THE ORTHOPAEDIC FORUM

Beyond the Decade: Strategic Priorities to Reduce the Burden of Musculoskeletal Disease

Joshua J. Jacobs, MD, Toby R.W. King, CAE, John H. Klippel, MD, Sigurd H. Berven, MD, David B. Burr, PhD, Paul M. Caskey, MD, Ann L. Elderkin, PA, Paul W. Esposito, MD, Eric P. Gall, MD, Steven R. Goldring, MD, Andrew N. Pollak, MD, Christy I. Sandborg, MD, and Kimberly J. Templeton, MD

In the U.S., direct expenditures involving health-care costs and indirect expenditures involving lost wages of persons with musculoskeletal diseases have been estimated to total \$950 billion, or 7.4% percent of the U.S. gross national product, in 2004-2006¹. Despite this enormous financial burden, in addition to the personal and societal impact, musculoskeletal research represents less than 2% of the National Institutes of Health (NIH) budget². This disparity between the burden of these diseases and the investment in research to develop improved preventive and treatment strategies for them is noted in every region of the world and has been a major impetus for the global Bone and Joint Decade movement. After ten years, it is important to undertake a retrospective analysis of what has been accomplished and what remains to be done with this program.

The U.S. Bone and Joint Initiative (USBJI, previously called the U.S. Bone and Joint Decade, the National Action Network of the global Bone and Joint Decade) conducted a strategic planning process to determine what the organization is best positioned to accomplish, to assess how it can serve its mission in the future, and to set priorities “beyond the decade.” This was accomplished by six task groups (Arthritis, Bone Health and Osteoporosis, Pediatric Musculoskeletal Conditions, Spinal Disorders and Low Back Pain, Trauma and Injury,

and Research). The following is a compilation of the priorities identified by each group.

Task Group 1: Arthritis (Chairs: Eric Gall, MD, and Christy Sandborg, MD)

Priority Area 1.1: Public Education and Patient Empowerment

There needs to be increased public recognition of the benefits of prevention, early diagnosis, and treatment of arthritis, including the importance of positive health behaviors. By the year 2020, the number of persons who attend or participate in arthritis health promotion activities such as public education, patient empowerment, arthritis self-management, exercise, and other programs should increase by 50%. To accomplish this ambitious task, it will be necessary to work with key organizations participating in the USBJI as well as regional and national public institutions and organizations.

Priority Area 1.2: Education of Policy Makers (Government and Non-Government)

In addition to informing the public, policy makers need to be made aware that arthritis is an important health priority. Federal funding for arthritis-related public health initiatives, as well as for professional training, research, and health-care systems

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for arthritis care, should be substantially increased. Achievement of this objective will require collaboration with arthritis advocacy groups and others within the USBJI.

Priority Area 1.3: Access to Health-Care Providers with Expertise in Arthritis

Access to primary care providers and specialists with arthritis-related expertise needs to be improved. This will require USBJI member organizations to address arthritis education in schools that train health-care professionals as well as to encourage certification boards to develop questions addressing these curricular principles. Workforce studies in arthritis-related specialty and primary care areas should be completed to demonstrate the need in this area.

Priority Area 1.4: Early Diagnosis and Prevention

Public health policy and health-care systems do not currently support osteoarthritis prevention or early diagnosis and management that could improve arthritis outcomes. The “beyond the decade” goal is to coordinate development and dissemination of interdisciplinary standardized protocols and public health resources focused on these needs. By 2015, guidelines for osteoarthritis and other major conditions will be adapted and disseminated by each country’s Bone and Joint Decade National Action Network. This objective can be accomplished by harmonizing guidelines across organizations, supporting the development of patient-centered metrics, demonstrating clinical and cost effectiveness, obtaining payer endorsement, and creating patient demand through the use of multiple media resources.

Priority Area 1.5: Research

As with other musculoskeletal conditions, there should be a prioritization of funding for arthritis-related research, including a substantial increase in NIH funding for research in epidemiology, outcomes, and comparative effectiveness of arthritis treatments. This will require collaboration among arthritis-related USBJI professional and patient volunteer organizations to promote and lobby for increased public and private research funding.

Task Group 2: Bone Health and Osteoporosis (Chairs: Ann Elderkin, PA, and Steven Goldring, MD)

Priority Area 2.1: Develop a Bone Health Alliance

A National Bone Health Alliance will be developed that will work collaboratively with the USBJI to increase awareness of bone health among the public and health-care professionals and to develop programs designed to improve prevention, diagnosis, and treatment of bone conditions, especially osteoporosis. Stakeholder organizations are being recruited to develop a shared vision, mission, and priorities and to establish key working groups. Bone health information from government and non-government sources should be coordinated and made widely available. Organizations will collaborate on messages about healthy lifestyles and improving bone health and will foster connections with other chronic disease groups and professional organizations. Although the focus will be on the most common bone condition,

osteoporosis, a rare bone disease network would be continued to address less common conditions.

