<table>
<thead>
<tr>
<th>Contents</th>
</tr>
</thead>
<tbody>
<tr>
<td>Editorial</td>
</tr>
<tr>
<td>Computer Gender</td>
</tr>
<tr>
<td>Letters</td>
</tr>
<tr>
<td>President’s Column</td>
</tr>
<tr>
<td>IEA Column</td>
</tr>
<tr>
<td>Reports</td>
</tr>
<tr>
<td>1. CybErg ‘2002 Conference</td>
</tr>
<tr>
<td>2. ACCS Forum on re-use of invasive medical devices</td>
</tr>
<tr>
<td>Article</td>
</tr>
<tr>
<td>Exercise ergonomics … when things are grim in the gym!</td>
</tr>
<tr>
<td>Max Hely CPE</td>
</tr>
<tr>
<td>Forum</td>
</tr>
<tr>
<td>Noticeboard</td>
</tr>
<tr>
<td>New Members</td>
</tr>
<tr>
<td>Conference Calendar</td>
</tr>
<tr>
<td>Information for Contributors</td>
</tr>
<tr>
<td>Information for Advertisers</td>
</tr>
<tr>
<td>Ergonomics Australia On-line (EAOL)</td>
</tr>
<tr>
<td>Caveats</td>
</tr>
</tbody>
</table>

The Official Journal of the Ergonomics Society of Australia

Volume 16, Number 4 (December 2002), ISSN 1033-875

Editor
Dr Shirleyann M Gibbs
Email: shanng@optushome.com.au

Design and Layout
Acute Image Pty Ltd Tel: 03 9381 9696

Printer
Impact Printing
The Ergonomics Society of Australia Inc.
Creeda Business Centre
Bradfield Street, Downer ACT 2602
ESA URL http://ergonomics.org.au
Tel: 02 6242 1951 Fax: 02 6241 2554
Email: secretariat@ergonomics.org.au

Promoting systems, spaces and designs for People
Editorial

A refereed journal needs a steady flow of contributions ... the editor is most grateful to the authors who have contributed such a variety of material in the first year of this new journal format. The co-operation of a valued team of referees, national secretariat and publisher has been critical and much appreciated. To ensure that there is a steady flow of articles on-stream throughout the year, we need an active (not just token) editorial board comprising representatives from each state branch who will pursue articles, nominate appropriate referees, and act as journal agents. Ergonomics Australia is a tangible national product to inform and influence existing members as well as to extend the boundaries of public interest in ergonomics. If we really believe our discipline is a fundamental design science for human-environmental interaction we must reach beyond our own palace walls. What will you contribute?

The call for papers on sport and leisure for this edition at least produced one thought provoking article from NSW. Is no-one else involved in this field across the length and breadth of Australia? Perhaps the September edition is still unopened on your desk? If everyone believes that someone will do something, no-one ever does anything. Thank goodness for the reliable stalwarts who regularly do “do something”! The editor would be delighted to be inundated with articles, reports of research and events, responses to articles and controversial issues and offers of supportive action by branch volunteers. Suggestions for quartery topic editions in 2003 would be most welcome. For March edition 2003 it is hoped to publish an article from each state branch, about developments in relation to forensic ergonomics. This is a lively area of ergonomics in an increasingly litigious society. Get those fingers and little grey cells working after the stimulation of the National Conference in Melbourne and the Festive Season celebrations! Then email your contribution in good time for publication next March.

The National Occupational Health and Safety Commission moved to Canberra many moons ago. A former senior employee recently contacted NOHSC and was advised that a visit could be arranged as long as a formal appointment was scheduled – NOHSC headquarters are not open for the general public. Remember when communicating with the public was part of the NOHSC paradigm and a central library was open to all in business hours? This isolation preceded world terrorist attacks and presumably was intended to enhance the time available to the bureaucrats for undisturbed data mining.

In New South Wales, WorkCover has decentralized to Gosford on the central coast. It seems that top management personnel remain somewhere in Sydney; official headquarters, the main switchboard and middle management relocated to Gosford. Some lone individuals remain in the old Sydney H/Q. Metropolitan team leaders and their minions are based at satellite centres around the Sydney basin. Since the move, a call to the WorkCover switchboard has resulted in a recorded voice advising the digit to press for available options such as product sales, injury reports and compensation forms – but no digit or time delay to be connected to a live operator to learn new contact numbers for people! Failure to hit a digit meant being disconnected. A redial and pressing any digit on the off-chance, resulted in a digitized voice announcing “all our operators are busy … you are … number … 22 … in the queue”. This caller disconnected. Old campaigner eventually can trace people via established personal telephone or cyberspace networks – but the digital switchboard is unhelpful to “outsiders”, and possibly even for dislocated “insiders”, whether professionals or members of the general public.

Are numbers the key to the universe? Have we decided that science depends on quantitative data and we should suppress the qualitative aspects of our intuition and experience? Some thoughts on this topic are used to open a discussion in this edition’s Forum ... hopefully someone out there is alive, reading and reacting ... the discussion about a possible name change for ESA died without further fleeting breath! Does anyone care about human complexity as a key aspect of human factors in the ergonomics equation?

At the start of the new millennium is there a ground swell of change for change sake? Does somebody hope to write a research paper that quantifies binary outcomes in statistical terms ... without addressing the flow-on complexity of outcomes for individuals, families and organizations? Are the boffins finally seeking palace isolation like the last of the Chinese emperors? In today’s brave new world isolation will not provide protection from terrorists but it may alienate friends. Perhaps the message is slowly beginning to penetrate that safety can never be 100% guaranteed in any setting. Risk is a part of life.

Geographical isolation is gradually being overcome by the Internet which is rapidly changing the possibilities for networking with global colleagues. The recent month long CybEng Conference gave value in providing opportunities for sharing knowledge, understanding and new collegiate friendships. It will enhance future flesh meetings for those who participated as well as extending the available information network. Check a brief overview of this event in Reports. Australians are well represented on the international scene when one considers
how few actually get involved in organizational participation – but that is probably true even in the larger ergonomics societies around the world. Margaret Bullock is one such Australian who has recently been honoured in USA for her years of dedicated work on behalf of ergonomics, as reported in this edition.

Season’s Greetings to everyone and all best wishes for 2003.
Shann Gibbs PhD
Editor

COMPUTER GENDER

An English teacher was explaining to his students the concept of gender association in the English language. He noted how hurricanes at one time were given only female names, and how ships and planes were usually referred to as “she.” One of the students raised her hand and asked, “What gender is a computer?”

The teacher wasn’t certain. So he divided the class into two groups: males in one, females in the other, and asked them to decide if a computer should be masculine or feminine. Both groups were asked to give four reasons for their recommendations.

The group of women concluded that computers should be referred to as masculine because:

1. In order to get their attention, you have to turn them on.
2. They have a lot of data but are still clueless.
3. They are supposed to help you solve your problems, but half the time, they ARE the problem.
4. As soon as you commit to one, you realize that, if you had waited a little longer, you could have had a better model.

The men, on the other hand, decided that computers should definitely be referred to as feminine because:

1. No one but their creator understands their internal logic.
2. The native language they use to communicate with other computers is incomprehensible to everyone else.
3. Even your smallest mistakes are stored in long-term memory for later retrieval.
4. As soon as you make a commitment to one, you find yourself spending half your pay cheque on accessories for it.

[Ed:] Just try to quantify the above qualitative data!

Letters

On behalf of Ergonomics Society of Korea, I cordially invite all the ESA members to participate in the XVth International Ergonomics Association Triennial Congress (IEA 2003 Seoul Congress) to be held in Seoul, Korea from the 24th to 29th of August, 2003, which is hosted by Ergonomics Society of Korea in cooperation with International Ergonomics Association.

The theme of the IEA 2003 Seoul Congress is “Ergonomics in the Digital Age”, and proposals for paper presentations, panel sessions, international symposia sessions, demonstrations, and poster sessions are welcomed.

We expect about 1500 participants thanks to close cooperation and great support from the neighboring IEA affiliated societies such as China, Japan, and Taiwan as well as from those in the western part of the world, which will make this occasion by far the biggest ergonomics conference ever held.

I believe, therefore, that this will be an excellent opportunity for your organization with leaders of both the East and the West in the field of ergonomics. For further information, please don’t hesitate to contact us.

We look forward to your active support and participation.

Best Regards,

Jenny Kim
Convention Manager
IEA 2003 Seoul Congress Secretariat
IEA 2003 Secretariat
Address: Hallym Bldg, 3rd Fl. (ICEM) #907-13 Daechi-dong,
Gangnam-gu, Seoul, 135-841, Korea
Tel: +822-552-8350
Fax: +822-552-8325
E-mail: info@iea2003.org
Website: http://www.iea2003.org
President’s Column

We are fortunate in the ESA to have so many members who have volunteered their time and effort to fulfil a wide range of responsibilities both within the Society, and also represent the ESA on a range of international, government, research and standards development and promotional initiatives. Without these dedicated volunteers the Society is a name only without any substance. The on-going challenge is for these volunteers to balance their efforts with the other demands of their life and to spark interest and energy in others, so that they can eventually share the load for the progress of a dynamic and professional Society.

I have just compiled my report for the AGM and the 2002 Annual Report. This has given me the opportunity to step through some of the activities and milestones of 2002 for the Society. When put together there is rich, dynamic activity occurring. It is not always the sort of activity that all are aware of, but it is always done to enhance the Society and its aims. I do not wish here to repeat what I have written in my President’s report as you will be able to read it in the annual report or at the AGM. But when you do, please reflect on the fact that it has taken the time and effort of other Members behind each and every activity that occurs in the name of the ESA.

