk of a subsequent coronary event compared with subjects with high job control at both occasions. This association could not be explained by employment grade, negative affectivity or classic coronary risk factors. Job demands and social support at work were not related to the risk of coronary heart disease. The cumulative effect of low job control assessed on two occasions indicates that giving employees more variety in tasks and a stronger say in decisions about work may decrease the risk of coronary heart disease.
<b>Comments/ limitations</b>	Information (reporting) bias is not considered by the authors to be a likely source of bias.



<b>Study</b>	<u>Authors:</u> Carayon 1993 <u>Study aim:</u> To test a model of the relationships between job demands, job content and career concerns (independent variables), job control (intervening variable) and stress (outcome variable).
<b>Sample attributes</b>	<i>N:</i> 170 <i>Age:</i> Mean 37 yrs <i>Sex:</i> 71% female, 29% male. <i>Country:</i> USA. <i>Data collection years:</i> Not stated.
<b>Method</b>	Part of a longitudinal office automation study. Subjects were office workers. Management supplied employee lists were used to solicit respondents. Response rate 85%. A self-administered questionnaire was used which was filled in at work premises.
<b>Health variables</b>	Stress (psychological complaints and mood states)
<b>Labour market variables</b>	Job control, job demands, job content, career concerns.
<b>Findings</b>	Only job demands and career/future concerns influenced stress outcomes; their effect on the stress outcomes was direct and independent of their effect on job control. Neither job control nor job content influenced worker stress. However the size of the correlations between job elements and stress outcomes was relatively small.
<b>Comments/limitations</b>	

<b>Study</b>	<u>Authors:</u> Eriksson <i>et al</i> 1996 <u>Study aim:</u> To investigate the significance of different facets of the psychosocial work environment for the occurrence and prevalence of SBS (sick building symptoms) in office workers.
<b>Sample attributes</b>	<i>N:</i> 391 <i>Age:</i> 21- 66 yrs <i>Sex:</i> 83% female & 17% male. <i>Country:</i> Sweden. <i>Data collection years:</i> Oct - Dec 1988
<b>Method</b>	Cross-sectional case referent study using random sample of office workers in 3 cities in the country. 95.7% response rate. Of these 4, 943 respondents, 232 fulfilled the criteria for SBS cases. (A case was defined as an office worker reporting at least one general symptom every month and at least one mucosal and one skin symptom every week during the preceding three months.) These were matched by office workers without symptoms. Subjects were clinically examined and filled out questionnaires addressing psychosocial and organisational factors. Interviews were also held with representatives of the organisations concerned to collect information about the organisations in which the respondents worked.
<b>Health variables</b>	Morbidity (worry)
<b>Labour market variables</b>	Work environment/demands/control/satisfaction/support.
<b>Findings</b>	Results show that psychosocial work characteristics, such as workload and job satisfaction, as well as worry and reorganisation are factors that have a significant impact on the risk of developing the symptoms of SBS.
<b>Comments/limitations</b>	Results are given as odds ratios which have very wide confidence intervals. There is no analytical comparison of the two sets of respondents.

<b>Study</b>	<u>Authors:</u> Fagin <i>et al</i> 1996 <u>Study aim:</u> Extent of stress, copying and burnout in ward based mental health nurses.
<b>Sample attributes</b>	<i>N:</i> 648 <i>Age:</i> (average range) 34-38 yrs <i>Sex:</i> 56-63% female <i>Country:</i> UK <i>Data collection years:</i> Not stated.
<b>Method</b>	Data from 3 studies all using self report questionnaires. Study 1 used opportunistic sampling drawn from 2 district general hospitals psychiatric units and five mental hospitals. For studies 2 & 3 all nursing staff were surveyed giving response rates of 46 and 47%.
<b>Health variables</b>	Psychological well-being, stress, coping skills
<b>Labour market variables</b>	Work demands/environment
<b>Findings</b>	The main stressors for ward staff were to do with staff shortages, health service changes, poor morale and not being notified of changes before they occurred. Differences in copying skills were found across studies. The study group with the highest stress scores also had the lowest copying skills scores. This was also associated with significantly higher alcohol consumption and greater self-reported sickness absence.
<b>Comments/ limitations</b>	Cross-sectional design limits casual inferences being made. Study 3 was found to have higher levels of burnout and GHQ scores than the others. Perhaps a little more information about this hospital would have given a better understanding as to why it showed significant results.

<b>Study</b>	<u>Authors:</u> Fujigaki 1996 <u>Study aim:</u> To examine the effect of life/job events on depression, using a prospective design.
<b>Sample attributes</b>	<i>N:</i> 10 <i>Age:</i> 23-32 yrs <i>Sex:</i> Male <i>Country:</i> Japan <i>Data collection years:</i> Not stated
<b>Method</b>	Longitudinal time series analysis. The work contents of each day and each week were surveyed using a diary style. Semi-structured interviews were also held on each sampling day. 181 observations were made of 10 computer software engineers over 7 months.
<b>Health variables</b>	Depression.
<b>Labour market variables</b>	Employment, job demands, job events.
<b>Findings</b>	Life events (of which only two were measured: death/birth of blood relative) had a significant effect on depression. It also showed that the effective time period of the events on depression is within two weeks.
<b>Comments/ limitations</b>	A very small sample used with no information given about recruitment of subjects. Only two life events were assessed.

<b>Study</b>	<u>Authors:</u> Greenlund & Elling 1995 <u>Study aim:</u> To examine the relationship between structural divisions in the economy and occupational hazard exposure, injury and illness.
<b>Sample attributes</b>	<i>N:</i> 30 090 <i>Age:</i> >18yrs <i>Sex:</i> Both genders. <i>Country:</i> USA <i>Data collection years:</i> 1988
<b>Method</b>	Secondary data analysis of National Health Interview Survey (NHIS) occupational health supplement. (NHIS is a multistage probability sample of US households. Data are weighted to reflect the age-sex-race composition of the US population.) Analysis restricted to current and recent employed workers.
<b>Health variables</b>	Any morbidity caused by any occupational exposures (job injuries)
<b>Labour market variables</b>	Economic sector. Job hazards/environment.
<b>Findings</b>	Almost 72% of currently and recently employed workers experienced at least one of 14 hazards on the job, ranging from 6.5% to 50.7%. About 7% of workers experienced at least one job related injury. The percentage of workers exposed to at least one hazard was more than twice as high and the mean number of exposures more than five times as high, in the agriculture sector compared with the core utilities sector. The local monopoly sector (consisting of construction, hospital etc) core sector (manufacturing industries) and the oligopoly sector (electronics) ranked among the highest for workers' health and safety problems(WHS). Foreign involvement (the extent to which American firms are involved in foreign markets) was inversely related to WHS. Greater worker power (as measured by level of unionisation) was associated with a lower likelihood of WHS problems.
<b>Comments/limitations</b>	A good representative sample but cross-sectional design poses limitations, also fairly dated.

<b>Study</b>	<u>Authors:</u> Hardy <i>et al</i> 1997 <u>Study aims:</u> (1) To obtain a systematic estimate of the levels of fatigue in representative samples of the major occupational groups of health care workers. (2) To examine the relationship between fatigue and mental health as a function of occupational and work role factors. (3) To test the proposition that fatigue arises from a combination of poor mental health and high job stress.
<b>Sample attributes</b>	<i>N:</i> 7694 (effective) <i>Age:</i> Not stated <i>Sex:</i> 25% male, 75% female <i>Country:</i> UK <i>Data collection years:</i> 1993
<b>Method</b>	Cross-sectional survey of 19 hospital trusts. Estimated response rate 61-65%. About two thirds of respondents included in this study.
<b>Health variables</b>	Fatigue, mental morbidity, depression.
<b>Labour market variables</b>	Work demands, work autonomy and control, role conflict.
<b>Findings</b>	Higher levels of fatigue were reported among health care workers in comparison with general population figures. Highest levels of general fatigue, the subjective sensation of tiredness, were experienced by doctors (especially women doctors), professions allied to medicine and managers. Highest levels of fatigability, the onset of symptoms after exertion, were experienced by ancillary and nursing staff. Both general fatigue and fatigability were associated with high levels of psychological distress. Fatigue appears to arise from a combination of poor mental health and high work demands.
<b>Comments/limitations</b>	Representativeness of sample is unclear, therefore generalisability of findings is unknown.