Priority Area 2.2: Promote Bone Health and Prevent Disease

Optimizing bone health must begin early and continue throughout life by promoting good nutrition (including adequate intake of vitamin D and calcium) and physical activity. In addition, additional focus on fracture prevention in older adults is needed. A key goal is to increase education of primary care professionals, specialists, and the public on the impact of, and measures to improve, bone health across the lifespan, emphasizing good bone health in children and adolescents and fracture prevention in older adults. Low-energy fractures need to be viewed as sentinel events requiring coordinated intervention. A consensus should be developed on interdisciplinary guidelines of care after fracture, focusing on secondary prevention measures.

Priority Area 2.3: Improve Diagnosis and Treatment Through Increased Research and Education

Despite advances in diagnosis and treatment of osteoporosis, further research is needed, especially the development of better tools to diagnose disease and assess risk. Existing measures should be improved and new tools developed to understand who is at risk and how best to initiate treatment. Research in this area needs to be more effectively translated into clinical practice. This can be accomplished, in part, through enhanced education of health professionals, including the development of bone health curricula for these professionals, a focus on a fragility fracture as a sentinel event, and discussion of optimal fracture management. The latter would incorporate collaborative models of interdisciplinary care with multifaceted interventions.

Priority Area 2.4: Enhance Surveillance and Evaluation

To better understand who is at risk and to improve prevention, diagnosis, and treatment, data should be collected and analyzed to identify gaps and opportunities involving current data collection, reporting, and evaluation. Improved data collection, including methods used for other chronic diseases (involving the use of Medicare data, industry tracking, and public opinion surveys), would aid in achieving this goal.

Task Group 3: Pediatric Musculoskeletal Conditions (Chairs: Paul Caskey, MD, and Paul Esposito, MD)

Priority Area 3.1: Healthy Lifestyles

Emphasizing healthy lifestyles among children and adolescents has the greatest potential impact of any intervention of the USBJI. There should be coordination by the member organizations regarding education and advocacy to allow children to reach their full musculoskeletal potential.

Obesity is one of the most substantial health problems of children that impact their current and future musculoskeletal health. It is increasing in frequency and intensity and has ramifications extending into adulthood, with potentially grave consequences. The goal would be to achieve a decrease in the incidence of obesity-related musculoskeletal disorders by 10% by the year 2020 and substantially increase the number of

children exercising vigorously for forty-five minutes at least three times per week. This can be achieved by developing and supporting after-school physical activity programs and promoting education concerning nutrition and diet.

Lack of affordable, high-quality foods; inadequate calcium and vitamin-D intake; and poor dietary choices interfere with the development of optimal bone mass and strength. The goal of the organization should be to improve knowledge in these areas by 2020. There should also be improved education of health-care professionals regarding this area, focusing on exercise and diet, with simple, cost-effective dietary and exercise screening tools to identify children at risk for poor musculoskeletal health.

Priority Area 3.2: Infectious Disease of the Musculoskeletal System

Resistance to antimicrobial agents and related morbidity represent a growing problem worldwide. The incidence of complications related to bone and joint infections in pediatric patients is increasing. No uniform guidelines exist for the management of these infections. There is a need to optimize prevention strategies and therapeutic pathways for pediatric bone and joint infections, especially in resource-poor environments.

Priority Area 3.3: Limb Deficiency in Children

Limb deficiency, either acquired or congenital, is relatively uncommon in children but requires lifelong medical attention and frequent surgical services, and it has major financial, functional, and psychosocial impacts. Obstacles involving access to prosthetic and ongoing rehabilitative services and the cost of these services can be overwhelming, both in the developed and the developing world. The USBJI, working with the global Bone and Joint Decade, should work to initiate discussion and collaboration in this area.

Priority Area 3.4: Optimizing Function in Children with Chronic Neuromuscular and Musculoskeletal Disorders

Children with chronic neuromuscular and musculoskeletal disorders face unique medical, physical, and psychosocial challenges. Children with these disorders, including those with chronic inflammatory diseases and other congenital or acquired musculoskeletal disorders, can currently live well into adulthood with appropriate treatment and support. However, they have a lifelong impact from either the initial condition or the treatment thereof. It is critically important to develop and make available programs that can optimize bone, joint, muscle, and psychosocial functions for these children.

Priority Area 3.5: Successful Transition from Pediatric to Adult Care for Persons with Childhood-Onset Musculoskeletal Disorders

Although most children with substantial or severe childhood musculoskeletal disease can currently expect to live well into adulthood with appropriate treatment, their disorders may worsen with age, leading to decreased function, even as the individual loses access to appropriate medical care. There should be an improvement in the transition from pediatric to adult care in

persons with childhood-onset musculoskeletal disorders, through enhanced health professional, patient, and family education.