By the time you peruse this, the 2002 ESA conference will be over. The 2002 ESA national conference in Melbourne is a milestone. HF 2002 is the culmination of many years of encouragement to develop a closer professional relationship between the ESA and CHISIG. The ESA Board considers the contribution of computer-human interaction (and “useability” more generally), essential to the ergonomics/human factors profession. Furthermore, the contribution of professionals from CHI backgrounds to the Society, through direct participation, through its interest group CHISIG, or through influencing positions on Branch committees or the Board, can only enrich the fabric of the overall Society.

Over the current ESA executive’s term, CHISIG has enjoyed closer administrative links to the Society along with the obvious administrative conveniences and financial advantages to CHISIG that this entails.

Stephen Hehir, Greg Ralph and their team have been working hard for more than a year to bring together the ESA annual conference and OZCHI and to ensure that this conference is a success and provides a true meeting place of ideas and people. It hasn’t been an easy road for this group of people. They have a lot of responsibility and are always juggling the opinions of others when coming up with a “product” that attempts to satisfy the majority. In doing so, they make decisions that not all members agree with and therefore encounter criticism. Despite this, at the end of the day, I believe all their tremendous efforts will pull together a terrific event. I am sure that there will be a report in the next edition of EA about the conference.

This brings me to 2003. The Board has decided to conduct a smaller scale conference in 2003 in an effort to avoid unintended competition with the triennial IEA Congress hosted by Seoul in August. I would encourage all members to consider attending Seoul. The 2003 ESA conference will be run back to back with the annual OZCHI conference in Brisbane. Robin Burgess-Limerick is co-ordinating this event which is likely to emphasise a workshop approach and will be held at the University of Queensland.

This is the end of the 2 year term of the current Queensland based executive. I would like to thank once again my other team members. Roxanne Egeskov and Margaret Cook have spent innumerable hours devoted to the ESA over the last two years. I couldn’t have pulled together a better team. We welcome the new in-coming ACT-based national executive team of Margaret Head, Jenny Kerr and Les Hogg and wish them all the best for the next two years. Please support them in their efforts.

Jim Carmichael
President
Ergonomics Society of Australia Inc.
November 2002
AWARD TO MARGARET BULLOCK: ‘DISTINGUISHED INTERNATIONAL COLLEAGUE’

By the USA’s Human Factors and Ergonomics Society at their 2002 Conference.

Margaret Bullock recently received an award from the HFES which honoured her as their Distinguished International Colleague for 2002.

This award recognises the major contributions made by Margaret to ergonomics over many years, and in particular, her international achievements in various activities in the area of quality assurance, on behalf of the IEA.

Margaret’s international contributions include activities such as the following:

- Chairing IEA Committee and working parties to outline a series of Guidelines for IEA dissemination to and application by Ergonomics Societies throughout the world.
  These have covered such topics as:
  - Minimum criteria for certification of the ergonomist
  - Criteria for endorsing certification bodies
  - Competency standards for the practising ergonomist
  - Code of professional behaviour
  - Accreditation guidelines for educational programs at tertiary level
- Being keynote or invited speaker at national and international ergonomics congresses in many countries throughout the world.
- Organising international symposia in Palermo Sicily, Tampere Finland, Rio Brazil, and Toronto Canada for discussion of issues relating to mechanisms of quality assurance.
- Organising ergonomics educational symposia to support and assist persons interested in ergonomics in industrially developing countries.
- Organising the review of the Directory of Educational Programs offered throughout the world.

During her career, Margaret has received many awards, in recognition of her contributions to either or both physiotherapy and ergonomics. In addition to the Order of Australia (AM), and in specific relation to ergonomics, she has received a number of Excellence awards and medals, and has been honoured by being awarded the status of Fellow of the ESA, Fellow of the IEA and Fellow of the Australian Academy of Technological Sciences and Engineering. Additional recognition is shown by the following:

<table>
<thead>
<tr>
<th>Year</th>
<th>Award Description</th>
<th>Honoree</th>
</tr>
</thead>
<tbody>
<tr>
<td>1993</td>
<td>Sodalem honoris causa</td>
<td>Czech Medical Association</td>
</tr>
<tr>
<td>1993</td>
<td>Excellence Award</td>
<td>Ergonomics Society of Australia (Q’d).</td>
</tr>
<tr>
<td>1995</td>
<td>Honoured Member Award</td>
<td>Australian Physiotherapy Association</td>
</tr>
<tr>
<td>1995</td>
<td>President’s Medal</td>
<td>Ergonomics Society of Australia.</td>
</tr>
</tbody>
</table>

FUTURE IEA AWARDS

The IEA is inviting ESA nominations for the IEA Triennial Awards to be presented at the Seoul Congress to be held 24–29 August 2003. In addition the IEA is inviting nominations for the 2003 Fellow Awards that will also be presented at the Congress along with the 2001 and 2002 Fellows.

There are four Triennial Awards to be selected from nominations submitted by IEA affiliated societies:

1. IEA Distinguished Service Award
2. IEA Outstanding Educators Award
3. IEA Award for Promotion of Ergonomics in Industrially Developing Countries
4. IEA Ergonomics Development Award

Whereas the Triennial Awards are presented to the most deserving individual in the category, the IEA Fellowship is presented to all candidates that merit recognition of their extraordinary or sustained, superior accomplishments.

All nominations must be submitted electronically to Ian Noy (noyi@tc.gc.ca) before 31 March 2003 using the form sent to the Secretariat ESA. Other documents such as supporting letters and CV should be attached as separate documents. All nominations received by 15 March 2003 will be reviewed by the Awards Committee.

For further information, please consult the IEA Rules and the IEA website (www.iea.cc). If you require additional information please do not hesitate to contact Ian Noy directly as the email address above.

Y Ian Noy PhD, P Eng, CPE
Past President IEA
IEA K.U. SMITH STUDENT AWARD

Unfortunately the deadline for submission (4 November) will have passed by the time this journal is distributed but lecturers may like to take note for action in future years.

The IEA K.U. Smith Student Award was launched in 1997 through an agreement with the St. Paul Foundation, which provides overall management of the Fund. The award provides a tangible means by which the IEA can encourage the development of the discipline, foster scholarship and recognize worthy achievements. The purpose of the award is to honour a deserving student responsible for an application of or contribution to ergonomics.

The award consists of a cash amount of US $ 3,000. Any student enrolled in an accredited post-secondary institution (college, university, technical or vocational school) is eligible to apply for the award. All areas of ergonomics are eligible for consideration. Examples of applicable projects include an applied ergonomics project, a human performance study or analysis, a design project or product, a research project undertaken in the laboratory or field, or a theoretical/conceptual contribution to ergonomics. This study endeavour should be documented in a paper submitted to the IEA Congress.

The next award will be presented during the IEA 2003 XVth Triennial Congress, scheduled to convene August 24, 2003, in Seoul, Korea.

1. CYBERG 2002 CONFERENCE

There were 113 registered participants from 23 countries including Chile, Iran, South Africa, Latvia, Sweden, US, UK, NZ, Japan, Malaysia and of course Australia. There were 11 participants from Australia, many of whom were fairly active at the conference (Shann Gibbs, Leon Straker and Darren Joubert jump to mind as the active participants). This constitutes approximately 10% of the participants. This figure is down from the 17% of participants in 1999 and the 25% of participants in 1996 who were from Australia, both times when Leon Straker was Chair of the conference.

This should not necessarily be seen as a decrease in participation from Australia, but rather an increase in interest and participation from other parts of the world, especially Africa and South East Asia in 2002. Also, approximately 18% of the papers presented at CybErg’2002 were from Australia. This implies that the Australian contingent tended to have more than one paper at the conference (Leon Straker had 5 papers!).

It is also worthwhile mentioning that the Best Paper Award went to Leon Straker and Andrea Roelofs for their paper entitled “The experience of musculoskeletal discomfort amongst bank tellers who just sit, just stand, or sit and stand at work”. This paper will appear in a special edition of the IDC journal ‘Ergonomics SA’. And of course, let’s not forget that Shann Gibbs was awarded the Silver Medal in the Best Contributor category. Please could you mention that a selection of the best papers will be appearing in the IDC journal, ‘Ergonomics SA’, as well as the International Journal of Industrial Ergonomics? Also, that all papers and symposia sessions went through a thorough review process. The full CD-Rom proceedings are still for sale and if anyone would like a copy they should contact me at this email address:

thatchera@umthombo.wits.ac.za.

After a short break we will get stuck into planning CybErg’2005. I have personally learnt a great deal from the experience and wish to put that experience to the test.

Andrew Thatcher
General Chair CybErg ’2002
Editor’s additional comments:

1. It should be noted that “Ergonomics SA” means “Ergonomics South Africa”. Three geographical locations across the southern hemisphere refer to themselves as SA ... South Africa, South America and South Australia ... never use the abbreviation as a postal address as recent delays in correspondence can attest!

2. IDC refers to Industrially Developing Countries in this context NOT Industrially Developed Countries ... this caused a little confusion for some CybErg participants where the terms IDC and IAC were acronyms with IAC referring to Industrially Advanced Countries.

3. It was interesting to realise during CybErg that South Africa regards itself as an IDC although many would have considered South Africa as being a wealthy industrialised nation. CybErg South African participants seemed largely concerned with problems relating to the new political reality that was concerned with the vast problems associated with “black” African development.