<b>Study</b>	<u>Authors:</u> Hayashi <i>et al</i> 1996 <u>Study aim:</u> To evaluate the influence of overtime work on the cardiovascular system.
<b>Sample attributes</b>	<i>N:</i> 66 <i>Age:</i> 36 - 47 yrs <i>Sex:</i> male <i>Country:</i> Japan <i>Data collection years:</i> Jan 1992 - June 1993.
<b>Method</b>	A cross-sectional study comparing and measuring 24 hour blood pressure amongst several groups of white-collar workers. Blood pressure measured using a portable blood pressure monitor and fatigue symptoms measured using a self-administered 30 item questionnaire.
<b>Health variables</b>	Karoshi (death through overwork), cardiovascular disease.
<b>Labour market variables</b>	Overtime.
<b>Findings</b>	For those with normal blood pressure and those with mild hypertension, the 24 hour average blood pressure of the overtime group was higher than that of the control groups; for those who periodically did overtime work, the 24 hour average blood pressure and heart rate during the busy period increased.
<b>Comments/ limitations</b>	There is a limited degree of 'control' exerted over the groups under study. They have been measured at different times of the year which means that other variables will be able to influence the results, eg. nearer Christmas staff are more likely to want to work overtime for cash reasons yet are more likely to be stressed for other reasons; whereas in summer time, due to the weather and holidays, staff are likely to be in a more relaxed mood.

<b>Study</b>	<u>Authors:</u> Hedge <i>et al</i> 1996 <u>Study aim:</u> To investigate further the relationship between atmospheric conditions, personal factors, occupational factors and self-report of Sick Building Syndrome (SBS).
<b>Sample attributes</b>	<i>N:</i> 4479 <i>Age:</i> Not stated <i>Sex:</i> Not stated <i>Country:</i> USA <i>Data collection years:</i> Not stated.
<b>Method</b>	27 office buildings (not known to have any indoor air quality problems) were selected according to the type of organisation, ventilation and office layout in various American cities. 6335 self-report questionnaires were distributed at each office site, 4479 returned, response rate of 72%.
<b>Health variables</b>	Morbidity
<b>Labour market variables</b>	Job stress/satisfaction, job environment.
<b>Findings</b>	67% of men and 81% of women reported at least one SBS symptom. Men reported on average 2.77 SBS and women on average 4.33. Odds ratios and 95%CI obtained from logistic regression containing physical environment measures (humidity, formaldehyde, illumination) and concurrent self-reports of SBS (irritated, tired or dry eyes, lethargy, stuffy or runny nose, mental fatigue, headache, dry skin) although all were statistically significant, the OR were so close to unity that it is unlikely that they reflect any real effect. Job grade and smoking were not statistically associated with total SBS. Hours of daily computer use were positively associated with average symptoms per person. Mean job stress ratings were positively associated with an increase in symptom reports. Mean job satisfaction ratings were negatively associated with symptom reports.
<b>Comments/ limitations</b>	Not told if some of the results reach statistical significance, only the number of respondents that chose a particular option. Insufficient information about the demographic features of respondents.

<b>Study</b>	<u>Authors:</u> Hemingway <i>et al</i> 1997 <u>Study aim:</u> To examine the relationship between psychosocial work characteristics, employment grade and sickness absence due to back pain among civil servants.
<b>Sample attributes</b>	<i>N:</i> 10 308 at baseline (1985-8). <i>Age:</i> 35 -55 yrs <i>Sex:</i> 67% male & 33% female <i>Country:</i> UK. <i>Data collection years:</i> 1985 - 1990 (follow up)
<b>Method</b>	Longitudinal aggregate analysis of sickness absence data and questionnaires. 94% of participants followed up based on their sick leave records.
<b>Health variables</b>	Musculoskeletal disorders (back pain)
<b>Labour market variables</b>	Sickness absence, work environment.
<b>Findings</b>	There was a strong inverse association between employment grade and rate of absence due to back pain: the lower the grade, the higher the absence rate. Of the psychosocial work characteristics studied, low control showed the most consistent effects, predicting short and long absences due to back pain. However, the effect of low control was reversed among the lower grade men and higher grade women. The findings suggest that the psychosocial work environment represents a potentially reversible cause of ill-health
<b>Comments/ limitations</b>	The authors consider and rule out the probability of omitted variable bias and response bias.

<b>Study</b>	<u>Authors:</u> Houtman <i>et al</i> 1994 <u>Study aim:</u> Examine the relationship between work stressors and the following health indicators: psychosomatic complaints, health behaviour and musculoskeletal problems.
<b>Sample attributes</b>	<i>N:</i> 5865 <i>Age:</i> 18-65 yrs <i>Sex:</i> Both genders <i>Country:</i> Holland <i>Data collection years:</i> 1977-1986
<b>Method</b>	Secondary analysis performed on data from the National Work and Living Conditions Survey which provides a representative sample of the Dutch working population once every three years.
<b>Health variables</b>	Morbidity (in particular musculoskeletal and anxiety)
<b>Labour market variables</b>	Job stressors, working environment.
<b>Findings</b>	High work pace, low intellectual discretion and physical stressors were associated with increased health complaints (both psychosomatic and musculoskeletal) and musculoskeletal disorders after adjustment for gender, age, education, and sports participation. Low intellectual discretion, but not high work pace was associated with poor general health and health behaviour indicative of poor health. Physical stressors were associated with general health as well, but not with health behaviour, except for reported absenteeism.
<b>Comments/ limitations</b>	Exact method of recruitment procedure is not given. The results presented as individual risk factors for the different health indicators. However most of the odds ratios (OR) do not give a value greater than 2 and most of the confidence intervals include 0. In fact the only variable that gives an OR of greater than 2 is the variable for age, in particular >55yrs

<b>Study</b>	<u>Authors:</u> Levoska & Keinanen-Kiukaanniemi 1994 <u>Study aim:</u> To describe the annual prevalence of neck, shoulder symptoms in female office employees and to test whether or not these symptoms were related to psychosocial stress, job satisfaction or components of health locus of control.
<b>Sample attributes</b>	<i>N:</i> 205 <i>Age:</i> 20 - 60 yrs. <i>Sex:</i> Female <i>Country:</i> Finland. <i>Data collection years:</i> 1989.
<b>Method</b>	232 female office employees in bank or insurance companies chosen on a voluntary basis. Cross-sectional design using self-administered questionnaires. 27 questionnaires rejected due to incomplete answers. Data also collected via a clinical examination.
<b>Health variables</b>	Musculoskeletal symptoms, chronic illness, stress, anxiety.
<b>Labour market variables</b>	Job satisfaction, health locus of control.
<b>Findings</b>	The annual prevalence of disturbing neck-shoulder symptoms among employees was 43%. An association of these symptoms with psychosomatic symptoms, poor general job satisfaction and its two sub-dimensions, work content and perception of the healthiness of the working environment, was noticed. The subjects with neck-shoulder symptoms had a significantly higher score of feelings of external control (fatalism) than those without symptoms.
<b>Comments/limitations</b>	Causal inferences limited by cross-sectional design. Volunteer sample also not representative of the workforce. A true response rate also not given.

<b>Study</b>	<u>Authors:</u> Marmot 1994 <u>Study aim:</u> Investigate the effect on health of occupational and other socio-economic influences on white-collar workers.
<b>Sample attributes</b>	<i>N:</i> unclear <i>Age:</i> Not stated <i>Sex:</i> Not stated <i>Country:</i> England <i>Data collection years:</i> 1950 to 1985
<b>Method</b>	Longitudinal secondary analysis of different data sets including the Whitehall II study.
<b>Health variables</b>	Coronary heart disease
<b>Labour market variables</b>	Work demands/environment, absenteeism.
<b>Findings</b>	The lowest risk of CHD was in administrators and the highest in the lower socio-economic groups. Type A behaviour was higher in higher grades of worker. Lower grade workers had less healthy lifestyle habits
<b>Comments/limitations</b>	Not an actual empirical study in itself but rather an overview of data in which health outcomes have been investigated with regards to work environments.

<b>Study</b>	<u>Authors:</u> Marshall <i>et al</i> 1997 <u>Study aim:</u> To test the job demand-control model (JDC) and the job demand-service (JDS) model. (JDC model posits that jobs that are both high in demands and low in decision latitude are associated with greater psychological distress. JDS model posits that jobs that are high in demands and low in service to others are associated with greater psychological distress.)
<b>Sample attributes</b>	<i>N:</i> 300 couples <i>Age:</i> Mean: male 35 yrs, female 24 yrs. <i>Sex:</i> 50% male, 50% female <i>Country:</i> USA <i>Data collection years:</i> Not stated.
<b>Method</b>	Random selection of dual earner couples (both employed full time in manufacturing, services and other industries). Selected from town lists of all adults living in two towns in the greater Boston area. Response rate 68%. Interviewed separately in their homes or offices. 98% of sample was white.
<b>Health variables</b>	Depression, anxiety.
<b>Labour market variables</b>	Job characteristics (job demands, decision authority, skill discretion).
<b>Findings</b>	There were no significant differences between industries in skill discretion, decision authority, finding the salary to be rewarding, the flexibility of the scheduling, hazard exposure or concerns about low pay. Partial support was found for the job demand-control model for workers in manufacturing. Greater psychological distress is associated with high job demands and low service to others, for workers in the service industries. However, rewards from service to others do not moderate the effect of job demand on psychological distress.
<b>Comments/ limitations</b>	Results are limited to sample of white men and women aged between 25 and 40 years, in dual earner couples in which both parties are-employed full time. Results cannot necessarily be generalised to individuals of different ages, race or family situations. Some industrial sectors (eg personal services) were under-represented.

