Development of the Australian Core Competencies in Musculoskeletal Basic and Clinical Science project — phase 1

Mellick J Chehade and Aleksander Bachorski

ABSTRACT

- Musculoskeletal conditions are a major contributor to the burden of disease globally and their impact is predicted to increase.
- Consistent with findings in other countries, the current standard of musculoskeletal education in Australian medical schools is inadequate to meet today's musculoskeletal care requirements.
- A national multidisciplinary approach unifying the key musculoskeletal clinical and basic science disciplines has been adopted to provide clear, evidence-based education guidelines that are specifically aimed at priority musculoskeletal conditions; a direct link is therefore established between community health care needs and education at a national level.
- This "top-down" approach provides the potential for a far more effective and efficient delivery of musculoskeletal education by allowing the identification of the key basic knowledge and skills required to achieve core competencies and by providing appropriate direction for students.
- The Australian Core Competencies in Musculoskeletal Basic and Clinical Science are being developed for medical schools to incorporate into their curricula, with the ultimate aim of improving the standard of health care for Australians with musculoskeletal conditions.

MJA 2008; 189: 162–165

The World Health Organization proclaimed the years 2000–2010 as the Bone and Joint Decade (BJD) in recognition of the substantial health burden imposed by chronic bone and joint conditions. In westernised countries, musculoskeletal conditions are the second most common reason for consulting a general practitioner, accounting for almost 25% of the total cost of illness and up to 15% of primary care practice.[1-3] Within Australia, arthritis and musculoskeletal conditions have been designated the seventh National Health Priority, costing Australia $15 billion per year, and are among the major contributors to the burden of disease.[3-5] With the increasing proportion of patients over 65 years of age, the relative burden of arthritic conditions and osteoporosis is rising.[6,7] Additionally, the impact of musculoskeletal conditions is predicted to grow with the increasing incidence of lifestyle-related obesity, reduced physical fitness and increased road traffic accidents.[1,2,4,8] As the impact of musculoskeletal conditions escalates, there is a growing imperative to ensure that medical practitioners are providing optimal, evidence-based, cost-effective treatment, but this relies on adequate undergraduate medical education in musculoskeletal science.

The competition for education time within undergraduate medical curricula is intense and continues to grow as the information base in medicine increases and the role and expectations of doctors within our community evolve.[9-14] Currently, it is estimated that the time allocated to musculoskeletal teaching in most medical degrees is less than 5%.[8,15-17] Deficiencies in undergraduate education in musculoskeletal science have been identified by students and graduates in studies conducted in a number of countries.[8,17-25] The BJD Education Task Force and the BJD Undergraduate Curriculum Development Group were formed to consider this issue.[2] These groups are composed of orthopaedic surgeons, rheumatologists, rehabilitation physicians and endocrinologists involved in musculoskeletal care or education in 29 countries, and are supported by associated international and national societies. They concluded that the standard of global musculoskeletal education is inadequate to meet today's requirements, and so they developed global core recommendations for a musculoskeletal undergraduate medical curriculum.[2] The recommendations were designed to be relevant to all countries and to enable a curriculum to be developed from them that is locally applicable, adaptable to national guidelines and reflective of local needs, priorities and opportunities.[2] Priorities in each curriculum would be based on the local prevalence, severity and urgency of conditions or clinical problems and relevance to the geographic and socioeconomic situation.[2] In Australia, one of us (MJC), representing the Australian Orthopaedic Association (AOA), obtained the support of the Australian Rheumatology Association (ARA) to investigate whether the concerns regarding the musculoskeletal education of medical undergraduates were applicable in Australia and, if so, to consider the development of national musculoskeletal core competencies for Australian medical schools. Here we describe the methods, results and progress to date of this major undertaking.