4. Two key areas of concern emerged in relation to philosophical issues as distinct from the standard musculo-skeletal concerns of physical ergonomists:

a) the need to determine a new paradigm for understanding individual capacity that was not restrictively aged-based — highlighted by several American participants; and

b) the need to recognise the complexity of differing problems facing ergonomists in the industrially developing countries in ways that challenge thinking about places such as Japan, South America, Asia and South Africa. Does Australia really rate as a developed or developing country? Just try thinking about the quantitative measuring rods and it will make for some disturbing insights.

Use of colour descriptions can be politically sensitive ... on North American flights one does not ask for black or while coffee as in Australia, but coffee with or without cream. A extract of a letter from an aborigine was sent to a friend saying “— when I was born I was black ... when I grow up I black ... when I go in the sun I black ... when I get sick I black ... when I get scared I black ... when I get cold I black ... when I die I black ... but you white fellas when you born you pink ... when you grow up you white ... when you go in the sun you red ... when you get sick you green ...when you get scared you yellow... when you get cold you blue ... when you die you purple, and you call me coloured!”

The present age can seem obsessed with avoiding various ‘discriminatory’ terms but what makes ordinary words so emotive that we seek euphemisms that fail to alter the meaning? Old person or senior refers to the same 60+ cohort in western societies. Neither word conveys the considerable complexity of individual performance detail! Interesting that normal life expectancy was 45 years in a Derbyshire village, Eyam UK in 1665 where the Great Plague decimated children and young adults (276 adults and children from 76 families died— more than 3/4 of population) ... theory being that people who survived childhood infections, lead mining and childbirth, had developed strong immune systems ... a nice example of qualitative insight from quantitative data available in the records viewed by the editor during a visit in 1998!

CybErg offered a great opportunity to be open to new ideas and have time to think about responses to the discussion. It also helped explore networks of interest in theory and application of ergonomics in a more leisurely fashion than is possible at land-based conferences. Not everyone has access to this technology as yet but neither is everyone able to afford to travel to meetings-in-the-flesh. It is an exciting option that will become easier to attend and to negotiate as we all gain experience with this technology.

2. ACCS FORUM ON RE-USE OF INVASIVE MEDICAL DEVICES

BACKGROUND

In November 1995 the Australian Contamination Control Society (ACCS) held a one-day Symposium on current attitudes and future directions in relation to the reuse of invasive medical devices labelled as single use. At the time, there was a general policy of no reuse although the Australian Therapeutic Goods Administration (TGA) noted in its Draft Policy in May 1994 that while it did not support reuse of single use devices it recognised that this was happening in many hospitals across Australia. The topic had long been complex and controversial as it involved medical technology, health system funding priorities, patient safety and informed consent, regulatory and auditing mechanisms and political ethics at many levels of federal, state and local involvement. At that time it was evident that hospital authorities were becoming increasingly aware of the need to establish formal protocols for any activity in this area of health provision — not least because of implications for staff/hospital indemnity in the event of litigation in an increasingly litigious society that no longer entertained a benefit of Crown Immunity.

On 25 October 2002 the ACCS held a one-day Forum at the AstraZeneca Conference Centre in Sydney to update awareness of developments for the re-use of single use...
medical devices. Of particular concern was the reuse of electro-physiology catheters. As President of ACCS and convenor of the 2002 Forum the writer soon appreciated that the matter was far from resolved. She had visited Bob Tribe of the GMP Audit & Licensing Section at the TGA headquarters while in Canberra in September 2001, to canvas the possibility of conducting an update on developments since the original symposium. While this was considered appropriate, the matter was said to be the subject of current industry dialogue and it would be preferable to conduct any update in early 2002. In spite of numerous phone calls in subsequent months the matter was continually stalled for a later time. When the committee agreed to proceed regardless of further delay it was learned that the Health Ministers’ Meeting in November 2001 had approved legislation on this topic. The legislation had been processed in February 2002 and given Royal Assent in March 2002 with Regulations to be prepared as soon as possible. The writer later located the Draft Regulations issued on 27 July 2002 via the TGA website — they came into force on 4 October 2002 with comment invited before 31 October 2002. The biggest problem seems to be that so few health personnel check the TGA website. Reuse has not been banned, but the conditions under which it will be permitted are extremely onerous and expensive. At first glance this does not appear to be unreasonable from a safety perspective since the FDA (USA) has chosen this route. The issue is still open in Canada & Europe.

FORUM

The following people presented at the ACCS Forum “Difficulties associated with the re-use of single use invasive medical devices” at the AstraZeneca Conference Centre on Friday 25 October 2002:

<table>
<thead>
<tr>
<th>Speaker</th>
<th>Topic</th>
</tr>
</thead>
<tbody>
<tr>
<td>A/P Joe Smolich, Monash Uni / Medical Centre</td>
<td>Potential infectious disease issues related to reuse of electrophysiology catheters.</td>
</tr>
<tr>
<td>Centre for Heart &amp; Chest Research</td>
<td>A cardiologist’s view of the issues.</td>
</tr>
<tr>
<td>Prof David Ross, Sydney Uni / Westmead Hospital, Director Cardiology Unit</td>
<td>Theory of microbial / viral infection control.</td>
</tr>
<tr>
<td>Dr Paul Priscott, Microbiologist AMS Laboratories, Sydney</td>
<td>TGA’s proposed position on reuse of medical devices.</td>
</tr>
<tr>
<td>Andrew Lattimore, GMP Auditor, TGA, ACT</td>
<td>Aspects of cleaning medical devices.</td>
</tr>
<tr>
<td>Jeremy Pigott, Regulatory Affairs Manager</td>
<td>Update on hospital practice since 1995</td>
</tr>
<tr>
<td>Steritech Limited, Sydney</td>
<td>The Australian Medical Industry position on the re-use of single-use devices.</td>
</tr>
<tr>
<td>Sandy Berenger, Infection Prevention &amp; Control Consultant, Hunter Health, NSW</td>
<td>Crystal Ball: Nanotechnology for future testing?</td>
</tr>
<tr>
<td>Penny Adams, Manager Scientific &amp; Regulatory Affairs, MIAA, Sydney</td>
<td></td>
</tr>
<tr>
<td>Dr Bruce Cornell, Director of Research</td>
<td></td>
</tr>
<tr>
<td>Ambri Limited, Sydney</td>
<td></td>
</tr>
</tbody>
</table>
From that position it would be a simple step to fall in behind the latest advice from USA without objective analysis of the options.

Overall it raised significant concerns about the scope and direction of ethical and practical considerations in future management of a viable paradigm for auditing the use of medical devices. It is evident that a generic umbrella covering all medical devices is unrealistic, unmanageable and counter-productive to good health industry systems management.

**MEDICAL DEVICES**

Dr Shirley Bolis who was coordinating the TGA community consultation process indicated that a representative of TGA would be unable to address the Forum on the subject of Definition of Medical Devices and Implications of the Legislation and Regulations as requested; her alternative topic was accepted. While disappointing, this attitude was not surprising given that the department was still deciding how it would cope and the draft did not provide a definition per se, even in the Dictionary provided from page 106–113 ... although many words were used to detail what, in general, will be covered by the regulations.

Schedule 1 set out Essential principles. The document proceeds in a prose style that will restrict the time available for health personnel to perform their duties if they ever attempt to read and interpret it. From the writer’s long practical experience in the health industry – as well as extensive doctoral research field visits across seven countries – the majority of people in any discipline refer to Standards, Guidelines Regulations and Legislation on the basis of what someone tells them rather than what they have actually read. It is reasonably predictable that the present Regulations may be studied by administrative staff that will in turn provide a plain English version of future activity for specific items used in the facilities under their control. It is equally predictable that various groups will attempt to influence the commercial opportunities arising from these issues by canvassing their preferred interpretation of patient and organizational safety. The outcome may well be unexpected in terms of public dissatisfaction and political fall-out – quite apart from the hospital debates when the information is finally disseminated.

The term medical device covers a wide range of materials and products and there is considerable variation in hazard potential and efficacy of sterilization and cleaning procedures. Each one requires a properly conducted risk assessment and management plan for contamination control. The ACCS forum focussed on invasive medical devices that are labelled single use but have long been subject to re-use – admittedly on the basis of manageable costs within known cleanliness methodology.

**ELECTROPHYSIOLOGY CARDIAC CATHETERS**

The focus of concern in 1995 and again in 2002 related to implications of any arbitrary decision about reuse of electrophysiology cardiac catheters. These devices are widely used in Australian hospitals that incorporate a Cardiology Department and consume a large part of a hospital budget. Heart Disease is a major cause of hospitalization in this country and testing, diagnosis and treatment already consume a large part of the available health budget that is already being squeezed to accommodate the demands made upon it. No-one would suggest that safety of patients should be compromised by inadequate procedures for ensuring the safety of all concerned.

After a wealth of information had been provided by the various speakers the Forum recognised a number of crucial factors:

**Manufacture**

1. The catheters are not manufactured in Australia.
2. The imported items do not provide explicit detail about the materials used or substituted.
3. Information about the precise material components has seldom been advised when questioned by users — on the grounds of necessary commercial competitive product security.
4. The above reasons alone make it difficult to determine the exact original condition of the item.
5. The limitations of primary data make it difficult to specify conditions for re-manufacturing / re-processing to original state – irrespective of who does it.
6. There does not seem to be any requirement to return these items to the original manufacturer (off-shore) as this would be impractical and unduly expensive.
7. A local facility for re-processing would require clearly defined standards for the activity – and this is yet to be formally determined for either hospitals or commercial entities.