<b>Study</b>	<u>Authors:</u> Matthews <i>et al</i> 1998 <u>Study aim:</u> To identify gender similarities and differences in psychosocial work characteristics for those in and out of paid employment.
<b>Sample attributes</b>	<i>N:</i> 11 407 <i>Age:</i> 33yrs <i>Sex:</i> 5129 men & 5438 women <i>Country:</i> UK. <i>Data collection years:</i> 1991
<b>Method</b>	Longitudinal 33 year follow up of 1958 British birth cohort. All births in one week in 1958 (3-9 March). Information collected on 98% totalling 17414. Subsequent follow up of survivors at ages 7,11,16,23 and in 1991 at age 33yrs when 69% of original re-interviewed.
<b>Health variables</b>	Morbidity, well-being.
<b>Labour market variables</b>	Work demands/environment.
<b>Findings</b>	Women reported more negative work characteristics than men, primarily because of differences in learning opportunities (26% lacked opportunity compared with 13% of men) and monotonous work (47 & 31% respectively). Women in full time employment reported fewer negative characteristics (27%) than part time (39%) or home workers (36%). Home workers had fewer opportunities for leaning (36%) and greater monotony (49%) than paid workers (21 & 22% respectively), however fewer home workers reported inability to control the work pace (11% compared to 23%) and inflexibility of breaks (21% compared to 47%). Socio-economic gradients in work characteristics was found for full and part time workers, but not among home workers. Differences in self-reported health were also examined: a social gradient was found for all employment status groups, being strongest for home workers despite the absence of a gradient in negative work characteristics.
<b>Comments/ limitations</b>	Good generalisability.

<b>Study</b>	<u>Authors:</u> Melamed <i>et al</i> 1995 <u>Study aim:</u> To examine the association between repetitive work and coronary heart disease risk factors (including blood pressure and plasma lipids) and the two distinct forms of objective monotonous work (repetitive work and work underload).
<b>Sample attributes</b>	<i>N:</i> 2776 <i>Age:</i> 20-64 yrs <i>Sex:</i> 70% male, 30% female <i>Country:</i> Israel <i>Data collection years:</i> 1985-87
<b>Method</b>	Respondents part of the CORDIS (Cardiovascular Occupational Risk Factors Determination in Israel) study which incorporates both cross-sectional and longitudinal components. Study based on data collected during phase 1 of project from 21 manufacturing plants. About 60% (N=4337) of all employees provided data at phase 1, of whom 64% were included in this study. Each participant was assigned to one of five work categories (three types of repetitive work and work underload and a control group engaged in varied work).
<b>Health variables</b>	Weight, blood pressure, cholesterol, glucose.
<b>Labour market variables</b>	Work repetitiveness
<b>Findings</b>	Men in short cycle repetitive work (RW) and those in work underload had significantly higher systolic blood pressure (SBP) values than those in varied work (the control group). No other risk factors turned out to be significant in men. Women in short cycle RW had higher mean SBP, diastolic blood pressure (DBP), cholesterol and glucose levels than those in varied work. Women in work underload had marginally higher mean cholesterol and significantly higher HDL than those in varied work. Both men and women in short cycle RW had significantly higher risk factor levels than those in medium cycle and that there were no differences between those in medium and long cycle work. A positive association between mean CHD risk factors and work repetitiveness was not supported; rather, a threshold effect was observed. Those in short cycle RW had the highest levels of the outcomes studied; higher than those in varied work, and higher still than those in other levels of RW.
<b>Comments/limitations</b>	High rate of exclusion from the study and evidence of sample bias. Possibility of omitted variable bias (other stressors).

<b>Study</b>	<u>Authors:</u> Mullarkey <i>et al</i> 1997 <u>Study aim:</u> To examine the effects of two properties of advanced manufacturing technology (AMT), technological uncertainty and abstractness, on psychological strain, and the moderating effect of job control.
<b>Sample attributes</b>	<i>N:</i> 72 <i>Age:</i> Mean 31 yrs <i>Sex:</i> 56% male, 44% female <i>Country:</i> England <i>Data collection years:</i> Not stated.
<b>Method</b>	Cross-sectional survey in large electronics company. 65% response rate.
<b>Health variables</b>	Psychological well-being (job-related strain, anxiety, depression)
<b>Labour market variables</b>	Technological characteristics (uncertainty and abstractness), control, job satisfaction
<b>Findings</b>	Little evidence that technological uncertainty and abstractness influence psychological well-being. Only limited support for the hypothesis that method control moderates the impact of technological stressors. There were 'dis-ordinal' interactions involving timing control, such that when pacing is high, strain increases as technological uncertainty or abstractness increase; when pacing is low, strain increases as technological uncertainty or abstractness decrease.
<b>Comments/limitations</b>	Cross-sectional design and small sample size limit confidence in the robustness of the findings. Reliance on self-reports is not considered to pose a serious threat to the study's internal validity.



<b>Study</b>	<u>Authors:</u> Nygard <i>et al</i> 1997 <u>Study aim:</u> To evaluate the perceived changes in work demands and stress factors among ageing workers in different work categories.
<b>Sample attributes</b>	<i>N:</i> Time 2= 924 <i>Age:</i> Mean: 47 yrs men; 46 yrs women in 1981 <i>Sex:</i> 38% male and 62% female. <i>Country:</i> Finland <i>Data collection years:</i> 1981 - 1992 (11 year follow up)
<b>Method</b>	Longitudinal survey using self-administered postal questionnaire. Employees who had municipal occupations and who were born between 1923-1935 were sent questionnaires; 6257 responded in 1981. During follow up 41.5% of the group retired, 27% work disability pension, 6% died, 5% no response, 2% changed occupations and 0.8% changed to part time work. Final response rate in 1992 was 14.8% of the original respondents.
<b>Health variables</b>	Stress
<b>Labour market variables</b>	Employment, job demands, physical environment.
<b>Findings</b>	Physical and mental demands of jobs broadly increased from 1981 to 1992, especially muscular work and use of knowledge. In 1992 the women still perceived higher physical demands than the men but felt they had greater possibilities to develop. The use of knowledge had increased, especially among the women and was on the same level for both genders. The perception of changes differed according to the content of jobs: more men in the 'mental' work group (23%) than in the 'physical' work group (20%) or 'mixed mental and physical group' (15%) reported an increase in muscular demands. Older people appear to work at a relatively higher capacity than younger workers, and this higher workload may be a risk factor for early work disability.
<b>Comments/ limitations</b>	Very high attrition rate at 2 <sup>nd</sup> follow up limits the generalisability of the findings..

<b>Study</b>	<u>Authors:</u> Parker & Kulik 1995 <u>Study aim:</u> Examine how job stress and work support predict the experience of burnout and how burnout is related to absenteeism and job performance.
<b>Sample attributes</b>	<i>N:</i> 73 <i>Age:</i> 23-65 yrs <i>Sex:</i> 90% female <i>Country:</i> USA <i>Data collection years:</i> Not stated.
<b>Method</b>	Cross-sectional survey of nurses using voluntary participation. Of the 89 questionnaires distributed, 75 were returned. 82% response rate. The supervisor of each nurse who completed questionnaire was asked to complete a brief performance rating of the nurse, response rate 97%.
<b>Health variables</b>	Stress, fatigue.
<b>Labour market variables</b>	Job demands, absenteeism.
<b>Findings</b>	Levels of work support and job stress were both significant predictors of burnout. Additionally higher burnout levels were significantly associated with poorer self-rated and supervisor-rated job performance, more sick leave and more reported absences for mental health reasons. Further analysis suggest that level of burnout served as a mediator of the relationship between social support and self-rated job performance, absences for mental health reasons and intentions to quit .
<b>Comments/ limitations</b>	Small sample size and cross-sectional design all pose limitations.