Goals of the core competencies project

In 2002, Australian health ministers established arthritis and musculoskeletal conditions as a National Health Priority, supporting them in the 2002–03 ("Better Arthritis Care") and 2006–07 ("Better Arthritis and Osteoporosis Care") budgets. The Australian Core Competencies in Musculoskeletal Basic and Clinical Science project, beginning in November 2005, was funded through these initiatives. The principal goals of Phase 1 of this project were:

- the establishment of a broad stakeholder group for the project;
- validation of the claims made by the BJD Education Task Force in the Australian health care context;
- liaison with all current and establishing Australian medical schools, with the aim of achieving unified national acceptance and commitment to the development of Australian national competencies in musculoskeletal basic and clinical science; and
- development of a preliminary framework for the national musculoskeletal competencies.

Assessing the need for curriculum change

As an initial step, in-principle approval from the Chairman of Medical Deans Australia and New Zealand was obtained, and the

1 Results of consultation about the need for core competencies

Medical schools

- Most medicals schools reported difficulties in reconciling the skills and core knowledge demanded of their graduates against the realities of the increasing scientific information base.
- Decreasing resources and insufficient time to teach general and applied anatomy adequately were identified as ongoing problems, particularly in musculoskeletal science, where a sound knowledge of applied anatomy is critical for competency.
- Difficulties were compounded by the implementation in most universities of "problem-based learning" curricula, which do not appear to be achieving acceptable results in the specific area of musculoskeletal science, predominantly because of insufficient time to obtain or retain the necessary core knowledge in anatomy.

Australian Medical Students' Association

- Students perceived a lack of basic science being taught and a lack of direction in what to learn, especially in anatomy.
- Following musculoskeletal clinical attachments, students expressed a lack of confidence in being able to adequately manage routine musculoskeletal cases, particularly common emergency and traumatic conditions.
- Students reported that insufficient or conflicting training in basic musculoskeletal physical examination techniques, depending on which orthopaedic surgeon, rheumatologist or general practitioner taught them, caused significant confusion.
- Students found a lack of clear direction and detail as to what the learning priorities were and why. ◆

relevant curriculum coordinators from each Australian medical school were invited to participate in the initiative. A project team (both of us) visited all 17 current and yet to be accredited Australian medical schools to ascertain the opinions and experiences of relevant staff concerning the standard of musculoskeletal undergraduate education (Deakin University was not visited, as its medical degree program was not established at that time). The Australian Medical Students' Association (AMSA) was also contacted following concerns raised by students regarding their musculoskeletal education.

Consultations with medical schools, academic and teaching orthopaedic surgeons (through the National Undergraduate Committee of the AOA), and the AMSA identified that the problems described by the BJD Education Task Force were indeed applicable in the Australian context (Box 1). All participants welcomed the proposal for the development of Australian Core Competencies in Musculoskeletal Basic and Clinical Science, and support from other significant stakeholders in musculoskeletal medicine was obtained from key professional organisations (Box 2).

The national working group

A national working group was assembled, consisting of a nominated musculoskeletal curriculum representative from each Australian medical school. A 2-day workshop was held in April 2006 (see *Acknowledgements* for list of participants) to explore common goals in the field of musculoskeletal science and how they might be achieved. Agreement was achieved in the form of a nine-point statement of objectives (Box 3).

The achievement of these agreed objectives signalled the successful completion of Phase 1 of the project. The next phases involve the development of the actual Australian Core Competencies in Musculoskeletal Basic and Clinical Science.

2 Organisations supporting the Australian Core Competencies in Musculoskeletal Basic and Clinical Science project

Steering committee representation

Australian Orthopaedic Association
Medical Deans Australia and New Zealand
Australian and New Zealand Bone and Mineral Society
Australian Rheumatology Association
Consumers Health Forum of Australia
University of Adelaide
University of Melbourne
Australasian Faculty of Rehabilitation Medicine
Royal Australian College of General Practitioners
Australian Medical Association
Australian Medical Students' Association
Australian Physiotherapy Association
Council of Deans of Nursing and Midwifery (Australia and New Zealand)