6. Research data are available in relation to potential infectious disease issues.

7. Available research does not indicate a high incidence of failure in infection control when these devices have been re-processed for re-use in any country.
Re-use parameters

1. Clear parameters must be established for the re-processing of items originally designated single-use.
2. Standards of workroom environmental conditions must be established to meet existing known classes of clean space standards for various levels of contamination control in any facility that undertakes to re-process these devices.
3. Cleaning and re-processing protocols must be established to give a clear indication of acceptable and unacceptable standards for re-use of such items.

Implications for re-processing

Given a set of established workplace requirements and protocols it becomes immaterial whether the work is conducted in a suitable hospital facility or by an external commercial re-processor. Decisions should be made on the basis of advantages/disadvantages of time delay from theatre to workshop and overall cost given that the actual facility must conform to prescribed criteria.

IMPLICATIONS FOR COMPLIANCE AUDITS

1. Auditors must have practical as well as theoretical knowledge of the products and the means of testing for compliance and prescription for any corrective action necessary.
2. A large number of auditors will be required to provide more than token inspectorate capability.
3. A new federal / state budget allocation will be necessary to:
   a) fund salaries for auditors;
   b) fund the nominated fee scale for audit purposes that will be built into the cost regardless of whether the work is carried out by hospital staff or an external commercial enterprise.

IMPLICATIONS FOR HEALTH SYSTEMS

1. Re-processing

For most of their history, health systems have enjoyed Crown Immunity, a situation that was fiercely protected until the late twentieth century when industrial reality overcame professional pride. In those earlier times a fierce territorial independence existed between federal and state health authorities. While federal agencies held sway over commercial enterprises and federal health providers (such as Veterans’ Affairs hospitals, they could only enter state hospital facilities by invitation.) That began to change in the mid-nineties with the general shift from a plethora of workplace acts and regulations to an overriding concern for Occupational Health and Safety legislation. While agencies such as the TGA could now offer Good Manufacturing Practice (GMP) inspections to state hospitals as well as commercial operations (for example oncology pharmacy units), this was seldom adopted for the simple reason that the user-pays system placed the service beyond the existing scope of hospital budgets.

There is every indication that current health funding would be insufficient to meet the proposed scale of fees for TGA licensing and auditing of re-processing facilities (details available on web site).

2. Dismissal of re-processing

The introduction of compulsory single use for these devices would have a significant impact on the provision of cardiac services:
1. The cost could not be accommodated within existing health funding parameters.
2. A discriminatory policy would eventuate to limit those patients having access to these forms of testing, diagnosis and treatment via the public hospital system.
3. The cost to private hospitals would soon exceed the private health funds capacity to cover the procedures.
4. The ethical considerations implicit in withholding established medical technology would soon create a community outcry and severely embarrass whatever government happened to be in power at the time.

A WAY FORWARD

The first step is to recognise that this is not a simple bivalent problem to be solved by an either-or solution. It cannot be a case of no re-use of medical catheters or indiscriminate re-use of medical catheters. It is a classic example of complexity and chaos theory in which any move will have a ripple of implications that need to be evaluated in the existing transitional state to determine the best options for nudging developments to a satisfactory outcome for all participants. This amounts to a proper “what if” analysis of any action.

This does not mean a vast expenditure on consultants’ fees to determine the necessary parameters of the future health landscape in relation to medical devices. It is worth noting in passing that apparently after the FDA in USA had imposed a ban on re-use of dialysis catheters, reality soon set in and evidence was gathered to show that re-use was not an unacceptable risk in controlled circumstances. The matter was quickly resolved by the FDA insisting on the removal of the single use label on new product.
It must be acknowledged that both Monash Medical
Centre in Victoria and John Hunter Health in NSW have
been researching this problem for more than seven years.
Monash has accumulated research data about major
infection concerns and the absence of evidence to link
these concerns with re-use of cardiac catheters. John
Hunter Health has well documented procedures and
computerized programs to ensure the tracking, monitoring
and performance outcomes of carefully controlled re-use
of these medical devices. The necessary protocols are
already in place for replication in other settings.

CONCLUSION

It seems that the wrong questions may have dominated
recent debates about the re-use of some nominated single
use medical devices.

There is a need to establish informed protocols to ensure
the safety of an economically sustainable system for the
provision of this medical technology.

There is a need to determine the extent of clerical demand
for maintaining adequate records of use and outcomes
across a specified life cycle for electro-physiology cardiac
catheters.

There is a need to implement a national computerized
database to record and monitor individual facility
performance in this area.

There needs to be a consultative negotiation between
health industry users of these products, health
administrations, suppliers and the appropriate regulatory
authority to determine the criteria for in-house or external
re-processing of suitable medical devices.

There is a need to avoid an either/or situation and
implement a pragmatic resolution of a national concern
that will respect individual solutions based on a host of
discrete geographical, volume of usage and financial
factors. It is a concern in all industrially developed
countries and has considerable ethical implications
for the transfer of protocols to developing communities.

While multi-national companies may have traditionally
complained about TGA cost imposts they are generally
better placed to either accept the cost and build it into
their pricing schedules ... or take their product elsewhere.
The health system is in a somewhat different position as
it is funded by the taxpayer through government health
budgets. The general public clearly has a limit on its
capacity to pay for further cost imposts. A vast new audit
empire may seem attractive at first sight but the long term
prospect is neither practical nor cost-efficient. The TGA
could develop a highly competent audit unit to administer

[The above report is based on papers prepared by the
writer for “H&h” Hospital & Healthcare Magazine
November 2002, and her response to the TGA call
for comment, following the ACCS Forum.]

Shirleyann M Gibbs PhD
Safety Scientist and Ergonomist
President, ACCS
EXERCISE ERGONOMICS … WHEN THINGS ARE GRIM IN THE GYM!

Max Hely

ABSTRACT
Attaining physical fitness through exercise is well understood to provide long term health and performance benefits. However, while considerable attention has been paid to improving the effectiveness of fitness methods and services, the safety of exercise participants while engaged in the pursuit of fitness has been less well accommodated. This article briefly considers the similarities and differences between exercise and work settings, particularly with respect to the safety of the humans involved in either system. Deficiencies evident in the provision of fitness services which resulted in injury and litigation are examined and related to the more conventional perspectives taken in the field of occupational health and safety with which ergonomists are generally more familiar. Consideration is then given to the implications of these analyses for development of a safe practice model directed to ensuring improved safety standards for the delivery of fitness services.

OVERVIEW OF THE FITNESS INDUSTRY
Throughout the latter part of the 20th century, the sport, fitness, recreation and leisure industries in Australia were among the fastest growing industry sectors in terms of employment. Indications of increased community demand for these services and facilities are consistent with trends in Australia and overseas toward greater promotion of, and participation in, active lifestyles and fitness pursuits. Public health promotions and programs (e.g., Life Be In It; Active Australia) have long been directed toward influencing community members to increase their involvement in physical activity and exercise.

As with the rapid expansion of any potentially profitable industry, the early phases were characterised by rapid attempts to encompass the full scope of market potential, with emphasis placed on expanding the range of services offered. In particular, there was early recognition of the potential to reach the community in its workplaces through corporate fitness facilities and programs. By the mid-1990’s, even the National Occupational Health & Safety Commission was providing advice on the establishment of corporate health promotion programs which included, among many other initiatives, fitness programs. With the accumulated wealth of decades of scientific research in exercise science, better standards of care than ever were (or should have been) available to the users of fitness-related products and services.

Historically, however, the foundations of the fitness industry (as it came to be known) were laid in what was, by today’s standards, a relatively “dark” past wherein its activities were largely informed by the principle of “no pain, no gain” – loosely translated as “you’re not making progress unless it hurts!” Recognition of the adverse effects of that mentality on exercise adherence – to say nothing of injury risk - among a largely sedentary and unfit community, together with a number of crises of public confidence (primarily related to consumer financial protection), eventually led the fitness industry to embrace professionalism in all its aspects. This saw, among other things, the advent of professional accreditation and training courses for fitness instructors. These continue to develop in sophistication and scope through the auspices of representative and advisory bodies like the Australian Fitness Advisory Council and various state bodies (e.g., Fitness NSW). Unfortunately, however, careless, outdated and potentially injurious practices are still quite evident in many quarters.

In light of the above, an important distinction should be clarified. Whilst health and well-being are important and widely recognised objectives of fitness activities, they are rather general and diffuse outcomes and are usually understood to be gained simply by participation in exercise and other fitness-related activity.

The term safety, however, is recognisably different in its implications, relating to immediate conditions as well as long-term outcomes. Indeed, the pursuit of health and well-being through fitness activities may well place an exercise participant at risk of acute physical injury as a result of unsafe practices. Unless the fitness service provider also has, as an explicit objective, the immediate safety of the participants while they are engaged in pursuing longer term health, fitness and well-being, the former can be (and often has been) neglected in pursuit of the latter.

THE (INEVITABLE) LEGAL CONTEXT
All physical activity, whether occupational or recreational, entails risk. While one of the most common justifications for engaging in fitness-related physical activity is to improve musculoskeletal health, there would seem to be no a priori reason to assume that more involvement – whether in terms of the amount of such activity undertaken by individuals or the overall number of people involved – will not, as for increased exposure to physically demanding occupational activities, lead to an increasing rate of injury. Although the ultimate purpose
of fitness equipment and activities may differ from industrial equipment and tasks, the types and extent of risk inherent in each are similar, if not identical.

