

## **Embedding Ergonomics in Hospital Culture: Top Down and Bottom Up Strategies**

*Dr Sue Hignett*

*Lecturer in Ergonomics, Dept. of Human Sciences, Loughborough University, Loughborough, Leics. LE11  
3TU. UK*

*Email: S.M.Hignett@lboro.ac.uk*

### **This paper is abstracted from:**

*Hignett, S. (2001). Embedding ergonomics in hospital culture: top-down and bottom-up strategies. Applied Ergonomics. Vol 32, pages 61-69.*

### **Introduction**

Following the introduction of the European Directive on Manual Handling Operations in January 1993 many hospitals in the UK reported difficulty in implementing the recommendations from the government advisory body (Health and Safety Executive, HSE). Although the HSE recommended using an ergonomic approach to manage manual handling risks there was very little information about how this could be achieved. In the UK the National Health Service (NHS) had immunity from prosecution under health and safety law until 1991 so very few Ergonomists had experience of working in the healthcare industry. This led to questions about whether recommendations and ergonomic tools developed in other industries (e.g. manufacturing and the military) could be transferred to healthcare. How does health care differ from other industries?

### **Organisation**

The National Health Service (NHS) is the biggest civilian employer in Europe, employing more than 1 million people, 5% of the UK working population. It is the largest employer of women, with approximately 75% female workers, with nurses accounting for 50% of all staff.

Nottingham City Hospital is a specialist teaching hospital employing approximately 5,000 staff and has over 1200 beds. It provides a wide range of general services (medicine, surgery, gynaecology, paediatrics, care of the elderly, rehabilitation and obstetrics) to the local population and specialist services including heart and lung transplant surgery, cystic fibrosis service, breast screening, and regional renal, burns, head injury and oncology centres. Additionally there are extensive laboratories for genetics, haematology, clinical chemistry, microbiology, histopathology (including a mortuary) which are used for both research and diagnostic testing. Non-clinical support facilities include a hospital laundry, on-site kitchens (for all food preparation and distribution), a steam-generating boiler house, and administration and clerical staff.

### **Culture**

A particular aspect that differentiates hospital work from most other industries is the 'hands on care'. Nursing work is often physically heavy (involving lifting weights which would be unacceptable in

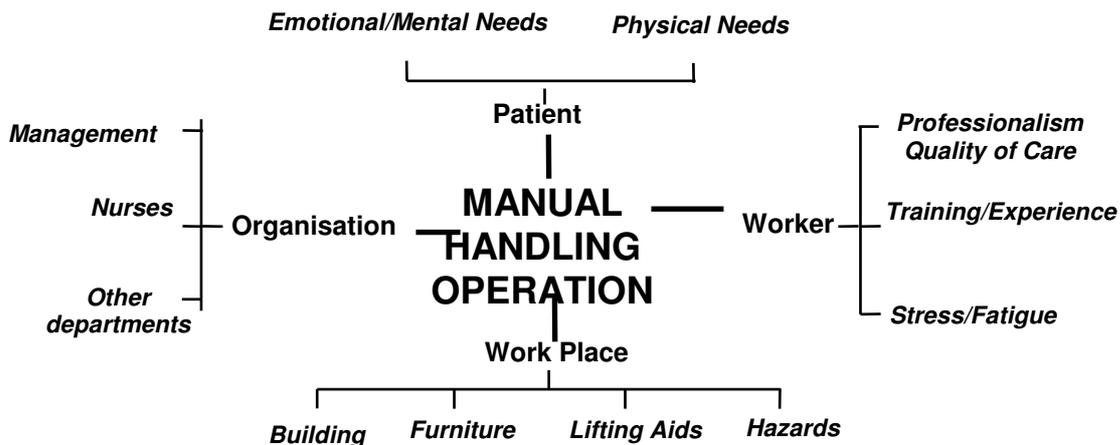
male-dominated industries); physically dirty (involving tasks such as washing soiled bodies); and highly repetitive.

The organisational structure in hospitals is also different to that of other industrial sectors. There will be at least three managerial lines: (1) a clinical line for the management of the patient; (2) a professional line (e.g. for nursing staff); and (3) an administrative line for each service area (e.g. surgery). The three-way hierarchy adds to the complexity with respect to accountability, authority and power.

**Ergonomic strategy**

The strategy for the ergonomic approach at Nottingham City Hospital was based on the findings of a 2 year research project which explored the role of ergonomics in manual handling operations in nursing. The traditional approach to manual handling problems in health care has been to train the staff in moving and handling technique, however this has been shown to have no long-term benefits. The model in figure one shows the factors which were found to influence patient handling tasks.