<b>Study</b>	<u>Authors:</u> Peterson & Wilson 1996 <u>Study aim:</u> To determine if perceptions of select facets of work were related to perceptions of health.
<b>Sample attributes</b>	<i>N:</i> 218 <i>Age:</i> 23 - 58 yrs. <i>Sex:</i> 38% male & 62% female. <i>Country:</i> USA. <i>Data collection years:</i> Not Stated.
<b>Method</b>	Cross-sectional study using self-administered questionnaire sent to a stratified random sample of 432 employees at a large University. Response rate 53.8%.
<b>Health variables</b>	Well-being
<b>Labour market variables</b>	Work environment, job satisfaction
<b>Findings</b>	As education level increased so did job satisfaction and perceptions of current health. Susceptibility to illness was more positive among older subjects and previously married or single. Single respondents and those with children reported a more positive health outlook. Job satisfaction was lower for women than men with the areas of greatest dissatisfaction being co-workers and pay. Satisfaction with co-workers was the strongest predictive job factor for every health perception measure. Satisfaction with supervisions and opportunities for promotion were not predictive of health perception measures. As work perceptions became more positive health perceptions also became more positive.
<b>Comments/ limitations</b>	Limited scope for generalisability and in making causal inferences due to design and very low response rate.

<b>Study</b>	<u>Authors:</u> Rasanen <i>et al</i> 1997 <u>Study aim:</u> To determine the number and nature of perceived harmful work conditions and perceived work related symptoms by sex and socio-economic group.
<b>Sample attributes</b>	<i>N:</i> 2744 <i>Age:</i> mean (men) 41.5 yrs & (women) 42.7 yrs <i>Sex:</i> 1396 men & 1348 women <i>Country:</i> Finland <i>Data collection years:</i> Oct - Dec 1992.
<b>Method</b>	Computer assisted telephone interview of sample drawn from patient registers of occupational health units. Units chosen from 18 different townships in southern and central Finland. Subjects chosen from the manual or computer based registers according to a systematic sampling approach from a cluster sample of occupational health units. 5269 people in original sample, 4990 had telephone numbers, of these 3422 were interviewed. Only 2744 salaried employees and wage earners were included.
<b>Health variables</b>	Morbidity (respiratory/sensory organs), musculoskeletal, skin, psychosomatic, mental.
<b>Labour market variables</b>	Socio-economic group, job environment/demands.
<b>Findings</b>	94% of the respondents stated that at least one harmful factor occurred at work, half of them reported more than three such factors. The most commonly occurring harmful factors were increased work pace, mental demand, repetitive movements and noise. Of the symptoms perceived as work related, musculoskeletal symptoms were the most common. They were reported by 44% of respondents, followed by mental symptoms (26%), psychosomatic symptoms (19%) and respiratory or sensory symptoms (15%). Both the reporting of perceived harmful work factors and perceived work related symptoms varied by socio-economic group and sex. Perceived work related musculoskeletal symptoms were associated with perceived ergonomic harmful work factors among both the men and women with physical or chemical work factors among both men and with psychosocial or work organisational factors among the women. Perceived work related respiratory symptoms were associated with perceived harmful physical or chemical work factors among both the men and the women, and both groups also reported mental and psychosomatic symptoms in relation to harmful ergonomic work factors were also related. Even though the degree of work related ill health was related to socio-economic group, the reporting of particular symptoms indicated the probability of a particular work factor being considered harmful independently of socio-economic group, although there was some relationship to sex.
<b>Comments/ limitations</b>	

<b>Study</b>	<u>Authors:</u> Reynolds 1997 <u>Study aim:</u> To examine the interaction between the effects of industrial unemployment and job conditions on workers' levels of psychological distress.
<b>Sample attributes</b>	<i>N:</i> 7095 <i>Age:</i> 18 yrs plus <i>Sex:</i> 48% male, 52% female <i>Country:</i> USA. <i>Data collection years:</i> 1987-1988
<b>Method</b>	Secondary data analysis of data drawn from the first wave of the National Survey of Families and Households (a longitudinal national survey of 13017 individuals) using face to face interviews plus supplementary self-administered questionnaires. Response rate 75%.
<b>Health variables</b>	Depression, distress.
<b>Labour market variables</b>	Job conditions/demands; industrial context (unemployment rates).
<b>Findings</b>	Economic stress is more distressing to workers in highly complex jobs. At low levels of complexity, worker distress is high but industrial unemployment does not increase or decrease distress. Distress decrease with age, education and social support; also married or cohabiting respondents are less distressed than widowed, divorced, separated or single respondents. Females, African Americans and respondents who report being responsible for greater hours of housework all report higher levels of distress. Industrial rates of unemployment have a direct effect on worker distress that is not accounted for by work conditions of overload or complexity. Job demands are found to increase distress, but this effect does not interact with industrial employment conditions.
<b>Comments/limitations</b>	Cross-sectional study limits certainty about causal pathways.

<b>Study</b>	<u>Authors:</u> Riipinen 1997 <u>Study aim:</u> To test whether job involvement based on need fulfilment in the job is differently related to well-being than involvement not based on it.
<b>Sample attributes</b>	<i>N:</i> 433 <i>Age:</i> 20 - 60 yrs. <i>Sex:</i> 383 women & 50 men. <i>Country:</i> Finland. <i>Data collection years:</i> Not Stated.
<b>Method</b>	Cross-sectional design using self-administered questionnaires. Participants were elementary school teachers and secretaries randomly selected. Response rate (teachers) 72% and (secretaries) 69%.
<b>Health variables</b>	Well-being
<b>Labour market variables</b>	Job involvement
<b>Findings</b>	Job involvement based on need congruence was related to a high level of well-being. Job involvement not based on need congruence was independent from well-being or was negatively related to it. The mean levels of the two kinds of involvement were equal. Results suggest that job involvement is related to well-being only if the constructs are based on equal processes, ie on need congruence in one's job.
<b>Comments/limitations</b>	Generalisability of findings are limited due to design and as no rationale is given for sample selection.

<b>Study</b>	<u>Authors:</u> Samuelsson <i>et al</i> 1997 <u>Study aims:</u> (1) To assess the prevalence of suicidal feelings and attempted suicide among psychiatric nursing personnel. (2) To explore the perceived cause of any suicide behaviour. (3) To examine the possible associations between work environment and suicide.
<b>Sample attributes</b>	<i>N:</i> 191 <i>Age:</i> 20-62 yrs <i>Sex:</i> 38% male, 62% female <i>Country:</i> Sweden <i>Data collection years:</i> Not stated.
<b>Method</b>	Cross-sectional survey using self-administered questionnaires. These were sent to 242 nurses and attendants working in psychiatric care at different wards and out patient departments. 79% (effective) response rate.
<b>Health variables</b>	Attempted suicide, suicidal feelings, depression, well-being.
<b>Labour market variables</b>	Work environment, demands and control, decision latitude.
<b>Findings</b>	23% had seriously considered suicide at some time in their life and 13% had attempted suicide, all earlier than the previous year. Reasons for suicide attempt were given as: 90% partly or definitively as a family situation, 31% to illness and 16% to work environment. No subjects reported work environment as the only reason for the suicide attempt. There were significant correlations between negative work environment and burn out/depression, and between burnout/depression and suicidality. No direct link was demonstrated between work environment and suicidality. Quality of work was not correlated to any of the other factors. Thus, the only factor that correlated with suicidality was burnout/depression.
<b>Comments/ limitations</b>	This is a relatively small cross-sectional study. Generalisability of findings is unknown. Some indirect evidence that a negative work environment may increase suicidal feelings, but other explanations of the findings are possible.

<b>Study</b>	<u>Authors:</u> Schaubroeck & Merritt 1997 <u>Study aim:</u> To test the hypothesis that the relationship between job demands and blood pressure will vary according to levels of self-efficacy and job control.
<b>Sample attributes</b>	<i>N:</i> 77 <i>Age:</i> Mean: 37 yrs <i>Sex:</i> 10% male, 90% female <i>Country:</i> USA. <i>Data collection years:</i> Not stated.
<b>Method</b>	Cross-sectional design using self-report questionnaires. 110 full time direct patient care workers approached. Response rate 60%.
<b>Health variables</b>	Blood pressure.
<b>Labour market variables</b>	Job demands and control; self-efficacy.
<b>Findings</b>	The job demands-control model was supported among workers who reported high self-efficacy. Job demands were more positively related to systolic and diastolic blood pressure among workers lower on control. Among those with low self-efficacy, demands were positively related to blood pressure when control was higher. When people are confident in their abilities, having control mitigates the stress consequences of demanding jobs. Raising self-efficacy may be as important as increasing control to reduce cardiovascular risk associated with job demands.
<b>Comments/ limitations</b>	Limitations are posed by the small sample size, sex bias and cross-sectional design.