The obligations imposed upon employers and persons in control of workplaces by OHS legislation in Australia are well known among ergonomists. While the specific requirements may vary from State to State, they generally include, in brief, the provision of:

- safe and appropriate equipment and environmental conditions;
- safe, appropriate and well-conducted activities;
- effective supervision; and
- the provision of information (including instructions, training, and warnings) necessary to ensure safety.

Despite these obligations, many do not view the fitness venue in the same light as they would a more conventional workplace. That the fitness industry has not suffered greater involvement in personal injury litigation to date may well be more a reflection of the community’s lack of expectations than of the industry’s universally high professional standards. Anecdotally, there seems still to be relatively little appreciation that providers of fitness services owe the same duty of care with respect to consumers’ physical safety as they do with respect to their financial dealings and, indeed, as do employers or providers of any other products and services. There are, however, many recent (some quite public) signs that expectations may be changing, at least in relation to outdoor recreation and leisure pursuits.

In fact, the apparently low injury rate in the fitness industry may well reflect a low reporting rate rather than a low incidence of injury. Not only may individuals have little understanding of the level of care they should expect, but they may also be averse to taking legal action against providers in an industry where participation is widely (if somewhat inaccurately) seen to be entirely at one’s own risk, and where pain and injury are thought to be either natural concomitants of the process (harking back to those “dark ages”) or reflections of one’s own errors or limitations rather than resulting from inadequate or inappropriate service delivery. Moreover, as for many musculoskeletal injuries in industry, exercise injuries only rarely result in emergency department attendance or hospital admission and therefore largely escape the attention of injury surveillance systems.

However, recent high profile public liability cases have led to a realisation that fitness centres and providers of exercise and related services are, like others in sport and recreation, not insulated from the legal processes to which any member of our community has recourse should he or she be injured allegedly as a result of the actions or inactions of others.

A survey of over 400 sport-, recreation- and fitness-related lawsuits in the United States found that:

- 24% related to faulty or inadequate supervision;
- 40% related to inappropriate selection or conduct of activities; and
- 36% related to unsafe environmental conditions (including equipment).

In other words, approximately two-thirds of cases were related to deficient management of programs, while only approximately one-third related to unsafe physical equipment and conditions. To my knowledge, similar data have not been published for Australia. However, it is this writer’s personal experience that there have also been a number of similar personal injury cases in Australia involving both commercial and corporate fitness facilities in which issues such as instructions, exercise prescription and supervision have been material considerations in determining negligence.

In the field of OHS, provision of sound management and supervisory practices are widely accepted as essential where physically demanding, potentially injurious work is performed. Given the physical demand inherent in most fitness activities, sound administrative practices might also be expected to be of the highest priority in any exercise facility. Yet, again from overseas experience, the absence of adequate program management and supervision in fitness settings has resulted in a variety of negligence claims which include but are not limited to:

- failure to evaluate participants’ capabilities and identify limitations which may contraindicate certain exercises or activities;
- failure to properly monitor exercise tests;
- failure to instruct on the appropriate use of exercise equipment or on the correct performance of exercises;
- failure to appropriately prescribe exercise intensity in accordance with metabolic, muscular, or cardiovascular demand; and
- failure to provide advice on appropriate modifications or restrictions on an individual basis

The following are briefly summarised Australian cases which occurred in both corporate and commercial fitness facilities and led to costly personal injury litigation. They are relatively recent examples drawn from a large number of sport, recreation and fitness related personal injury
occurrences investigated by the writer and are presented here simply as exemplars of the issues under consideration:

- lower back injury sustained during the use of exercise equipment to perform an unsafe version of an exercise; contributory factors included excessive rate of attempted progression in exercise intensity over a short period of time, absence of adequate evaluation, instructions, advice and supervision, and inadequate evaluation of equipment and exercise suitability;

- shoulder injury sustained during the incorrect use of a pulley-based exercise apparatus while unsupervised, consequent upon being provided by supervisor with an excessive number of exercises, inadequate attention by supervisor to individual limitations, and inadequate prior supervision;

- foot injury sustained while using equipment without properly affixing restraints, absence of instructions, warnings or supervision, poor information and warning design;

- neck injury sustained while performing an exercise with incorrect posture, inattention by supervisor to individual’s limits and to adverse feedback from participant, failure of supervisor to prescribe modifications of technique and intensity to suit individual’s capacity, inadequate instruction in exercise performance and inadequate supervision; and

- neck and shoulder injury sustained while performing exercise with excessive load and incorrect method, no evaluation, advice, instructions, warnings or supervision provided.

Notably, and consistent with the findings in the US studies referred to above, few cases in my experience (and none in the above list) arose from unsafe equipment per se. The majority arose from deficient management of the process of providing the exercise services. Moreover, each of the exercise venues was under the control of accredited fitness professionals – a disturbing fact that underscores the issue of supervision briefly dealt with in a subsequent section.

How might an ergonomics/human factors perspective contribute to both the evaluation of the conditions which lead to such injuries and the development of effective preventative measures? To address this, it is instructive to first consider both the similarities and distinctions between the occupational setting (with which many ergonomists are more familiar) and the fitness setting.

THE EXERCISE-ERGONOMICS DICHOTOMY

The conventional objective of ergonomics with respect to physical activity is to reduce the demands imposed by the task to a level which does not induce excessive physical stress. The closer the task’s physical demands approach what are understood to be the upper threshold of some human capacity, the higher the risk of injury. The logical and familiar outcome of this perspective is to aim for the design of tasks and environments which reduce physical demands to a level that leaves a significant margin of safety.

In ergonomics terms, participants in exercise activities are analogous to workers in industrial settings – i.e., there is a system of work (or activity) with attendant mental and physical demands; there are individual limits beyond which safe performance is compromised; and the design of the human-task system should ensure that demands don’t exceed human limits, thereby ensuring safe, efficient and effective human performance.

However, in contrast to occupational tasks, the defining characteristic of fitness activities is their emphasis on increasing the physical capacity of the person. This is also in quite marked distinction to other markets where the emphasis is often on increasing the efficiency or reducing the utility demands of the product or service and thereby reducing the demands on the human.

The ergonomist confronting fitness-related phenomena may find that the emphasis on increasing, rather than decreasing, the demands on the human are unusual in several respects. As noted above, our familiar ergonomics criteria are aimed at producing a situation where “normal” human capacities or capabilities are not exceeded. This approach seems, prima facie, oddly inappropriate or even inapplicable in a context where the very aim of most activities is to expose the person to demanding physical stimuli with a view to inducing a level of physical stress that is at, or very near to, the human organism’s tolerance threshold in order to encourage physiological adaptation for the very purpose of being able, in the near future, to further exceed one’s present capacity.

A second unusual (and often ignored) aspect of the fitness setting (compared with the industrial environments ergonomists usually examine) is that, from the clients’ perspective, they are involved in it in addition to their normal occupation, rather than as part of that occupation. There are clear implications here for physical stress, cumulative loading and workload titration that are not usually considered in occupational ergonomics.
EVALUATION OF CASE STUDIES

It is beyond the scope of this article to provide details of, and analyse, each of the above Australian cases. However, consideration of the characteristics of each suffices to identify a number of common themes and thus provide some useful direction in terms of principles and design recommendations which can reduce the risk of these types of injury occurrences.

As already noted, the most salient difference between exercise and occupational settings is that, unlike workers, exercise participants intentionally expose themselves to levels of musculoskeletal stress which they (more-or-less) plan to be sufficiently intensive, when combined with adequate rest and nutrition, to induce an adaptive response. In light of the injury conditions briefly related above, it seems that, from a safety perspective, several essential conditions should attend such exercise performance. These include the following:

- the actions and postures adopted during the exercise performance should facilitate the intended physical stress but not inadvertently result in excessive stress being imposed on some component(s) of the musculoskeletal system less able or unprepared to tolerate that stress;
- the selected intensity of the exposure to physical loading should not be excessive for the current physical condition of the participant; and
- the rate at which a participant increases the exercise intensity over time is sufficiently conservative to accommodate what is potentially (given that many other factors may variously contribute) a non-linear and variable rate of adaptation.

The above conditions necessitate, in turn, some prerequisites, including:

- The exercise participant be provided with sufficient information and instruction to understand both the inherent risks and expected safety behaviour as well as acquire the necessary skill for each exercise.

In relation to safety behaviour and skill, one can very frequently observe an exercise participant – often someone with considerable experience – using equipment or performing ostensibly simple exercises improperly or unsafely to varying degrees. The rate and degree to which one acquires “expertise” in any unfamiliar skill is dependant on, among other things, appropriate early instruction and ongoing monitoring. Moreover, although many exercises and their associated equipment do not appear overly complex or difficult to use, the difficulties faced by novices usually do not pertain to the complexity of the movements or apparatus per se, but rather to the control of their own bodies and limbs when exerting themselves in unaccustomed ways.

- The exercise participant be provided with adequate supervision to detect inadvertent, unsafe lapses or deviations in performance.

