COMPUTERS AND HEALTH ISSUES
REPORT COMMISSIONED BY THE VALLEYVIEW
OCCUPATIONAL HEALTH AND SAFETY COMMITTEE

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June 20 XX
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1. REPORT BRIEF

This report was commissioned by the ValleyView Occupational Health and Safety Committee following an inquiry from senior management. Apparently there has been an increased number of documented and verbal reports of staff suffering headaches, strains, sore eyes and backaches in the office.

Management wanted to know whether the problems could be related to computers or ergonomics in some way. They requested a general outline of some problems that computers could cause and how these problems could be solved. They also wanted an outline of good ergonomic practice in terms of the design of equipment and work stations.

The author, on behalf of the Occupational Health and Safety Committee, undertook research from a number of books, magazines and pamphlets on ergonomics and computer health issues in order to identify health issues and potential solutions or ways of minimising these problems. Discussions with staff also took place. The findings and recommendations are outlined in the report.
2. COMPUTER-RELATED PROBLEMS AND SOLUTIONS

2.1 INTRODUCTION

Computers have revolutionised the workplace in terms of productivity and efficiency and it would seem that the office worker’s job has been made easier. However, working with computers imposes greater physical and mental demands on workers than conventional office work and, as a result, computer work has been known to cause several health problems, including:
- Repetitive Strain Injuries (RSIs)
- eye problems
- neck and lower back problems
- headaches
- stress-related disorders.

2.2 REPETITIVE STRAIN INJURIES

Repetitive Strain Injuries (RSIs) include tendonitis, carpal tunnel syndrome, ‘tennis elbow’ and chronic muscle strain. Most cases of RSI are job-related and can be linked to occupations that involve fast, jerky, wide-stretch movements or highly repetitive manual tasks.

RSIs can be caused by:
- rapid, repetitive movements, particularly those requiring some strength or sustained pressure
- incorrect posture
- equipment that is of an inappropriate height
- inefficient performance of tasks which results in unnecessary movement
- inadequate supervision—workers not being corrected when using damaging movements
- not enough rest breaks
- no consideration of possible job rotation or variation.

The symptoms of RSI include pain, numbness, weakness and burning/tingling sensations in the fingers and hands which sometimes extends to the elbows or shoulders.

RSIs are both painful and debilitating, and cost the economy millions of dollars each year in terms of days lost and workers compensation claims. The request for this report by management indicates that it is becoming a problem for ValleyView as well. The risk of RSIs can be avoided completely, or at least minimised, by observing a few simple measures:
- correct posture
- regular rest breaks (ten minutes every hour)
- job rotation or variation
• simple exercises
• adequate fluid intake

ValleyView should implement these measures by:
• encouraging rest breaks away from the desk
• encouraging job variation where possible
• educating all staff about the risks of RSI and ways to avoid it
• educating all staff in simple exercises designed to break the strain
• supervising staff in order to correct potentially damaging practices.

2.3 EYE PROBLEMS

The eyes take an incredible beating from the enormous increase in airborne pollutants. The airflow through the monitor picks up dust particles that can cause eye abrasion and soreness.

Eyes dehydrate because of the low humidity in a typical office due to air-conditioning that enhances electromagnetic effects and makes it more difficult for the eyes' natural lubrication system to work. Some monitors may also cause a rapid deterioration in the ability of the eyes to focus.

The risk to the eyes may be minimised by:
• blinking regularly to stimulate tear formation and lubrication
• using an eyewash or tear-substitution drops to provide extra lubrication
• not squinting
• cutting down on excessive reflection from windows, desk-lamps and other bright objects by using blinds, moving the work station or using a computer screen shade/antiglare filter which reduces eye fatigue
• keeping the screen clean
• using a comfortable font size and background colour
• doing simple eye focusing exercises.