<b>Study</b>	<u>Authors:</u> Shimizu <i>et al</i> 1997 <u>Study aim:</u> Report trends in the status of employee work related stress.
<b>Sample attributes</b>	<i>N:</i> Approx 20 000 (1982), 15 000 (1987), 16 000 (1992) <i>selected</i> <i>Age:</i> <29 - 60 yrs <i>Sex:</i> Both genders <i>Country:</i> Japan <i>Data collection years:</i> 1982-1987
<b>Method</b>	Secondary data analysis of Japanese Ministry of Labour survey, conducted every five years on employee health using a self-administered questionnaire. Subjects are selected by a two step stratified selection method. Establishments are selected by kind of industry and size of establishment. Employees are selected according to distribution of age, gender, class etc throughout Japan . Response rate in 1992 was 85.9%, response rate not given for other years.
<b>Health variables</b>	Stress, anxiety, health behaviours (smoking, drinking, relaxation)
<b>Labour market variables</b>	Employment, work conditions/demands.
<b>Findings</b>	The percentage of employees with work related stress among all subjects gradually increased as follows: 51% in 1982, 55% in 1987 and 57% in 1992. The percentage of employees with work related stress increased remarkably from 1982 through 1992 among the following groups: the 50-59 age group in males; employees in the electricity, gas, heat and water supply industries; those in the real estate industry; administrative and managerial workers; employees of large establishments with more than 5000 employees; and employees performing shift work involving no night duty. The problem of human relationships in the workplace was associated with the increasing stress levels among 50-59 yr old males, 40-49 yr old females, employees of large establishments with more than 5 000 employees, those in the real estate industry and service workers. In terms if means of relaxing to relieve fatigue and stress, employees tended to engage in active pursuits such as eating out and ‘shopping and driving’ and ‘travelling’ over the past decade. In 1992 on the other hand, 22% of males and 6% of females selected ‘smoking’ as a means of relaxation.
<b>Comments/ limitations</b>	Although the study uses longitudinal data and is fairly representative of the Japanese working population, limitations exist in the actual data. The actual number of respondents is not given, nor is the response rate for 1982 & 1987. The fact that the Labour Ministry was not forthcoming with all of the information means that the results cannot be considered as 100% reliable or valid.

<b>Study</b>	<u>Authors:</u> Sorensen <i>et al</i> 1996 <u>Study aim:</u> To compare the relationship of job experiences, including psychological job demands and job decision latitude, to risk factors for coronary heart disease in men and women.
<b>Sample attributes</b>	<i>N:</i> 360 <i>Age:</i> 25-46 yrs (Mean: 38 yrs men; 37 yrs women) <i>Sex:</i> 54% male & 46% women <i>Country:</i> USA <i>Data collection years:</i> March - October 1987
<b>Method</b>	Cross-sectional data collected from a random sample of employees subscribed to a group model health maintenance organisation. 58% response rate. Participation required visit to clinic, where blood pressure, cholesterol were measured, and completion of questionnaire administered by trained interviewers.
<b>Health variables</b>	Risk factors for coronary heart disease (serum cholesterol and diastolic blood pressure)
<b>Labour market variables</b>	Employment, job decision latitude.
<b>Findings</b>	High decision latitude and fewer work hours were associated with lower levels of risk factors for CHD. Men and women reported similar levels of job decision latitude and psychological stressors in their jobs. Although men tended to work longer hours and have more exerting jobs, no evidence that job decision latitude and psychological stressors differed by gender. Only one gender difference was noted: physical exertion was related to higher blood pressure levels in women, but to lower levels in men.
<b>Comments/ limitations</b>	A cross-sectional study which limits causal inferences. The study design also poses limitations, in that respondents are only those subscribed, which is likely to be those who can afford it. The study also does not make provisions for other intervening variables, such as length of employment, that are likely to affect the findings.

<b>Study</b>	<u>Authors:</u> Stansfeld <i>et al</i> 1997 <u>Study aim:</u> To overview research in three areas: the association between work characteristics and psychiatric disorder; the association of work characteristics and psychiatric sickness absence; and the impact of privatisation and job change on mental health .
<b>Sample attributes</b>	<i>N:</i> 7372 (participants at all three study phases) <i>Age:</i> 40-60yrs in 1991-93. <i>Sex:</i> 67% male, 33% female <i>Country:</i> UK <i>Data collection years:</i> 1985-1993
<b>Method</b>	Whitehall II cohort. (see Hemingway <i>et al</i> , 1997)
<b>Health variables</b>	Mental morbidity
<b>Labour market variables</b>	Job demands, decision latitude, sickness absence.
<b>Findings</b>	High job demands were associated with increased risk of psychiatric disorder for both sexes. Conversely, high levels of social support were protective of mental health in both sexes. Both high decision authority and high skill discretion are associated with reduced risk of taking short spells in sickness absence. In men there is also no significant increased risk of taking sickness absence association with high job demands. In women, high skill discretion protects against taking short spells of psychiatric sickness absence but, unlike men, decision authority was not similarly protective. On the other hand, high job demands were associated with increased risk of taking sickness absence. There was an increase in psychiatric morbidity in both sexes during the anticipation phase (lead up to privatisation) compared with baseline.
<b>Comments/ limitations</b>	

<b>Study</b>	<u>Authors:</u> Stenberg <i>et al</i> 1994 <u>Study aim:</u> To assess the relationship between the occurrence of sick building syndrome (SBS) symptoms and personal, psychosocial and building-related factors.
<b>Sample attributes</b>	<i>N:</i> 232 matched pairs <i>Age:</i> Mean: 40 yrs <i>Sex:</i> 17% male, 83% female <i>Country:</i> Sweden. <i>Data collection years:</i> 1988-89
<b>Method</b>	A case control study: a 'SBS-case' was an office employee reporting at least one general symptom every month and at least one mucosal and dermatological symptom every week; non-symptomatic controls were matched by age, gender and geographical area. Data were derived from questionnaires and a clinical examination. Inspection and measurements were also taken at worksites.
<b>Health variables</b>	Dermatological conditions, psychosocial factors
<b>Labour market variables</b>	'Sick building' syndrome
<b>Findings</b>	Personal factors, such as atopy and photosensitive skin, psychosocial conditions and physical exposure factors influencing indoor air quality, such as outdoor air flow rates and the presence of photocopiers, were related to an increased prevalence of the reported SBS symptoms.
<b>Comments/ limitations</b>	Use of unmatched statistical tests is questionable (though this would produce a conservative estimate of SBS impact). Reporting of symptoms relied on subjects' perception of work-relatedness; some reporting bias may have resulted.

<b>Study</b>	<u>Authors:</u> Stenberg & Wall 1995 <u>Study aim:</u> To survey the distribution of reported and potential risk factors among females and males and to assess the relationship between the occurrence of SBS symptoms in office workers and its risk indicators focusing on the sex differences.
<b>Sample attributes</b>	<i>N:</i> 4943 <i>Age:</i> up to 50 yrs <i>Sex:</i> 48% male <i>Country:</i> Sweden <i>Data collection years:</i> Oct to Dec 1988.
<b>Method</b>	Using data from a number of substudies, mainly using office workers who spend more than half of their working hours in the office during the 3 preceding months. Questionnaire mailed to 5986 workers. Response rate of 83%. Respondents also underwent a clinical examination to verify questionnaire on aspects of health.
<b>Health variables</b>	Morbidity.
<b>Labour market variables</b>	Work characteristics, conditions, building characteristics.
<b>Findings</b>	Most risk factors such as paper work and psychosocial work load had an unfavourable distribution for females. In the multivariate analysis however, female sex remained the most prominent risk factor indicator almost unaffected by the addition of other factors. Neither did effect modification contribute to the excess prevalence among females. The results from the clinical examination indicate that the excess symptom prevalence among females is real and not a reporting artefact.
<b>Comments/ limitations</b>	Study uses a complicated recruitment method which is not explained very thoroughly.

<b>Study</b>	<u>Authors:</u> Tassie 1997 <u>Study aim:</u> To describe occupational health and safety aspects of home based work ('outwork').
<b>Sample attributes</b>	<i>N:</i> Not stated <i>Age:</i> Not stated <i>Sex:</i> All female <i>Country:</i> Ausrtalia <i>Data collection years:</i> Not stated
<b>Method</b>	Qualitative cross-sectional (?) study of outworkers.
<b>Health variables</b>	Occupational health and safety
<b>Labour market variables</b>	Working conditions
<b>Findings</b>	71% of those surveyed said that they had experienced occupational health and safety problems, including exposure to toxic substances, occupational overuse injuries, stress and exhaustion.
<b>Comments/ limitations</b>	No information about sample size, sampling procedures, data analysis etc. Difficult to draw firm conclusions or generalise from the findings.