Working group representation

Flinders University
James Cook University
Monash University
University of Newcastle
Osteoporosis Australia
Arthritis Foundation
Australasian College for Emergency Medicine
Australian College of Rural and Remote Medicine
Australasian Faculty of Musculoskeletal Medicine
Australian Institute of Sport
Children's Hospital at Westmead
Flinders Medical Centre
Hanson Institute
Pharmacy Guild of Australia
National Prescribing Service
Repatriation General Hospital, Adelaide
Royal Adelaide Hospital
Royal Australasian College of Physicians
Royal Australasian College of Surgeons
Sansom Institute
University of Queensland
University of Melbourne
University of New South Wales
University of Sydney
University of Western Australia
Women's and Children's Hospital, Adelaide ◆

Discussion

Any education strategy must start with the knowledge of what to teach. Two weaknesses of many teaching guidelines are ambiguity and a lack of specific detail. For example, to claim that more teaching of anatomy is required is insufficient and merely an opinion. There needs to be a very clear statement of what anatomy,

in what detail and why. This is much more readily achievable if the knowledge, skills and attitudes required in relation to a specific competency are defined. Definition also greatly facilitates curriculum planning and the development of appropriate assessment tools. This project plans to expand on and define core competencies based on the BJD *Global core recommendations for a musculoskeletal undergraduate curriculum*,[2] facilitating their integration into any curriculum (Box 4).

The competencies will be defined by a series of eight national working groups, which will bring together content and educational experts from a range of academic, consumer and professional organisations (Box 4). Assessment tools will be developed in tandem with the competencies. Considerable effort has been invested in developing a multidisciplinary, diverse infrastructure that incorporates clinicians, educators, students and patients to ensure the success of the project (Box 2).

An evaluation strategy will be built into the process for implementing core competencies. A baseline survey of graduating medical students (identifying knowledge, skills and attitudes in musculoskeletal medicine) will be undertaken before implementation, and a complementary survey of orthopaedic specialists and GPs will gauge their perceptions of medical graduate knowledge and skills.

This project aims to clearly delineate core musculoskeletal competencies that should be achieved during undergraduate training from competencies that can and should be deferred to postgraduate or specialist training. This process will allow the development of a "musculoskeletal competencies road map" that will vertically integrate education from the undergraduate setting through to postgraduate medical specialty training in various fields. Such a map will greatly facilitate planning for post-medical school education. A future aim is to improve the overall delivery of musculoskeletal care by *all* Australian health care professionals by establishing a minimum national baseline standard for musculoskeletal education, targeted not only at medical graduates, but also at allied health practitioners. A horizontal integration of multidisciplinary education such as this would ensure that all Australian health care professionals are suitably equipped to address the increasing impact of musculoskeletal conditions in Australia. The scope of the education is also aimed at patients, both directly and through improved doctor–patient education. With the chronic nature of many musculoskeletal conditions and the influence of lifestyle choices, there is an increasing need to develop and direct patients towards self-management strategies. These strategies need to become as fundamental to the management of patients with musculoskeletal conditions as is "ABC" in resuscitation.

Conclusion

The overall aim of the establishment of Australian Core Competencies in Musculoskeletal Basic and Clinical Science is to improve the health-related outcomes for Australians with musculoskeletal conditions by raising the quality of health care. The standard of education provided to undergraduate medical students in Australia in the area of musculoskeletal science needs to dramatically improve to reflect the increasing burden that musculoskeletal conditions place on the Australian health care system and the community. This should be greatly facilitated by clearly defined, evidence-based core competencies in musculoskeletal medicine that have been developed and agreed upon via wide consultation at the national level, and which are based on an international consensus.

3 Objectives agreed by the national working group

- To develop National Core Competencies in Musculoskeletal Basic and Clinical Science.
- To use the general outcome learning objectives of the Bone and Joint Decade Education Task Force's recommendations as the basis for the development of the national core competencies.
- To ensure that these competencies are appropriate for the clinical requirements of an intern starting work in the Australian health care system before starting further postgraduate studies.
- To ensure that graduating medical students possess sufficient skills and core knowledge, and appropriate attitudes, to enable them to advance these competencies through further learning and clinical experience.
- To develop standardised, evidence-based, musculoskeletal examination protocols where applicable.
- To develop a national repository of teaching and assessment resources.
- To ensure that these resources will be based on current, evidence-based, best-practice guidelines as recommended by the Australian national clinical and scientific authorities.
- To develop valid means of assessing these core competencies.
- To develop and implement monitoring and evaluation processes to measure the effect of the competency standards on subsequent learning, clinical practice and population health outcomes. ◆