It is recommended that ValleyView implement these measures by:
• educating all staff about the need to blink regularly
• providing tear-substitution drops such as Murine or ClearEye at all work areas
• ensuring all computers have a screen shade or antiglare filter
• minimise reflection by installing blinds or curtains in sunny work areas
• having the air-conditioning system serviced and cleaned in order to minimise airborne pollutants.
2.4 NECK AND LOWER BACK PROBLEMS

These problems are predominantly caused by bad posture—which is often exacerbated by poorly-designed office furniture.
Correct posture, regular breaks and simple exercise can reduce the incidence of these problems. Regular visits to a chiropractor or physiotherapist to ensure the spine is correctly aligned can often fix problems before they happen.

2.5 HEADACHES

Headaches are often related to problems with the neck and lower back, but can also be caused by suffered by:
- stress (eg. repressed emotions)
- muscular tension brought on by poor posture
- bad screen display
- computer noise, which is often beyond the extremes of human hearing has been known to cause headaches. Infrasound (below frequency) has also been linked with tinnitus, motion sickness, nausea and, in extreme cases, internal bleeding
- environmental stressors such as noise, strong light, dust and uncomfortable humidity levels (which also aggravate allergic conditions).

These can be minimised by implementing the measures already outlined, but it is also suggested that ValleyView:
- consider providing a masseuse once a month for free, ten-minute massages
- subsidise staff visits to a chiropractor or physiotherapist.

2.6 STRESS-RELATED CONDITIONS

These arise from such factors as job dissatisfaction, unsympathetic management, lack of opportunity for promotion and fulfilment, and electronic monitoring. These factors often ‘just go with the territory’. The level of stress they induce is predominantly dependent on the personality of the worker and the methods they use to cope.
ValleyView has already demonstrated that it takes the issue of stress very seriously and has undertaken some measures to reduce this through its open communication and an environment of trust between management and staff. However, the provision of a staff counsellor would go a long way to further reducing the stress levels of staff, particularly with regard to stress caused by personal issues.
3. GOOD ERGONOMIC PRACTICE

3.1 DESIGN OF EQUIPMENT

3.1.1 Chair
A well-designed chair should be a top priority. It is actually better to sit in an uncomfortable chair that makes you change position frequently (as long as the lumbar spine retains its natural shape) than in a comfortable chair that encourages you to remain static. Overall, the chair should be well-proportioned with good lumbar back support and firm padding. There should be no sharp edges on components, no penetrations in which fingers may be caught and no protruding nuts, bolts or staples. The chair should also be able to be easily adjusted in height and seat tilt.

Seat
The padding on the seat needs to be of sufficient thickness to give adequate support but not cause localised pressure areas under the thighs. The front edge of the seat should be curved or waterfall-shaped to maintain even/acceptable loads on the buttocks and thighs. The seat should swivel around on the horizontal axis as this is an added benefit to cope with gravity’s forces and realign the spine as the worker changes position at the work station.

Back support
The back support needs to be concave to fit the general contour of the lumbar spine—the edge should curve away from the operator.

Base
The base should be a swivel type to allow free rotation of the body, matt finished to minimise reflection.

3.1.2 Desk
Factors in the attainment of a good working posture are desk dimensions and working height.
Top: The top of the desk should be no thicker than 2.5cm and it should be matt finished to minimise glare.

Height: The minimum height is dependent on the build of the operator and should be determined by correct operator posture, but the usual height is 680mm.

Footrests: Footrests help remove pressure from the underside of the thighs, and need to be large enough to allow for both the comfortable placement of the feet and changes in posture.

Document holders: These are necessary in order to avoid unfavourable inclination/angulation of the head or even a complete sideways body movement when shifting vision between documents and the screen.
3.2 LAYOUT OF THE WORK STATION

The layout of equipment and furniture should promote an environment in which good seated posture can be attained and in which there are minimum cases of fatigue. The screen, source documents and keyboard should be placed in such positions as to minimise movement of the head in an arc that leads to discomfort in the neck and shoulder muscles.

3.2.1 Viewing distance

The keyboard, monitor and source document should ideally be the same distance from the operator in order to avoid constant refocussing. Where this cannot be achieved, the work station should allow the operator to achieve the best possible compromise.