<b>Study</b>	<u>Authors:</u> Williamson <i>et al.</i> 1994 <u>Study aim:</u> Examine the effects of making the change from 8 to 12 hours shifts/rosters on health, job satisfaction, personnel and productivity factors.
<b>Sample attributes</b>	<i>N:</i> 18(who take part in both stages) <i>Age:</i> 24-27yrs <i>Sex:</i> Not stated. <i>Country:</i> Australia. <i>Data collection years:</i> Not stated.
<b>Method</b>	Longitudinal survey of computer operators working for a large Australian company, Studies on two occasions first when working on roster A and then 12 months later . Data were collected using a self-administered questionnaire and keeping a diary on meal, mood and sleep patterns.
<b>Health variables</b>	Mental morbidity, gastrointestinal, sleep, fatigue or heart problems
<b>Labour market variables</b>	Work environment, shiftwork.
<b>Findings</b>	Changing to a 12 hours shift rota produced significant improvement in health. Gastro-intestinal problems, sleep patterns and psychological distress showed the greatest decrease in symptom prevalence. Job satisfaction levels did not change significantly nor did workers' perception of the work environment.
<b>Comments/ limitations</b>	Although the longitudinal design permits casual inferences to be made, the actual sample size is very small. On close inspection it is found that only 18 operators in the study completed both stages and not 75 as stated. Insufficient information is given regarding sampling and recruitment of subjects.



## **8. Discussion and Conclusion**

### **8.1 Introduction**

The key findings of our review are summarised below. It should be noted, however, that confidence in the findings is variable, in accordance with the quality of the publications under review. In general, the standard of methodological competence displayed in the quantitative empirical reports was disappointing, with widespread problems in areas such as study design, sample bias, response bias, and untested indicators and measures, resulting in threats to both internal and external validity. Very few qualitative studies were identified. This results, in large measure, from the over-representation of journals and disciplines which privilege quantitative methods, and, to a lesser degree, from a relative neglect of the topic under review by qualitative researchers. It should be pointed out, however, that the methodological rigour of the few qualitative reports was not particularly high.

### **8.2 Workplace reorganisation: downsizing, re-organisation and job insecurity**

The combination of increased international competition, the introduction of new technologies, de-industrialisation, repeated recessions and the privatisation of previously state owned industries have led many industries and individual companies to engage in reorganisation, restructuring and/or downsizing. In this section we reviewed studies which have sought to chart the relationships between the health of employees and workplace reorganisation and/or company or industry downsizing.

There is evidence in the literature that job insecurity leads to worse self-rated physical health and an increase in some clinical symptoms. However, as a result of inconsistencies in research design and outcome measures, comparison between studies is difficult and meta-analysis impossible. The Whitehall II study suggests that the impact of job insecurity on physical health may be more pronounced for men than for women. Other work raises the possibility that the negative effects of job insecurity on physical health may increase with time, and that the perceived intensity of employment insecurity is strongly associated with psychosomatic symptoms, aches and pains. In relation to emotional/psychological health the literature confirms earlier findings that insecurity in the period leading up to organisational change is related to worse health. Only the Whitehall II study has looked at job insecurity and health behaviours. The team report that they found hardly any relationship, although women who were anticipating job change did show increased levels of smoking and a reduction in daily exercise.

In considering factors which explain or mediate the effects of threatened job change and/or job loss, the literature suggests that people who have been previously unemployed or who are in short term contracts are most likely to perceive their employment as insecure. Employees who are at the lower levels within organisations and who have little knowledge about the likely effects of organisational change tend to have little decision latitude (control) and to be most at risk of ill-health. There is also some evidence that personality and psychological characteristics are important in perception of, and coping with, insecure-employment. For instance, it is reported that having low self-esteem and an external locus of control leads to a greater impact of job insecurity than high self-esteem and an internal locus of control. With

regard to *long term* insecurity, people with ‘positive affectivity’ fare better; however, this relationship does not hold for those experiencing *acute* job insecurity. High levels of perceived co-worker, supervisor or trade union support can help to offset some of the negative effects of job insecurity; although this is at best a partial solution. Having information about the changes that are taking place and feeling that one has some control of the situation can also be helpful.

The only study which specifically examined the relationship between surviving organisational change and physical health suggests that downsizing can lead to increased levels of certificated sick leave, especially in workplaces that shed a large proportion of the workforce and where there is a high proportion of older (over 44 years) workers. In relation to psychological/emotional health, the effects of downsizing are unclear. The studies reviewed in the report highlight the ways that both the process of downsizing and its implications for the remaining workforce are important mediating factors. Carefully managed downsizing can actually lead to clearer roles and responsibilities for workers and result in increased worker participation. In addition, the personality characteristics of optimism and having a strong sense of mastery of one’s environment have been found to be important in the processes of perceiving job threat and the coping strategies employed by survivors of downsizing. These characteristics appear (within limits) to be able to offset the negative psychological effects of the downsizing experience.

### **8.3 Moving into and out of the labour market**

Limited research has been undertaken on health changes during the period immediately following redundancy. However, the literature shows that there are important differences between voluntary redundancy that involves a good financial package, exit counselling and training for future-employment, and compulsory redundancy against a background of high unemployment, often involving short notice and limited financial remuneration. This draws attention to the importance of understanding the meaning of redundancy for the individual. In relation to gaining re-employment, it appears that ‘problem focused’ coping has a positive effect, while the value of ‘symptom focused’ coping is unclear. The evidence that poor quality re-employment can actually be more detrimental to psychological health than unemployment should be noted.

In line with the experiences of other social groups, unemployment appears to have a negative effect, and employment a positive effect, on the health of women and young people. One study of young people does report, however, that the health consequences of employment and unemployment are strongly related to the quality of work. Those with the least satisfying jobs report the highest levels of health disorders. A study comparing the health of British and Finnish women concludes that financial and physical well-being is strongly linked to paid employment and recommends employment and childcare policies which facilitate the economic independence of women.

Our literature review suggests that the processes leading to early retirement are multifaceted and complex. Many people retire ostensibly on the grounds of ill-health. However, various organisations have different criteria for granting ill-health retirement, eg in relation to the type and duration of illness, the ability to perform the same or any job within the company, and the number of doctors required to confirm the diagnosis. It may be that some ‘ill-health’ early

retirements are motivated by factors other than ill-health (eg financial or social desires). Some organisations use early retirement as a method of company downsizing. Individuals are forced to weigh up the benefits of taking retirement against such considerations as the threat of compulsory lay-off, the possibility of job transfer and the chances of securing another job. In these situations the notion of ‘choosing’ early retirement is highly problematic. There is no evidence that early retirement has a negative effect on either physical or mental health. However, those who retire because of ill-health do report less satisfaction with their retirement. Early retirement often requires individuals to renegotiate some aspects of their marital relationship and their domestic division of labour.

#### **8.4 Workplace health promotion interventions**

The findings from the empirical studies, taken together with the conclusions of the two field reviews, suggest that stress management interventions targeted at individuals can be effective in reducing physical and psychological symptoms. Organisational outcomes, however, require to be tackled using interventions which address the sources of stress in the total work setting. The author of one of the reviews concludes that organisational-level interventions are beneficial and that “higher-level strategies” may be more efficacious than focusing upon “individual coping responses”.

In a comprehensive review of the effectiveness of workplace health promotion the weight of the evidence of impact on exercise, nutrition and weight control is stated to be only “suggestive” or “indicative” (rather than “conclusive”). On the basis of the empirical evidence from their recent papers included in this review, the only conclusion that can be stated with any confidence is that the regulation of smoking in the workplace appears to modify the amount of smoking among smokers but to have little effect on the overall prevalence of smoking.

A major impact of workplace health promotion activity on absenteeism was found in the empirical literature under review. For instance, one study found a reduction of over 3% in the proportion of workers reporting a sick day in sites receiving a programme aimed at improving weight control and reducing smoking, compared to equivalent ‘control’ sites. However, given the lack of uniformity among the interventions on offer, there must be some question about which particular elements within an overall intervention actually produce the effect on absenteeism rates.

#### **8.5 New technology and the impact on health**

Most of the available empirical evidence addresses the association between VDT use and health. There is empirical support for the high prevalence of musculoskeletal disorders, skin conditions, ocular problems and psychological complaints among VDT users. However, whether or not the level of ill-health among VDT users is significantly greater than among comparable non-VDT users is impossible to resolve: different studies produce discrepant findings. There is firmer evidence that increasing duration of VDT use is deleterious to health, with a threshold of four hours per day appearing to have some significance.