4 Core musculoskeletal competencies to be developed

Working group	Competency
Physical examination	Physical examination of patients presenting with musculoskeletal-related signs and symptoms
Red flag emergencies	Recognition and examination of conditions that require urgent intervention and specialist management
Basic science	Anatomy, physiology, pathology and biology
Patient education and self-management	Principles and practice of patient education and self-management
Procedural skills	Practical skills, such as plastering, joint injections and aspiration
Rehabilitation	Principles and practice of rehabilitation medicine
Clinical science	Musculoskeletal conditions specifically related to anatomical areas (eg, conditions of the hand and wrist, knee and hip, and shoulder) and medical conditions, such as arthritis, osteoporosis and infection
Assessment	Role is to review and revise assessment tools and processes suggested by the other seven working groups ◆

Acknowledgements

We thank Peter Brooks and Justin Beilby for their help, particularly in the very early stages of the project; the Australian Government Department of Health and Ageing for financial support; and Kathy Stiller, who provided medical

writing services on behalf of the National Musculoskeletal Core Competencies Project.

The participants in the National Working Group of Curriculum Coordinators' workshop in April 2006 were Mellick Chehade (National Project Director); Aleksander Bachorski (National Project Manager); John Beadle (University of Tasmania); Teresa Cosgriff (AMSA); John England and Zoe England (MindSystems); Marian Evans (Bond University); Kieran Fallon (Australian National University, Australian Institute of Sport); Jenny Hayes (University of Melbourne); Nicky Hudson (University of Wollongong); Isolde Kauffman (Department of Health and Ageing); Vaughan Kippers and Bruce McPhee (University of Queensland); Leon Kleinman (University of Newcastle); Peter Leedman (University of Western Australia); Rebecca Mason (University of Sydney); Patrick McNeil (University of New South Wales); Tony Pohl (University of Adelaide); Sue Runciman (Flinders University); Roger Soames (James Cook University); Ian Wilson (University of Western Sydney); and Michael Yelland (Griffith University).

Competing interests

None identified.

Author details

Mellick J Chehade, PhD, MB BS, FRACS(Ortho), Trauma Surgeon,[1] and Associate Professor[2]
Aleksander Bachorski, BE(Hons), GradDip(MW&J), Biomedical and Biomechanical Engineer[1]
1 Department of Orthopaedics and Trauma, Royal Adelaide Hospital, Adelaide, SA.
2 Department of Orthopaedics and Trauma, Faculty of Health Sciences, University of Adelaide, Adelaide, SA.
Correspondence: mellick.chehade@adelaide.edu.au