3.2.2 Seated posture

Well-designed seating reduces fatigue, allows changes in sitting position and promotes good seated posture. The main features of optimum working posture are:

- The chair seat height is such that the thighs are mainly supported by the legs
- The weight of the torso is supported mainly by the buttocks with minimum compression of the thighs against the chair seat
- The angle formed between the upper and lower arms is ninety degrees or slightly greater
- Wrists are adequately supported during non-keying periods
- The angle formed between torso and thighs is ninety degrees
- Lumbar spine is adequately supported by the back of the chair
- Feet have adequate support and are ninety degrees to the lower leg.

3.2.3 Working heights

Working height is, for visual display units, the height of the home row of keys. It is preferable that desks be adjustable in height in order to compensate for variations in operator stature.

3.2.4 Screen

The terminal should be adjustable so that the angle of the screen to the viewer can be varied. In a comfortable seated posture the neck muscles relax and the head tilts down. The most comfortable line of sight for a seated person is about fifteen degrees below the horizontal.

In terms of the design of equipment and the layout of work stations, it is suggested that the Occupational Health and Safety Committee conduct an assessment of all work stations and equipment, and recommend replacement or redesign where necessary.
4. DISCUSSIONS WITH STAFF

The author conducted discussions with twenty of the thirty staff at ValleyView: each department was represented. Discussions were conducted in a fairly informal manner, as this encouraged open conversation.

Discussions started with each staff member describing any symptoms they had or had had in the past and whether the staff member thought the symptoms were computer-related. It was alarming to find that only three staff reported not having any symptoms. The predominant symptom was headaches, followed by neck and shoulder problems, back problems, sore eyes and sneezing. There were only three reports of aching wrists. However, when asked if they thought the symptoms were computer-related, most of the staff confessed they hadn't even thought of the computer or ergonomic practice—they had simply put it down to stress as quite a few of the headaches were related to hangovers!

Other questions included:

- How do you sit at your work station?
- Do you take regular breaks away from your computer?
- Do you engage in simple exercises to relieve fatigue?
- How do you handle stress?

(A full list of the questions asked is available on request.)

What was discovered was that while many staff had a general idea of what good posture should be, very few of them practised it, and even fewer were fully aware of the risks of RSI and eye problems. Some of the staff were aware of the simple exercises they could do to minimise the risk of RSI but none of them ever did them. When asked why not, the answer was simply, ‘No time.’

Another issue that arose out of the discussions was that many staff used alcohol to relieve stress (after hours of course!). While this is a culturally acceptable practice in our society, it can have an effect on a person’s productivity at work—it is hard to be productive and to concentrate if suffering have a hangover or lack of sleep. The long-term health implications of alcohol abuse have been well-documented.

5. CONCLUSIONS AND RECOMMENDATIONS

Given the nature of the problems described by senior management, it is very likely that they are being caused by poor work practices in regard to computers and ergonomics. The following should be implemented at ValleyView to deal with these computer-related problems:

1. Having conducted discussions with staff from various departments, it seems that a lack of education about ergonomic practices is the main problem, and the one that can be most easily addressed. It is recommended that management provide funding for this education, which could include workshops run by a specialist in ergonomics, and posters in work areas.

2. Management should also fund some workshops on relieving stress—without alcohol.

3. Management should also consider providing funding to the OHS committee to provide the services of a staff counsellor, a masseuse and subsidised visits to a chiropractor or physiotherapist. Quotes for these services could be obtained by the OHS committee.
4 Management should be encouraging good ergonomic practices by encouraging rest breaks away from work stations and supervising staff in order to correct potentially damaging practices.

5 Managers need to examine work routines in order to encourage job variation where possible.

6 Management should provide an eyewash or tear-substitution drops in every department to minimise eye problems.

7 Management should arrange to have the air-conditioning system serviced and cleaned in order to minimise airborne pollutants.

8 Blinds or curtains should be installed in sunny work areas in order to minimise reflection.

9 The OHS Committee should undertake a thorough review of all work equipment and give a report to management, outlining any replacements or redesigns needed.

10 The OHS Committee should ensure all computers have a screen shade or antiglare filter.

These recommendations need to be undertaken as soon as possible in order to avoid any further incidents or accidents.