A recent review of psychosocial aspects of working with VDTs concludes that the introduction of computers and the design of computerised office work systems influence work processes, job tasks and design, social relationships at work, organisational policies, management practices and career opportunities in ways that can be both beneficial and harmful to physical and mental health. The author's summary of the research evidence on VDT use, psychosocial factors and stress is as follows:

- Lower paid, less skilled computer users are more psychologically distressed than higher paid, more skilled computer users
- The stress associated with the move to new technology is greater among lower paid, less skilled and older employees than among higher paid, more skilled and younger employees
- Seven job factors tend to produce high stress (across a range of job categories): (1) high job demands, such as heavy workload, work pressure and increased work pace; (2) lack of control over the work process and/or inability to participate in decisions; (3) high level of task difficulty coupled with inadequate skills; (4) monotony, lack of variety or lack of task content; (5) poor supervisory relations or lack of supervisory support; (6) technology problems, such as computer slowdowns or breakdowns, which increase the perception of higher workload and less control; and (7) a fear of job security.

The author suggests work organisation improvements for healthier VDT jobs, including organisational support, employee participation, improved task content, increased job control, reasonable production standards, career development, enhanced peer socialisation and improved workstation ergonomics.

## **8.6 Features of the work environment**

The job demand-control model proposes that the combination of heavy demands and limited decision latitude (control) to moderate these demands results in job strain, which in turn leads to negative health consequences. Most of the large-scale tests of the model have examined cardiovascular outcomes. A recent report shows that support for the model has been mixed, with some studies successfully predicting cardiovascular disease and elevated blood pressure, while others have failed to do so. The authors conclude that the evidence supports the job demands-control model, but only among people who experience a sense of high self-efficacy in their work. Among people with low(er) self-efficacy, increasing control may exacerbate the stress of demanding jobs.

Our own review of recently published research provides partial confirmation of the model. Thus, three studies report that health outcomes are related to job demands but not to job control; another concludes that low job control is associated with a higher risk of newly reported coronary heart disease, while job demands are not; and yet another finds that low control predicts short and long absences due to back pain, but note that the effect of low control is reversed (ie protective) among lower grade men and higher grade women. One study does claim to confirm the Karasek/Theorell model through finding an association between a high work pace and poor intellectual discretion, and several indicators of health, in a cross-sectional survey of the Dutch working population.

Findings relating to job satisfaction and job involvement are reported in several studies. Job satisfaction is found to be positively associated with a variety of health conditions, including the symptoms of Sick Building Syndrome and neck and shoulder symptoms. A study which examined the effects of a change in shiftwork hours reports improvements in health at no cost

to workers' feelings of job satisfaction. The only investigation (identified during the period under review) of job involvement and well-being found that job involvement was correlated with positive affect and a low level of negative affect in subjects with strong needs related to job involvement. However, if needs were not related to job involvement, there was a negative correlation between involvement and positive affect.

Finally, various aspects of the work environment and their relationship with employee health are examined in a heterogeneous set of publications. Among notable findings was an association between overtime work and elevated blood pressure; poorer psychosocial work characteristics among women compared to men, primarily because of differences in learning opportunities and monotonous work; levels of work support and job stress are both significant predictors of burnout; among certain groups of workers, the quality of human relationships in the workplace is associated with increasing stress levels.

## **8.7 Conclusion**

Despite concerns about the methodological quality of the studies included in this review, we conclude that there is substantial evidence of significant health impacts associated with current labour market conditions. Our findings suggest that workplace reorganisation, redundancy, new technology and features of the modern work environment are likely to be associated with deficits in physical and/or psychological health among a wide range of employees. This suggests that European governments should subject their labour market policies to routine health impact assessment, both prospectively and retrospectively, and consider how negative consequences of current labour market change can be reduced or offset through countervailing mechanisms. Employers (of companies of all sizes) should be encouraged or required to pay more attention to the health and human resources aspects of their business decisions, even in times of economic and financial instability. The health sector should be challenged to ensure that in all aspects of its work (promotion and prevention as well as treatment) close attention is paid to the link between employment, unemployment, health and well-being. Health promotion will need to consider how best it can fulfil its mission in the workplace setting, in particular addressing the question of the appropriate level (individual or organisational) at which interventions can be most profitably be implemented.



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## **Appendix 1: Search Strategy used for searching on Medline, BIDS Embase and CINAHL**

Time period covered is **1993 to Jan 1998**.

Search limited by age groups to include only those from ages **13 years to 64 years**.

All keywords are searched as textwords in the title or abstract, unless indicated as *exp* in which case the keyword will have been searched under its MeSH subject heading.

### **LABOUR MARKET SEARCH TERMS AND / OR KEYWORDS**

#### ***Labour market participation 'block'***

labo?r market.tw

workforce.tw

economic\$ activ\$.tw

exp employment/

self employ\$.tw

autonomous work\$.tw

self contract\$ work\$.tw

social\$ exclus\$.tw

*combine terms into one 'block' using 'or' function*

#### ***Restructuring 'block'***

exp personnel turnover/

work\$ restructuring.tw

downsizing.tw

redundancy.tw

job loss.tw

reorgani?ation.tw

*combine terms into one 'block' using 'or' function*

#### ***Labour market insecurity 'block'***

exp labo?r unions/

deunioni?ation.tw

job turnover.tw

casuali?ation.tw

(short or fixed) adj 2 (term contract).tw

(job or work or career) and (insecurity or security).tw

labo\$ market and (insecurity or security).tw

contract\$ and (insecurity or security).tw

anticipat\$ adj2 job (loss or change).tw

anticipat\$ adj2 (unemployment or redundancy).tw

*combine terms into one 'block' using 'or' function*

#### ***Non-employment 'block'***

(early or premature) and retirement.tw

training and (job or scheme).tw

economic\$ inactiv\$.tw

exp unemployment/

absenteeism.tw

sick\$ adj2 (long term or permanent).tw

welfare to work.tw

exp social security/

national insurance.tw

benefit\$ and (state or unemployment).tw  
national service.tw  
*combine terms into one 'block' using 'or' function*

***Changes in work 'block'***

long\$ hours.tw  
intensi\$ of work.tw  
overtime.tw  
(shift or home or tele) adj2 work\$.tw  
new technology.tw  
technological change.tw  
workform adj2 (atypical or new).tw  
(task or work or job) and flexibili\$.tw  
labo?r market flexibili\$.tw  
part time employment.tw  
decision latitude.tw  
work and (demand\$ or skill\$ or competancies).tw  
deskilling.tw  
job quality.tw  
work organi?ation.tw  
job characteristics.tw  
exp income/  
salar\$.tw  
income.tw  
wage\$.tw  
low pa\$.tw  
minimum wage\$.tw  
job change.tw  
underemployment.tw  
*combine terms into one 'block' using 'or' function*

**HEALTH RELATED SEARCH TERMS AND / OR KEYWORDS**

***Mortality 'block'***

exp mortality/  
exp cause of death/  
standardi\$ mortality ratio\$.tw  
SMR.tw  
karoshi.tw  
*combine terms into one 'block' using 'or' function.*

***Morbidity 'block'***

exp morbidity/  
exp disease/  
illness.tw  
exp incidence/  
exp.prevalence/  
*combine terms into one 'block' using 'or' function.*

***Mental morbidity 'block'***

(psychological or mental) adj5 incidence.tw  
(psychological or mental) adj5 prevalence.tw  
mental adj2 (health or illness).tw  
exp affective disorders/  
exp anxiety/



anxiety.tw  
exp depression/  
exp depressive disorder/  
depressed.tw  
exp stress/  
exp fatigue/  
suicid\$.tw  
parasuicide.tw  
burn out.tw  
*combine terms into one 'block' using 'or' function.*

***Physical morbidity 'block'***

exp neoplasms/  
cancer.tw  
exp coronary heart disease/  
exp cardiovascular diseases/  
exp angina, unstable/  
exp angina pectoris/  
exp myocardial infarction/  
hypertension.tw  
blood pressure.tw  
cholesterol.tw  
musculo-skeletal.tw  
*combine terms into one 'block' using 'or' function*

***Positive health 'block'***

positiv\$ adj5 health.tw  
well-being.tw  
exp quality of life/  
(quality of life) not cancer.tw  
exp physical fitness/  
*combine terms into one 'block' using 'or' function*

***Health behaviour 'block'***

exp health behavio?r/  
health behavio?r not (drug\$ or sex).tw  
exp life style/  
life style.tw  
exp tobacco/  
tobacco.tw  
cigarette\$.tw  
exp smoking/  
drinking and (binge or excessive).tw  
drunkenness.tw  
exp drinking/  
alcoholi\$.tw  
alcohol adj2 (abuse or misuse).tw  
exp diet/  
exp nutrition/  
exp eating/  
diet.tw.  
nutrition\$.tw  
eating adj2 (healthy or unhealthy).tw  
exp exercise/

exercise.tw  
physical activity.tw  
exp sports/  
sports.tw  
*combine terms into one 'block' using 'or' function*