Notably, effective supervision requires more than the mere presence of a fitness instructor – a fact which apparently escaped many of those subject to litigation. The quantitative dimension of supervision (i.e. supervisor/participant ratio), whilst a necessary consideration, is not sufficient for participants’ safety if the qualitative dimension is deficient. Quality supervision requires a proactive approach by supervisors to actively attend to all aspects of the setting under supervision. This includes attempting to detect and/or anticipate potential problems, and to take effective preventative action. Supervisory quality can further be seen to include both general supervision (an overview of the whole group and activity environment) and specific supervision (relating to the direct interaction of the supervisor with one or more individual participants).

THE NEED FOR A SAFE PRACTICE MODEL (OR STANDARD) AS WELL AS A CERTIFICATE

Currently, it is widely accepted within the professional realms of the fitness industry that only recognised industry-accredited fitness instructors should provide fitness services and that such a person should be in attendance at a fitness centre at all times. It might be argued that this provision (i.e., having an accredited instructor on the premises) adequately caters for all safety-related concerns by virtue of the instructor’s training.

While it is accepted that competently trained fitness professionals should be capable of providing for the safety of their clients, there is currently no documented client safety “Standard of Practice”, or similar mechanism, by which such provision is ensured. Clearly, an accredited fitness instructor’s presence and qualifications per se do not ensure that appropriate standards of practice in relation to participants’ safety are implemented any more than, for example, the possession of OHS qualifications by a staff member in an industrial setting ensures the provision of a safe work environment, or the presence of a medical doctor ensures that good medical practice is adopted – hence the requirement for industry- and activity-specific Standards and Codes of Practice. It is these that a trained professional must interpret and implement and to which they should refer when ensuring their practices are in compliance with the required safety standards.
A PROPOSED SAFE PRACTICE MODEL FOR THE PROVISION OF FITNESS SERVICES

While general facility-related safety issues, such as those pertaining to plant, equipment, access, surfaces, etc., are already well accommodated under the various occupational safety and building regulations, standards and codes – and apply equally to fitness facilities as to any other place of employment or business – there are no Australian Standards specific to the physical design of exercise equipment or facilities (other than one for stationary exercise cycles) nor any which place primary emphasis on participant safety in the provision of fitness services.

Consideration of the circumstances and characteristics of each of the above cases, together with those recommended conditions in which they appeared to be deficient, has been used here to propose, in qualitative terms, a model for fitness activity service delivery. The model aims to address the identified short-comings in practice, overcome the necessity for a laboriously prescriptive approach to providing exercise safety, and provide a template which is consistent with exercise science best practice.

The following model proposes a number of considerations that should apply to the prescription and administration of exercise to ensure the safety of the participants rather than effectiveness in achieving fitness goals, yet all are entirely consistent with the numerous sources of guidance to the fitness industry regarding program effectiveness.

1. **Determination of the health status of the participant for physical activity in general.**

   This should include both a general medical screening questionnaire to exclude any contraindications to physical activity, and specific reference to any possible contraindications to exercises, activity and equipment immediately available to the individual in that facility.

2. **Determination of the entering status of the participant into the program, i.e., the participant’s current level of specific fitness for the proposed program of exercises.**

   The participant’s current level of “fitness” for each prescribed exercise (i.e., their capacity to perform it) should be assessed under the supervision of the fitness professional. This applies not only initially, but also for major changes or addition of exercises to the participant’s program.

3. **Physiological and biomechanical evaluation of the prescribed exercises and equipment, especially in relation to the participant’s identified capacities and limitations.**

   It is reasonable to expect that an adequate understanding of exercise physiology and biomechanics should inform the process of prescribing exercises which require participants to perform a variety of actions or adopt a variety of postures under load.

4. **Appropriate instructions for both the performance of the prescribed exercises and their integration into the overall exercise program should be given.**

   The initial instructions for any exercise should include demonstrations by the fitness supervisor of correct technique and common technique faults, especially those relating to postural deviations, stability, and uncontrolled ballistic movements of the body. Instructions should include explanation of the inherent dangers of any exercise and the steps which must be taken to minimise such danger.

   Advice should also be given about progression, overload and recovery, and about precautions when exercising in the presence of other people or near other equipment and fixtures. In addition to specific instructions for each exercise and piece of equipment, the participant should be shown how to prepare properly and sufficiently in order to reduce the risk of injury.

5. **Adequate supervision of the exercise program should be provided both initially and at regular intervals to ensure the acquisition and maintenance of safe and correct techniques, postures, and general exercise behaviour.**

   The novice client should be personally supervised. This supervision should continue until he/she can demonstrate acquisition of safe and proper technique for the exercise. Regular routine checks should be made to ensure the novice maintains safe and correct technique and posture.

6. **The exercise area and those performing within it should always be under competent, qualified supervision whilst participants are exercising.**

   The workout area should be supervised by the fitness professional at all times during use in order that poor or unsafe equipment, conditions, behaviour, or techniques can be detected and immediate remedial action taken.
The components of the above model were extracted from activity analyses (including, but not limited to, those cases briefly described above) which identified the demands placed upon relatively novice participants when performing unaccustomed actions in what, for them, were largely unfamiliar environments. The results of these analyses pointed to quite evident mismatches between a novice participant’s capabilities and the perceptual, attentional, cognitive and movement demands of the exercise environment. Elimination or reduction of the extent of mismatch could have been achieved by designing program administration procedures that were sensitive to the potential for these human-system mismatches.

The above model provides, in qualitative terms, guidance for the safe as well as effective delivery and administration of exercise programs. It does not prescribe specific actions necessary to effect each component since these are embodied in the numerous resources and guidelines which have been widely available to fitness professionals since the late 1970’s and early 1980’s and which have long formed the basis of professional fitness instructor training.

It does, however, offer a framework for the translation of that knowledge into a practice regime which aims to ensure exercise participants’ safety. In this respect, it represents a domain-specific application of the more general risk management approach with which OHS/ergonomics professionals are familiar and it could be seen as a major risk control component in the safety management system of fitness service providers. In other words, many of the injury risks which could be identified as arising from deficiencies in the delivery and administration of exercise programs, such as those which emerged from an analysis of the personal injury cases summarised above, could be controlled by adoption of such a model.

Notably, it is quite common for both corporate and commercial fitness facilities to comply with the first step of the above model and require potential users to complete a pre-exercise medical screening questionnaire. Unfortunately, however, this is often the only one of the model’s elements which is routinely and rigorously pursued in practice. Moreover (and perhaps not coincidentally), it is the one element which emphasises the responsibility of the participant for risk reduction. The other elements, most or all of which have often been given scant attention, emphasise the fitness provider’s responsibility for the participant’s safety.

Perhaps not such a grim gym …

The usual purpose of Standards, Codes or Models is to provide practical advice in meeting clearly specified objectives within a particular context. Progressive management practices and recent legislation have now adopted the proactive Risk Management approach to provide safety for people in virtually all environments. The fitness industry and its services and centres should not be thought to be exceptions to these contemporary concerns.

The incorporation of a practice model such as that suggested above into existing fitness industry standards can effectively address safety deficiencies in fitness industry practices. While most, if not all, of the components of the proposed model could be seamlessly incorporated into the extant practices of many fitness service providers, it should nevertheless be understood as a “work-in-progress” and, like risk management practice itself, be subject to evaluation and modification through monitoring of its implementation and effects.

In its favour, the fitness industry has not, in recent times, been averse to initiatives aimed at increasing the professionalism with which it delivers its products and services. Moreover, there is an increasing number of exercise and sports science, or human movement science, graduates who are well qualified to further guide the industry towards comprehensive and systematic professional approaches and away from the rather piecemeal application of acquired (and often questionable) wisdom which was so prevalent in the fairly recent past.

Compared to most other industries, where the mechanisms for promoting and providing for human safety have been developing over many decades, the fitness industry is a fledgling. Therefore, at this stage, only ongoing development will yield a mature approach which will provide its consumers with the physical, as well as financial, protection to which they are both legally and ethically entitled.

References


Australian Fitness Accreditation Council (1987) Standards and Guidelines for the Planning and Conduct of Fitness Programs. AFAC.


ABOUT THE AUTHOR

Max Hely is an ergonomics and safety management consultant and Director of Safety Science Associates Pty Ltd. He has held human factors/ergonomics positions with Worksafe Australia and WorkCover NSW, is a Certified Professional Ergonomist, has a Human Movement Science degree, a Science (Honours) degree in Psychology, and is very slowly working his way towards a Ph.D. He has worked professionally in the OHS, security and fitness industries.

Forum

Several loosely related issues are offered in this edition of Forum – to discuss aspects of Relative Values that are all affected in some way by quantitative and qualitative measures. All three have crossed my desk in recent weeks and seem to reflect matters of importance to ergonomists.

What do you think?