Figure One A model of factors influencing patient handling tasks



This model was used at Nottingham City Hospital to inform the hospital strategy on Moving, Handling and Back Care and to set out the scope of ergonomic practice, including both ‘top down’ (macro, policy and support) and ‘bottom up’ (micro, operational) strategies.

**1. Organisation**

The strategy gives an organisational structure for authority and accountability for the operational management of manual handling risks. The departmental or ward manager has the daily responsibility for managing health and safety risks and is therefore central in the successful implementation of the programme.

Every department/ward is visited annually for an audit of their performance. This includes a review of known risk assessments; an update of new staff working practices and equipment; a check to ensure documentation is up-to-date; and two spot checks for (a) a designated manual handling task, by interviewing a member of staff, (b) a completed risk action to ensure that the risk is still managed. The audit enables specific ergonomic issues to be identified, which might be as simple as providing information about a piece of equipment, or as complex as setting up an exploratory study to investigate a problem in more detail.

This annual visit has gradually become part of the hospital processes, part of the formal culture. Initially there was some concern, and even reluctance, by the managers but over the years they have come to see this visit as a benefit, with some even contacting the Ergonomics Department to book an early annual audit.

#### *Management*

The 'top down' input was set up to support cross-professional, organisational-wide intervention in the form of an Injury Prevention Team with members from the Trust Board (Director of Nursing and Director of Operational Services), Divisional Co-ordinators of Rehabilitation and Surgery as well as the Ergonomist, Occupational Health, and Health and Safety personnel. The team functioned both as a steering group and to facilitate the implementation of change at the highest levels in the hospital.

The 'top down' strategy needed to be in place before any ergonomic input would have been successful. The corporate policy on 'Moving, Handling and Back Care' has been supported by the Chief Executive Officer and Executive Directors. It translated the categories of the model (figure one) into a relevant and operational framework to include ergonomic input for: building design; purchasing; manual handling training; risk management for musculoskeletal problems; and individual patient assessment.

#### *Wards and departments*

The 'bottom up' approach was carried out at a ward/departamental level, through risk management, and at an individual staff level. The risk management programme for manual handling operations started in 1994 with a Trust-wide risk assessment training programme ensuring the involvement of all heads of departments, senior nurse managers and ward managers. The programme was then spread throughout the organisation resulting in the initial generation of 918 actions. Each ward and department in the hospital was visited at least annually to audit known risk assessments and to provide support for any newly identified risks. All staff were encouraged to participate in this process, both within their departments/wards management structure and as part of the moving and handling refresher training sessions.

Each risk assessment could have a number of risk control actions for the short term improvements or require longer planning e.g. replacement of manual hydraulic beds with electric beds throughout the hospital. On occasion specific ergonomic projects were needed to tackle complex risks. A variety of methods were used including participatory ergonomic projects, product trials, product development, postural analysis, post-occupancy evaluation (after building work), and task analysis for the development of generic and specific procedures by multi-disciplinary teams.

#### *Other Departments*

Most wards and departments took part in the risk management programme. However there was a major area of failure - the medical staff (doctors). Although numerous, and often very creative initiatives were tried to incorporate the medical staff, there was almost no participation.

A number of factors were suggested for this failure, but the most likely is the management structure for the employment of medical staff in the NHS. In the past the medical staff contracts have rarely included any specific health and safety references. This is likely to change in the future with the Health and Safety Executive increasingly focusing on medical staff, including prosecuting for clinical incidents under health and safety legislation. There is also pressure for change with the introduction of Clinical Governance. This introduces a framework for organisations within the NHS to improve clinical services for patients. The guidance sets out specific areas for quality improvements and includes the need for: clear policies for managing risk; and procedures for all professional groups to identify and remedy poor performance. So the goal is to ensure that ergonomic issues are incorporated into these policies and procedures.

## **2. Workplace**

### *Building*

Another failure, which has seen very limited ergonomic input, has been building design for refurbishment and new work. Where limited ergonomic involvement in building projects has been achieved, it has been found to be of value for both the user groups and architects in facilitating consideration of all the user groups in a structured and systematic way using the principles of task analysis. It is felt that this is needed at all stages in the design process, from the initial conceptual stages, through iterative drawings and layouts, with increasing detail for elevations and room data sheets, to the final stages of building and commissioning.

### *Furniture and Lifting Aids*

Product trials have been used to ensure a systematic approach for purchasing furniture and other equipment, including moving and handling equipment. Structured product trials have been used to look at the ergonomic features of an increasingly wide range of products from office furniture (desking and seating), to electric beds, electric mobile hoists (lifters), transit wheelchairs, examination gloves, nurses uniforms and laboratory microscopes. The results from these trials have been used to both inform the purchasing department (NHS Supplies) and to establish a 'gate keeping' function so that only approved products are purchased. This has been a slowly growing area of ergonomic input with increasing success and scope for future development.