***Disability 'block'***

exp disabled/  
(disability or handicapped or rehabilitation).tw  
*combine terms into one 'block' using 'or' function*

***Health care costs 'block'***

exp health care costs/  
exp employer health care costs/  
health care costs.tw  
health service indicator\$.tw  
employer health care cost\$.tw  
employee assistance program\$.tw  
*combine terms into one 'block' using 'or' function*

***Service utilisation 'block'***

(utili?ation or uptake) adj5 service\$.tw  
contact adj 5 (primary or secondary or tertiary).tw  
(primary or secondary or tertiary) and care.tw  
contact adj5 service\$.tw  
exp referral and consultation/  
consultation adj5 time\$.tw  
*combine terms into one 'block' using 'or' function*

***Occupational health 'block'***

exp occupational health services/  
injur\$ adj2 (industrial or work).tw  
accident\$ adj2 (industrial or work).tw  
*combine terms into one 'block' using 'or' function*

## Appendix 2: Data Extraction Form

### EUROPEAN FOUNDATION EMPLOYMENT AND HEALTH PROJECT

#### Data extraction form

<i>Identification of publication</i>	
Author(s) [ <i>all to be included. Family name followed by initial(s), each author separated by comma</i> ]	..... ..... .....
Title of publication (journal article/ book/report) [ <i>in full</i> ]	..... ..... .....
Details of journal	Title..... ..... volume #..... issue #..... pages #.....-
Details of book/report	Place of publication..... Name of publisher..... Editor(s) of book..... Relevant pages #.....

Date of publication [year only]	.....
Publication ID#	.....
What type of publication?	1. Article in refereed journal 2. Article in non-refereed journal 3. Book chapter 4. Book/Publication (published) 5. Book/Publication (unpublished) 6. Other ( <i>specify</i> .....)
Language of publication	1. English 2. German 3. French 4. Spanish 5. Other ( <i>specify</i> .....)
Keywords (provided in publication)	1. Not included 2. Included ( <i>specify</i> .....)
RUHBC keywords	health..... ..... labour market..... ..... .....

How was the publication found?	1. Electronic database 1.1 Medline 1.2 Embase 1.3 SSCI 1.4 Sociofile 1.5 Psyclit (specify.....)	1.6 Cinahl 2. Handsearch 3. Referenced in another publication 4. Personal contact 5. Unknown 6. Other
<b>Review process</b>		
Name of reviewer	.....	Date of review .....
<b>Type of study</b>		
Methods [ <i>circle all that apply</i> ]	1. Personal or clinical interview 2. Questionnaire (postal or in-person) 3. Observation 4. Participant observation 5. Secondary data analysis/archival records/official records 6. Other ( <i>specify</i> .....)	
Purpose (main)	1. Exploratory/descriptive 2. Explanatory 3. Evaluative 4. Other ( <i>specify</i> .....)	
Level of analysis	1. Individual 2. Aggregate ( <i>specify</i> .....) 3. Cross-level ( <i>specify</i> .....) 4. Other ( <i>specify</i> .....)	

Temporal design	1. Cross-sectional 2. Longitudinal 3. Mixed 4. Other ( <i>specify</i> .....)
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Study design (quantitative)	1. Survey 2. Cohort study 3. Case-control study 4. Time-series analysis 5. Trial: RCT 6. Trial: other ( <i>specify</i> .....) 7. Quasi-experiment ( <i>specify</i> .....) 8. Other quantitative ( <i>specify</i> .....) 9. Not applicable (qualitative)
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***Description of the study***

Geographical coverage	..... .....
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Time period covered by the study	.....
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Aim(s) of the study	1. Not stated and not possible to determine 2. Not stated but can be derived (see below) 3. Stated (see below) ..... ..... ..... .....
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<p>Characteristics of the study population</p>	<p>Numbers.....</p> <p>.....</p> <p>Age group(s).....</p> <p>Socioeconomic status.....</p> <p>Ethnicity.....</p> <p>Gender.....</p> <p>Geographical location.....</p> <p>Civil state.....</p> <p>Other relevant information.....</p> <p>.....</p>
<p>Sampling and recruitment procedures [complete, if applicable]</p>	<p>[write in].....</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p>
<p>Main findings</p>	<p>[describe].....</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p>

Costs associated with 'treatment' of health outcomes	1. None provided 2. Health service ( <i>specify</i> .....) 3. Social security ( <i>specify</i> .....) 4. Welfare ( <i>specify</i> .....) 5. Other ( <i>specify</i> .....)																				
Intervening (moderating) variables	[describe]..... ..... ..... .....																				
<b>Quality issues</b>																					
Is/Are the method(s) appropriate to the research question(s)/ study aim(s)?	1. Yes 2. Uncertain ( <i>specify below</i> ) 3. No ( <i>specify below</i> ) ..... .....																				
Checklist for quantitative methods	<table border="0" style="width: 100%;"> <tr> <td style="width: 80%;">1. Is (are) the research question(s) (or the study aim(s)) clearly stated?</td> <td style="width: 20%; text-align: right;">No/Yes/Unsure</td> </tr> <tr> <td>2. Is the research method adequately described?</td> <td style="text-align: right;">No/Yes/Unsure</td> </tr> <tr> <td>3. Is there an adequate description of sample selection?</td> <td style="text-align: right;">No/Yes/Unsure</td> </tr> <tr> <td>4. Does the sampling procedure permit generalisation of findings?</td> <td style="text-align: right;">No/Yes/Unsure</td> </tr> <tr> <td>5. Are the results clearly presented?</td> <td style="text-align: right;">No/Yes/Unsure</td> </tr> <tr> <td>6. Are the results relevant to the research question(s)?</td> <td style="text-align: right;">No/Yes/Unsure</td> </tr> <tr> <td>7. Are the results credible?</td> <td style="text-align: right;">No/Yes/Unsure</td> </tr> <tr> <td>8. Is the interpretation of results defensible?</td> <td style="text-align: right;">No/Yes/Unsure</td> </tr> <tr> <td>9. Is the statistical analysis appropriate?</td> <td style="text-align: right;">No/Yes/Unsure</td> </tr> <tr> <td>10. Have ethical issues been considered and addressed?</td> <td style="text-align: right;">No/Yes/Unsure/Not applicable</td> </tr> </table>	1. Is (are) the research question(s) (or the study aim(s)) clearly stated?	No/Yes/Unsure	2. Is the research method adequately described?	No/Yes/Unsure	3. Is there an adequate description of sample selection?	No/Yes/Unsure	4. Does the sampling procedure permit generalisation of findings?	No/Yes/Unsure	5. Are the results clearly presented?	No/Yes/Unsure	6. Are the results relevant to the research question(s)?	No/Yes/Unsure	7. Are the results credible?	No/Yes/Unsure	8. Is the interpretation of results defensible?	No/Yes/Unsure	9. Is the statistical analysis appropriate?	No/Yes/Unsure	10. Have ethical issues been considered and addressed?	No/Yes/Unsure/Not applicable
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Direction of causality	<ol style="list-style-type: none"> <li>1. From labour market conditions/situation to (ill-)health</li> <li>2. From (ill-)health to labour market conditions/situation</li> <li>3. Reciprocal causality</li> <li>4. Not applicable (ie not rated 1 in item above)</li> </ol>
Overall judgement of the quality of the study	<ol style="list-style-type: none"> <li>1 High</li> <li>2. Medium (note problems below)</li> <li>3. Unsound (note problems below)</li> </ol> <p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p>
Should this publication be included in the review?	<ol style="list-style-type: none"> <li>1. Yes</li> <li>2. Perhaps (note reasons below)</li> <li>3. No (note reasons below)</li> </ol> <p>.....</p> <p>.....</p> <p>.....</p>

(Back cover)

One of the current objectives of the European Union is the promotion of a high level of employment in order to achieve economic and social progress. Employment and unemployment in their turn, have broad implications on citizens' health.

This bibliographic review describes and analyses the impact of the recent labour market developments on employees' health. It includes topics such as downsizing, workplace reorganisation, job insecurity, new technologies and health promotion. It indicates that current labour market conditions have a significant effect on citizens' health and highlights the potential of improving health through the application of appropriate employment strategies.

European Foundation for the Improvement of Living and Working Conditions.

**Changing Labour Market Conditions and Health: A Systematic Literature Review (1993-98)**

Luxembourg: Office for Official Publications of the European Communities, 1999

1999 – 124 pages – 21 x 29,7 cm