David Boyle, author of “The Tyranny of Numbers”— “Why Counting Can’t Make Us Happy”, (published by HarperCollins 2000) provides a fascinating commentary that explores our current obsession with numbers and what they can really tell us. In part he gives an historical background to the development of statistics, social history and analysis, and social economics from Plato to the Kyoto Protocol. The chapters offer:

i A short history of counting.

ii Historical Interlude 1: Legislator for the World. (Jeremy Bentham)

iii Elusive Happiness. (John Stuart Mill, McKinsey, Adolphe Jullien, Charles Handy)

iv Historical Interlude 2: Commissioner of Fact. (Edwin Chadwick ... the Royal Commission on the Health of Towns).

v The Feelgood Factor. (Fallowfield, health economics, self-esteem, John Vasconcellos, Gloria Steinem and Abraham Maslow)

vi Historical Interlude 3: Social Copernicus. (Charles Booth ... social maps of London)

vii The New Auditors. (Peter Drucker, W Edwards Deming, Michael Hammer, Karl-Erik Sviby, Konrad Group, Thomas Stewart, ethical investment, Simon Zadek)

viii Historical Interlude 4: National Accountant. (John Maynard Keynes, Simon Kuznets)

ix The New Indicators (E J Mishan, Marilyn Waring, Lisa Leghorn, Clifford Cobb and the Index of Sustainable Economic Welfare, Jonathan Rowe, Hazel Henderson and Citizens for Clean Air, Robert Rogerson and the Quality of Life Group)

x Historical Interlude 5: The Price of Everything. (David Pearce and his Blueprint for a Green Planet)

xi The Bottom Line is the Bottom Line. (Application to the professions)

The italics in the above list are my annotations to give an indication of the scope of ideas canvassed in this book. Overall it clearly demonstrates that many of the concepts adopted by government agencies with the best of intentions have sought to survey numbers rather than people. This has inevitably resulted in a binary analysis
of situations that are far more complex and better handled and understood by knowledge and intuition. On the last page he quotes from Prince Charles’ Millennium broadcast on the BBC:

Two and a half thousand years ago, Plato was at pains to explain through the words of Timaeus that the great gift of human rationality should not be discouraged. Far from it, he said — it should be exercised to its utmost, but it must not make the mistake of believing it has no limits.

Boyle concludes:
The same is true of counting. Western numbers that split things up, that see only the parts, which are blind to the most important things in life, can get us so far.

But in case this doesn’t convince you, I’ll end with an old Scottish proverb which seems to put this point in just nine words, two verbs and thirteen vowels: ‘You don’t make sheep any fatter by weighing them.’

[PS. A BBC Channel 4 Program screened recently on cable TV in Australia discussed the work of Charles Booth which is gaining renewed interest. The original social atlas he drew of Victorian London has been reproduced and is available on the Internet … well worth a look at this interactive site:

http://www.csiss.org/classics/contents/45

and the grid maps can be zoomed for easy reading.]

A nice example of numbers occurred on the Australia Ergo List in the past month in relation to the number of keystroke statistics versus social factors as indicators of injury causation.

Shann Gibbs

Another topic of general interest on the List related to the benefits or otherwise of a trial of stretching exercises prior to physical exertion and arose following the report of a British study. Since this is in keeping with the article in this edition the following opinions are included in response to Carmen Mitchell’s original inquiry Does this theory apply to workers using warm up/stretching exercises prior to heavy manual work?

1. The trial was not decisive in the application of its findings. The study was based only upon sports and was limited to a small group of individuals whose tested activity was not mentioned. However the study was one of the first if not the original study to determine that stretching before exercise may potentially be detrimental. And other information may now be available as more interest in this study’s findings leads to further trials (particularly in professional sports medicine). Additionally, the study did not mention post activity warm down/stretches which are vital to prevent chronic muscle tension developing due to muscle use during physical exercise/work. This long term muscle tension can lead to improper physiological function, leading to a higher potential for injury.

The theory upon which the study was based is congruent with physics and physical injuries pathology. It is my opinion that it would be ill advised to start changing current practices of stretching before physical activity until further significant findings are available.

Andrew and Donna Matfin

2. Stretching ... the truth! ... and how!! A belated contribution to the stretching discussion...

Some studies have been published recently in which the authors conclude that they found no evidence for the efficacy of stretching in preventing injury:


Given that stretching has long been seen as an indispensable component of fitness regimes, these studies - or, to be more precise, the authors’ conclusions about their work - became widely publicised. Subsequently, it was widely heard that “stretching doesn’t help”; “no point in doing any stretching, it doesn’t prevent injury”; and similar.

Unfortunately, on the basis of those authors’ conclusions, many (particularly the various magazine/newspaper commentators) were prepared, presumably on the basis of reading the abstracts only, to throw the baby out with the bathwater. Similar erroneous overreactions have occurred in response to “findings” on a number of topics over the years ("efficacy of training" studies come most immediately to mind).

The Herbert & Gabriel meta-analysis which has received wide publicity included only two studies that examined effects of stretching on injury, both by Pope and colleagues. Both studies examined, among other things, the effect of pre-exercise stretching on subsequent injury in military recruits during their 12 weeks of basic training (which is usually very physically intensive).

The stretching intervention in one study was 2 x 20 sec. static stretches for the gastroc. and soleus prior to exercise over 12 weeks of “intensive military training”. BOTH groups [stretching and non-stretching control] performed
other lower limb and upper limb stretching. Of the 48 injuries subsequently recorded, 90% were ankle sprains and stress fractures of the tibia or foot.

In the second study, both groups performed “active warm up”, with only the stretching group additionally performing 1 x 20 sec. static stretch for 6 lower limb m.groups (gastroc. & soleus; ham’s & quads; hip adductors & hip flexors). Of the 333 lower limb injuries subsequently recorded over the 12 weeks of military training (155 in the stretch group; 175 in the controls; non-sig.diff.), most were stress fractures, patellofemoral pain, ligamentous sprains, tendinitis, m. strains, or periostitis.

The most that can reasonably be said of these findings is that extremely limited stretching is probably not beneficial, and is most unlikely to be beneficial in preventing those injuries that probably don’t arise due to lack of supranormal ranges of motion.

It should be patently obvious that INadequate stretching regimes or methods “don’t work” in the sense that they either fail to sufficiently increase ROM, fail to prevent injury from mechanisms that are unrelated to the ROM increases which the stretching targeted, or themselves produced musculoskeletal insult sufficient to cause or contribute to subsequent injury. Those recent studies have, to an extent, provided support for these assertions.

There are several mechanisms by which “stretching” may either fail to show efficacy or be harmful, either in itself or as a contributory factor to musculoskeletal injury, particularly strain-type injuries:

- the stretching exercise itself may be poorly performed (e.g., too rapid);
- not sufficient to stimulate extension;
- insufficient temp increase to accompany stretch;
- incorrectly targeted – very commonly seen in “hamstring stretches” which stretch the lower back more than the ham’s, etc...);
- the stretching regime fails to result in increased m. extensibility beyond the ROM demanded of the task or activity, and thus not conferring any protection against that level of strain;
- the stretching targets m. groups which are not involved in the subsequent injury mechanism (e.g., gastrocnemius, hamstring, etc. stretches don’t increase flexibility of lateral ankle ligaments; why would they confer protection against a lateral ankle strain?);
- related to the above point, the injury mechanism may be unrelated to tissue extensibility (e.g., stress fractures; impact injuries).

There may well be others beyond this brief, ad hoc list. Equally obvious (especially to those who have incorporated extensive stretching into their training regimes over a long period of time) is that effective stretching regimes will confer protective effects if they:

1. target joint ROMs specific to the subsequent potential injury mechanisms;
2. produce sufficiently great increases in ROM to accommodate the forthcoming or potential mechanical stress; and
3. are performed in a careful, progressive and conservative manner such that the stretching itself does not potentiate a strain injury.

The widespread response to those recent stretching papers was akin to that seen in relation to other “controversial” topics in recent times. For example, RCTs provided relatively little support for the efficacy of “training” (the reference escapes me for the moment).

Unfortunately, “training”, was, at best, very ill defined. It apparently included, and treated as homogenous, everything from simple, brief, one-off technique demonstrations (of which there are very many examples in so-called “industry training”) to comprehensive risk management courses (of which there are very few). Then, not surprisingly, “training” was found to be relatively ineffective. The authors’ conclusions were then widely interpreted to mean that “training doesn’t work” and led many to infer that training should not be conducted because it is a waste of resources.

Nothing could be further from the truth. Without going into more details in this brief note, the only sensible interpretation was that POOR or INADEQUATE training doesn’t work. This should then lead us to examine what constitutes “training”, what are the characteristics of effective and ineffective “training”, how should it be implemented, what else is necessary besides the sessions themselves, etc. etc...

There were many features in that “controversy” in common with the present topic of stretching.

Max Hely

3. I’ve been reading the letters about the stretching debate. I suspect this has been reignited by the recent BMJ article by Herbert & Gabriel from U Sydney. I strongly urge interested readers to look at this article AND some of the correspondence it’s generated (just go to BMJ.com and enter ‘stretch’ in the search field). I won’t take sides, but I would point out that:
1. reporting (from the literature) that there is no evidence for a statistically significant benefit of pre-exercise stretching is not equivalent to finding it to be harmful;

2. there are some real questions about the representativeness of the clinical trials in this area, to date; and

3. (more importantly), there’s a big difference between stretching as part of a program of training and stretching immediately prior to exercise. We would not conclude, I think, that because performance in a 10k race is not improved by an immediately preceding interval training session those athletes should be cautioned against training!

Charles Worringham PhD

Noticeboard

GUIDELINES FOR THE APPOINTMENT OF ESA MEMBERS TO OUTSIDE BODIES

Approved by Council 22 September 1997
Nomenclature changed by Board 1998

1. Where possible the Board makes decisions to appoint people to outside bodies.

2. A list of ESA appointees to outside bodies / organisations is to be published regularly.

3. Draft standards being considered for review by such bodies as Standards Australia are to be published so that members could be advised and prepared.

4. Appointees to outside bodies are encouraged to report progress regularly to the Board through the Secretariat and to the membership through publication in Ergonomics Australia.

5. Appointees to outside bodies are acknowledged to the rest of the Society at its Annual Conference.

6. Where possible opportunities should be given to enlist expressions of interest from all members by advertising through Ergonomics Australia or Branch newsletters.