Where no suitable products were found to address the manual handling risk, specific product development projects have been undertaken with students over the last five years from a variety of local university departments, including product and furniture design, mechanical engineering, organisational psychology and ergonomics. This has resulted in, amongst others, the development of a birthing pool to give improved usability for the mother, midwife and delivery partners.

### *Hazards*

This category includes emergency situations, for example fire evacuation. Specific equipment is provided to be suitable for the evacuation route (vertical or horizontal) and patient group. This is supported with procedures and training to minimise the risk of injury from foreseeable emergencies.

### **3. Worker**

#### *Professionalism*

Personal and professional factors affect the well-being and safety of staff. The guidance from professional bodies as well as from government bodies and unions provide useful sources of information on manual handling operations in health care. At Nottingham City Hospital there has been an effort to make health and safety issues an integral part of the management structure, with a Safety Management Team of expert advisors to provide a backbone of support.

One of the challenges of practising ergonomics within this complex industry is interacting with a wide range of professionals. The use of ergonomics to facilitate between different professional groups has proven to be very effective in projects with nurses; midwives and occupational therapists.

#### *Training and experience*

Although the basis of the ergonomic approach does not incorporate training as its primary element it is still important that staff receive training in the systems of work and work equipment. However, as previously stated, there is almost no convincing evidence that any benefit is derived from any of the various behaviourist approaches to modify movement patterns or in technique training. In fact some would say that the traditional approach of moving and handling training for manual handling risks presents a dichotomy by training the worker to fit the task, rather than changing the task to fit the worker.

At the start of employment all staff attended a general hospital induction which included a session on ergonomics. This was followed up within the first month with a session to cover the basic principles of manual handling problem solving and back care relevant to their work. Additionally they were offered short refresher sessions using a targeted problem-solving approach based on departmental or ward manual handling risk assessments. These were found to be very cathartic sessions, and information was gathered about new manual handling risks as the staff discussed their problems. These new risks represented part of the bottom-up strategy. They were recorded on a database and returned to the ward/departmental manager on a regular basis. The manager was then required to carry out appropriate risk assessments and record their findings, with assistance from the Ergonomist as needed. Once a risk was identified it was also recorded on the Manual Handling Operations Risk Management database, which formed the basis for the annual ward/departmental audits.

#### **4. Patient**

One of the major differences in practising ergonomics in a hospital, compared with other industries, is the patient. For manual handling this means the 'load' is animate, unpredictable and often offers its own opinion.

At Nottingham City Hospital a patient-focused approach is taken to try to facilitate the staff/patient interface. A 'Mobility And Communication System' (MACS) is used to ensure that information about patients with special mobility needs (e.g. currently using a walking aid) is identified on admission by the named nurse. The details of these special needs are recorded on the MACS card (giving simple information about how to assist) which then travels with the patient throughout their stay in the hospital and, where possible, is owned by the patient. It has been used successfully to ensure that any walking aids are taken with the patient if they are visiting another part of the hospital for diagnostic tests or treatment, and additionally if special moving or handling equipment is required.

The use of the MACS card has been extended to facilitate communication by highlighting some speech and language issues and providing information about interpreting agencies, including sign language. At the most recent six monthly hospital-wide audit, every patient in the hospital was assessed by the Ergonomics and Back Care Advisory Team, with ward nursing staff, to check whether the system was being used correctly. A compliance level of over 60% was recorded.