References

1 Woolf AD. The bone and joint decade 2000–2010. *Ann Rheum Dis* 2000; 59: 81-82.
2 Woolf AD, Walsh NE, Akesson K. Global core recommendations for a musculoskeletal undergraduate curriculum. *Ann Rheum Dis* 2004; 63: 517-524.
3 Brooks PM, Hart JA. The Bone and Joint Decade: 2000–2010 [editorial]. *Med J Aust* 2000; 172: 307-308.
4 National Arthritis and Musculoskeletal Conditions Advisory Group. Evidence to support the national action plan for osteoarthritis, rheumatoid arthritis and osteoporosis: opportunities to improve health-related quality of life and reduce the burden of disease and disability. Canberra: Australian Government Department of Health and Ageing, 2004. http://www.health.gov.au/internet/main/publishing.nsf/Content/pq-arthritis-evid (accessed Jun 2008).
5 National Health Priority Action Council. National service improvement framework for osteoarthritis, rheumatoid arthritis and osteoporosis. Canberra: Australian Government Department of Health and Ageing, 2006. http://www.health.gov.au/internet/main/publishing.nsf/Content/pq-ncds-arthritis (accessed Jun 2008).
6 Australian Institute of Health and Welfare. Australia's welfare 2005. Chapter 4, Ageing and aged care. Canberra: AIHW, 2005. (AIHW Cat. No. AUS 65.) http://www.aihw.gov.au/publications/index.cfm/title/10186 (accessed Jun 08).
7 Australian Institute of Health and Welfare. Australia's health 2006. Chapter 2, Health of Australians; Chapter 4, Health of population groups. Canberra: AIHW, 2006. (AIHW Cat. No. AUS 73.) http://www.aihw.gov.au/publications/index.cfm/title/10321 (accessed Jun 08).
8 Williams JR. The teaching of trauma and orthopaedic surgery to the undergraduate in the United Kingdom. *J Bone Joint Surg Br* 2000; 82B: 627-628.
9 Feldmann TB. Medical students' attitudes toward psychiatry and mental disorders. *Acad Psychiatry* 2005; 29: 354-356.
10 Jenkins DJ. A nutritional requirement: the need for research, education, and health claims. *J Am Coll Nutr* 1999; 18: 4-5.
11 Koczwara B, Tattersall MH, Barton MB, et al. Achieving equal standards in medical student education: is a national exit examination the answer? *Med J Aust* 2005; 182: 228-230.
12 Lennox N, Diggens J. Knowledge, skills and attitudes: medical schools' coverage of an ideal curriculum on intellectual disability. *J Intell Dev Disabil* 1999; 24: 341-347.
13 Levison SP, Weiss LB, Puglia CD, et al. A model for integrating women's health issues into a problem-based curriculum. *J Women's Health* 1998; 7: 1113-1124.
14 Woolf AD, Akesson K. Education in musculoskeletal health — how can it be improved to meet growing needs? *J Rheumatol* 2007; 34: 455-457.
15 Craton N, Matheson GO. Training and clinical competency in musculoskeletal medicine. Identifying the problem. *Sports Med* 1993; 15: 328-337.
16 McColl G. A survey of the musculoskeletal curricula of medical schools in the Asia–Pacific region. *APLAR J Rheumatol* 2005; 8: 84-89.
17 Pinney SJ, Regan WD. Educating medical students about musculoskeletal problems. Are community needs reflected in the curricula of Canadian medical schools? *J Bone Joint Surg Am* 2001; 83A: 1317-1320.
18 Bernstein J, Alonso DR, DiCaprio M, et al. Curricular reform in musculoskeletal medicine: needs, opportunities, and solutions. *Clin Orthop Relat Res* 2003; 415: 302-308.
19 Day CS, Yeh AC, Franko O, et al. Musculoskeletal medicine: an assessment of the attitudes and knowledge of medical students at Harvard Medical School. *Acad Med* 2007; 82: 452-457.
20 Freedman KB, Bernstein J. The adequacy of medical school education in musculoskeletal medicine. *J Bone Joint Surg Am* 1998; 80: 1421-1427.
21 Goh L, Samanta A, Cavendish S, Heney D. Rheumatology curriculum: passport to the future successful handling of the musculoskeletal burden? *Rheumatology* 2004; 43: 1468-1472.
22 Kay LJ, Deighton CM, Walker DJ, Hay EM. Undergraduate rheumatology teaching in the UK: a survey of current practice and changes since 1990. *Rheumatology* 2000; 39: 800-803.
23 Matzkin E, Smith EL, Freccero D, Richardson AB. Adequacy of education in musculoskeletal medicine. *J Bone Joint Surg Am* 2005; 87: 310-314.
24 Mulhall KJ, Masterson E. Relating undergraduate musculoskeletal medicine curricula to the needs of modern practice. *Ir J Med Sci* 2005; 174: 46-51.
25 Walker DJ, Kay LJ. Musculoskeletal examination for medical students: the need to agree what we teach. *Rheumatology* 2002; 41: 1221-1223.

(Received 24 Nov 2007, accepted 12 Mar 2008) ❑