7. When appointments are made, deputies should be also nominated in case the nominee cannot attend particular meetings or functions.

8. In all cases, merit should be the essential criterion for nomination; only the most qualified person possible should be allowed to represent the Society.

9. When representatives are unable to continue in the roles held, they must notify the Secretariat and the Board should seek and appoint a successor; friends or colleagues should not be appointed by the retiring nominee.

10. Should occasions arise when there are real or potential conflicts of interest between the members representing the Society and his/her personal interests, the nominee should resign the position and notify the Board.

CYBERG 2002 AWARDS

The Elsevier Science Publishers Best Contributor Awards have been selected as follows:

First Place  Doug Griffith (USA)
Second Place  Shann Gibbs (Australia)
Third Place  Jon James (South Africa)

The Elsevier Science Best Paper Awards:
First Place  Andrea ROELOFS, Leon STRAKER (Australia)

Second Place  Farhaana SHAIK, Claus ZIMMERMAN (South Africa)

Third Place  Michael BERNARD, Spring HULL, and Barbara CHAPARRO (USA):

The experience of musculoskeletal discomfort amongst bank tellers who just sit, just stand or sit and stand at work.

Attitudes of semi-literate and literate bank account holders to the use of automatic teller machines (ATM’s)

Examining the Performance and Preference of Embedded and Framed/Non-Framed Hyperlinks

TASMANIAN BRANCH VISITS

An invitation has been extended to ESA members visiting Tasmania to make contact with their colleagues in the apple isle. Margaret Cooke (Queensland) and Shann Gibbs will both be there separately sometime in March next year and would love to meet with as many ergonomists as possible during their visits.
New Members Admitted Recently

ACT
Rhonda Berry
Member

NSW
Alison Bell
Member
Andrea Cartwright
Affiliate
Geraldine King
Affiliate

NORTHERN TERRITORY
James Rimmer
Upgrade to member

QUEENSLAND
Venerina Johnston
Member
Sara Pope
Member

VICTORIA
Michael Atherton
Member
Michael Lawrence
Member
Jodi Oakman
Member

WESTERN AUSTRALIA
Jean Mangharam
Member

Conference Calendar

2003
23 – 28 February 2003, 27th International Congress on Occupational Health (ICOH 2003) Iguassu Falls, Brazil
Pre-Congress Course in São Paulo, Brazil: Noise induced hearing loss: updating knowledge & practice.
5 Pre-Congress Courses in Iguassu Falls, Brazil
12 Keynote Addresses: The challenge of equity in safety & health at work.
26 Topic related round tables: following keynote addresses.
70 Symposium Sessions

Contact Secretariat: Av Candido de Abreu, 200 Galeria Sala 6, CEP 80530–902 Curitiba – PR – Brazil

19 – 22 May 2003, 7th Southeast Asian Ergonomics Society (SEAES) Conference & 4th Malaysian Ergonomics Conference (MEC) – Ergonomics and Design Innovations for Regional Prosperity Kuching, Sarawak, Malaysia

Contact: Halimahutn Khalid & Aida Velasco
General Conference Chairs
SEAMEC 2003 Email: seamec@unimas.my  http://www.idea.unimas.my


Contact: IEA 2003 Secretariat
Address: Hallym Bldg, 3rd Fl. (ICEM) #907-13 Daechidong, Gangnam-gu, Seoul, 135-841, Korea
Tel: +822-552-8350
Fax: +822-552-8325
E-mail: info@iea2003.org
Website: http://www.iea2003.org

1 – 3 October 2003, 7th International Symposium on Human Factors in Organizational Design & Management, Aachen, Germany

Contact: ODAM 7 Secretary
Bruno Kloubert M A
FIR — Federal Institute for Rationalization
& Operations Management
Pondriesch 14 / 16
52062 Aachen, Germany
T: +49 (0)241 4 7705 150   F: +49 (0)241 4 7705 199
E: kl@fir.rwth-aachen.de   URL: www.odam.net

2006
10 – 14 July 2006, IEA 16th Triennial Congress
MECC Congress Centre, Maastricht, The Netherlands
Contact: Ernst AP Koningsveld
Congress Chairman  E: nvve@planet.nl
Information for Contributors

EDITOR
Dr Shirleyann M Gibbs
Gibbs + Associates Pty Ltd
25 Melaleuca Drive St Ives NSW 2075 Australia
Tel: +612 9983 9855  Fax: +612 9402 5295
E-mail: shanng@optushome.com.au

THE DEADLINE FOR ISSUES IN 2003
<table>
<thead>
<tr>
<th>Edition</th>
<th>Deadline</th>
</tr>
</thead>
<tbody>
<tr>
<td>March edition</td>
<td>February 1</td>
</tr>
<tr>
<td>June edition</td>
<td>May 1</td>
</tr>
<tr>
<td>September edition</td>
<td>August 1</td>
</tr>
<tr>
<td>December edition</td>
<td>November 1</td>
</tr>
</tbody>
</table>

CONTRIBUTIONS
Contributions to *Ergonomics Australia* are always welcomed and encouraged.

The activities, achievements, experiences, views and opinions of Members are always of interest. These can be in the form of letters, notices, notes, commentaries and articles.

Graphics (photos, illustrations, drawings, computer graphics etc) are particularly welcome and should be camera ready. Photos need not be black and white and negatives are not required.

The preferred form of submissions is via e-mail, either in the body of a message (short notices), or as an attachment (articles / letters). Files may also be mailed on floppy disc (or Zip disc if very large). Microsoft Word and Corel WordPerfect are the preferred formats (the editor cannot transcribe MacIntosh files that are not in IBM type format.) Handwritten or hard copy submissions will only be accepted in exceptional circumstances as the Editor is not a trained typist and does not employ a secretary.

Any inquiries about contributions should be directed in the first instance to the Editor.

Information for Advertisers

INQUIRIES
All advertising inquiries should be directed to the Federal Office of the Society.

CONTACT
Ms Jennifer Allen
T: 02 6242 1951
Fax: 02 6241 2554
E-mail: secretariat@ergonomics.org.au
1.00pm— 5.00 pm Monday to Friday

SIZE
The finished page size of the Newsletter is A4 (210mm x 297mm)

Printed column sizes are 165mm x 225mm (double) or 80mm x 225mm (single)

ADVERTISING COPY
Must be camera ready and must arrive at the ESA Federal Office by the Copy Deadline Submission Date for the Edition in question.

A professional advertising service is available for producing camera ready copy if required. For further inquiries regarding this service contact:

Mr Goro Jankulovski, Acute Image
Tel: 03 9381 9696 Mobile: 0414 605 414
E-mail: goro@acuteimage.com.au

RATES FOR ADVERTISING
These rates are inclusive of GST

<table>
<thead>
<tr>
<th></th>
<th>Full page</th>
<th>1/2 page</th>
<th>1/4 page</th>
<th>1/8 page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Single issue</td>
<td>$ 330</td>
<td>165</td>
<td>82.50</td>
<td>41.80</td>
</tr>
<tr>
<td>2 issues</td>
<td>$ 297</td>
<td>148.50</td>
<td>74.80</td>
<td>37.40</td>
</tr>
<tr>
<td>3 issues</td>
<td>$ 264</td>
<td>132</td>
<td>66</td>
<td>33</td>
</tr>
<tr>
<td>4 or more</td>
<td>$ 231</td>
<td>115.50</td>
<td>58.30</td>
<td>29.70</td>
</tr>
</tbody>
</table>

ENCLOSURES
Pre-printed enclosures (leaflets, brochures) etc are welcome for inclusion with the Journal.

Enclosures should be pre-folded to fit inside the finished Journal.
RATES FOR ENCLOSURES
Enclosure not requiring folding $ 412.50
Enclosure requiring folding $ 462.00

These rates may increase if the enclosure weighs more than the equivalent of 2 standard weight A4 pages. These rates are inclusive of GST.

700 copies should be sent to arrive at the ESA Federal Office by the Copy Deadline Submission Date for the Edition in question.

Address for mailing Advertising copy and/or enclosures

ESA Federal Office
Creeda Business Centre
Bradfield Street
DOWNER ACT 2602

Advertising copy and enclosure submission deadlines for 2003 are the same as for Contributions — 1st of month prior to publication

Edition Submission Deadline
March edition February 1
June edition May 1
September edition August 1
December edition November 1

CIRCULATION
The Journal is published four times a year and is received by approximately 620 professionals Australia wide working in the areas of ergonomics, occupational health and safety, and design.

ERGONOMICS AUSTRALIA ON-LINE (EAOL)
Advertising and sponsorship opportunities also exist in the electronic version of this journal (EAOL) which is managed by Dr Robin Burgess-Limerick at Department of Human Movement at Queensland University. It is downloaded by more than 100 Australian and International readers each week. To view EAOL:
http://www.uq.edu.au

CAVEATS
The views expressed in the Journal are those of the individual authors and contributors and are not necessarily those of the Society.

The ESA Inc reserves the right to refuse any advertising inconsistent with the Aims and Objectives of the Society and Journal Editorial Policy.

The appearance of an advertisement in the Journal does not imply endorsement by the Society of the product and or service advertised.

The Society takes no responsibility for products or services advertised therein.

EDITOR
Shirleyann M Gibbs PhD
Print Post Approved PP 233744/00112
If undelivered return:
The Ergonomics Society of Australia Inc.
Creeda Business Centre
Bradfield Street
Dover ACT 2602
Australia