#### ***Measuring the strategy***

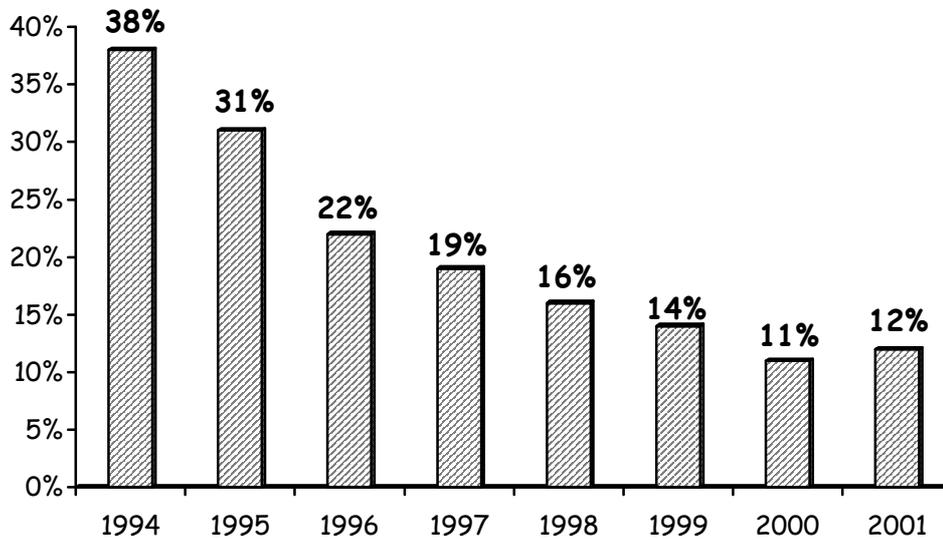
Over the five year period three measures were monitored to look at any trends following the introduction of the ergonomic strategy, these were: manual handling incident reports; musculoskeletal sickness absence; and completed manual handling risk assessments.

As in any large organisation there were initiatives to reduce sickness absence. In particular there was a programme to reduce the duration of long-term sickness absence with supported return-to-work and improved management of termination of employment. The data presented here do not prove that taking an ergonomic approach was the sole cause of the declining numbers for both manual handling incident reports and musculoskeletal sickness absence but they do demonstrate an encouraging trend.

#### ***Manual Handling Incident Reports***

These data were collected by the Health and Safety Department and analysed in the Ergonomics Department. The staff were encouraged to report all risks (including a near miss), and the incident reports were categorised based on the reported activity at the time of the incident. The staff incident reports relating to manual handling incidents showed a repeated decline (figure two) both as a percentage of the total staff reported incidents and in total number, falling from 244 in 1994 to an end of year total of 162 in 1999, representing an overall decrease of 33% in the reported incidents. In 2000 and 2001 this seems to have reached a plateau.

Figure Two Manual Handling Incident Reports

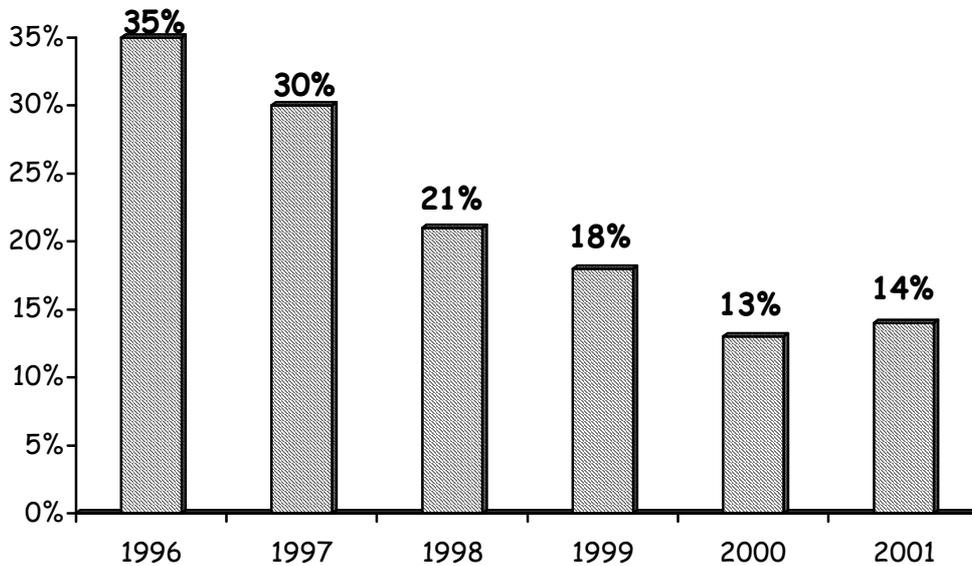


#### *Musculoskeletal Sickness Absence*

Data on sickness absence were collated by the Human Resources Department. Departmental managers send in a monthly staff list giving information about the duration and cause of any sickness absence. The method of collecting sickness absence data was changed in 1 October 1998 to introduce a system linking sickness absence with the payroll. This altered the reporting system both in the number of categories (reducing from 200 to 20) and the collection route (via Finance instead of Human Resources). Additionally the data counted were as hours lost rather than days, and recording started on the day of sickness instead of the next working day.

There was concern that the change in data collection would result in a rise in the days lost (when converted from hours recorded), and this was apparent for the total sickness absence in 1998 and 1999. However there continued to be a decrease in the number of days lost due to musculoskeletal sickness absence from a total of 15,096 days in 1995 to 9,610 days at the end of 1999. This represented a fall in both the absolute number of days lost with a saving of 5,486 days (comparing 1999 and 1994), which is a reduction of 36% over the five year period. This fall continued in 2000 but seems to have reached a plateau for 2001.

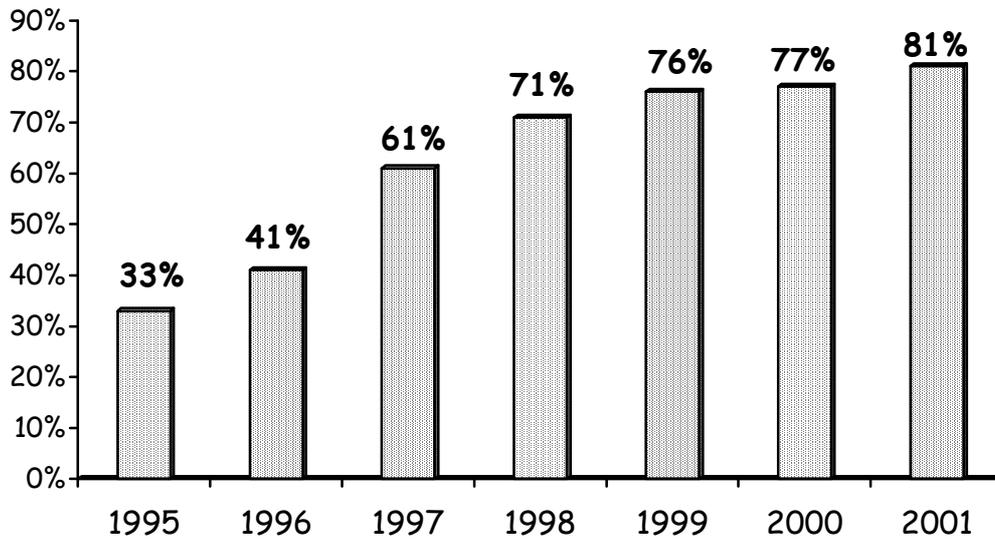
Figure Three Musculoskeletal Sickness Absence



#### *Risk Assessments*

The manual handling risk assessment data were collected by the Ergonomics Department as part of the manual handling audit programme. All the documented risks were reviewed and recorded as either complete or incomplete (to be reviewed the following year). In 1994, 916 actions had been listed by the managers as things they felt needed to be done to make the work place safer, and 301 of these (33%) had been completed. Each year new risks were identified so the total of risk actions increased, but the number of completed actions also increased each year with over 1650 recorded as complete at the end of 1999, representing 76%. There is now a core of more complex risk actions, mostly involving building work, major expense, or large hospital-wide issues. These now need to be addressed with 'macro ergonomics' projects at an organisational level, e.g. the total bed replacement programme which replaced all the manual height adjustable beds with electric 4-section height-adjustable beds in 2002.

Figure Four Manual Handling Risk Actions



**Costs**

The HSE (UK) calculated the estimated savings from this ergonomic intervention over a three year period (1996-1999). The simple calculation of cost of injury was based on a model from another UK hospital . This used the mid-salary point for a nurse and only included the cost of a replacement nurse, business interruption costs and investigation/administrative costs. It did not include any costs associated with civil actions or costs involved if either a new nurse or an agency nurse was recruited. The true costs, and savings, are likely to be significantly higher.

Table 1. Cost savings

Year	MH Incidents	% Decrease on baseline	MSD-related time lost (days)	Annual savings (1 day = €482)	% Decrease on baseline
1993/94	244	1%			
1994/95	243	9%			
1995/96	221	17%	15,096		
1996/97	203	37%	12,716	€1,145,970 (2380 days)	16%
1997/98	153	34%	11,452	€1,754,586 (3,644 days)	24%
1998/99	162		9,610	€2,641,509 (5486 days)	36%
<b>Total</b>				<b>€5,542,065</b>	

**Conclusion**

This paper does not report a research project, it simply shares the experience of trying to tackle manual handling risks in a hospital by taking an ergonomic approach. After five years the completed risk assessments suggest that the working environment became safer, and the trend for manual handling incidents and days lost from musculoskeletal-related sickness absence was downwards until a plateau was reached in 2001.

The ergonomic programme has become embedded within the formal and informal culture of the hospital organisational culture. At a formal level this is evidenced by the incorporation of ergonomic factors in the supplies and purchasing processes, and to some extent in the building process. The achievements over the last five years have been publicised locally with press coverage by television, radio and newspaper media.

**Reference**

Hignett, S. (2001). *Embedding ergonomics in hospital culture: top-down and bottom-up strategies*. *Applied Ergonomics*. Vol 32, pages 61-69.