Priority Area 3.6: Registries for Specific Disorders

The development of a registry system for specific disorders, through the coordination of resources of the USBJI and the global Bone and Joint Decade, could increase the number of published collaborative international projects by up to 50%. A registry system, utilizing discrete, standardized data elements regarding pediatric musculoskeletal disorders, should be compatible with 80% of the electronic medical records systems in North America. Appropriate patient protection safeguards will be built in to allow for collaborative research on specific musculoskeletal disorders and measurement of the impact of disease in North America as well as other areas of the world that possess adequate electronic medical record systems. These disorders include, but are clearly not limited to, clubfoot, developmental hip dysplasia, and slipped capital femoral epiphysis.

Task Group 4: Spinal Disorders and Low Back Pain (Chair: Sigurd Berven, MD)

Priority Area 4.1: Multidisciplinary Guideline Development

There is great variability in treatment modalities for spinal disorders, and this contributes to high cost and suboptimal, inconsistent outcomes. To address this issue, the organization should, by 2015, study all evidence-based, practical, multidisciplinary, patient-centered guidelines for management of spinal disorders, especially low back pain. The organization should seek to empower patients to participate in care and should target primary care professionals providing community-based spine care. To achieve this goal, the organization should distill existing guidelines from multiple disciplines to identify areas of consensus, improve awareness, and educate health professionals and the public by means of the media, online tools, education systems, and public health and entertainment entities to disseminate a common message. There should be additional efforts geared toward prevention.

Priority Area 4.2: Establishment of Infrastructure for Multidisciplinary Collaboration on Research and Education

There are large gaps in our knowledge of the causes of many spinal disorders and low back pain as well as in our understanding of the efficacy and effectiveness of contemporary treatment modalities. Future research directions will be defined in the process of developing the multidisciplinary evidence-based guidelines discussed above. The goal of the organization “beyond the decade” should be to create the infrastructure necessary to fill our knowledge gaps. This should be accomplished in partnership with industry, public health organizations, and the constituent member organizations.

Task Group 5: Trauma and Injury (Chair: Andrew Pollak, MD)

Priority Area 5.1: Road Traffic Crashes

Worldwide, road traffic crashes account for approximately 1.4 million deaths and 20 to 50 million injuries and/or disabilities

annually³. Lower and middle-income countries are disproportionately affected because of poorer transportation safety and poor access overall to trauma care. Musculoskeletal trauma care lags further behind resuscitative capabilities in many areas because of the need for additional human and technical resources. Although injury prevention efforts offer the possibility of dramatically limiting morbidity and mortality, these efforts cannot eliminate the problem. Many patients, especially children, who die or become disabled could have been helped by access to effective trauma care systems. Improvement in trauma care delivery systems should be a core component of any program initiated by the USBJI.

Efforts to improve musculoskeletal trauma care are inseparable from those to address overall trauma care and are similar to those necessary to ensure access to basic surgical care needs. Worldwide surgeon and pediatric organizations must be key partners in this endeavor. It is important to intensify efforts to increase the recognition within organizations such as the World Health Organization (WHO) and the United Nations that road traffic crashes and their sequelae are worldwide threats to public health.

Priority Area 5.2: Fragility Fractures

Hip fractures are the most devastating of all fragility fractures in terms of both morbidity and mortality, and their incidence is expected to double within the next forty years. Medical costs of fragility fractures in the U.S. alone exceed \$15 billion annually⁴. Although primary prevention is being addressed by other groups, secondary prevention after an initial fracture must be an important component of any educational and treatment strategy developed for physicians and surgeons charged with management of these injuries. Strategies are well described above by the Bone Health and Osteoporosis Group.

Priority Area 5.3: Extremity War Injuries (EWI)

Extremity injuries are the most common of all injury types associated with modern combat and land mines. Advances in protective equipment combined with improvements in resuscitative care have led to an increase in the number of war injury survivors with high-energy extremity injuries of greater severity. Improvements in care can be facilitated through better data collection tools, which will likely lead to improved understanding of the role and effectiveness of body armor. This should result in development of efforts aimed at prevention. Additional resources are necessary to improve care for common complications of these injuries, including heterotopic ossification and infection, and to better understand how to prevent them.

Priority Area 5.4: Repetitive Use Disorders

Repetitive use disorders are work-related musculoskeletal disorders that result from excessive microtrauma and represent an increasing source of substantial costs and threat to quality of life in many countries. Improved surveillance tools and standardized definitions to facilitate better understanding of the burden of disease and risk factors are required. The organization

should consider compilation and dissemination of evidence-based, interdisciplinary treatment strategies, which are necessary to provide optimal care. Collaboration among all stakeholders can improve comparability of systems, instruments, diagnostic tools, and definitions. Further education and advocacy will help increase research support to improve surveillance systems, disease definitions, and initiation of comparative effectiveness studies necessary to develop evidence-based treatment guidelines.

Task Group 6: Research (Chair: David Burr, PhD)

Priority Area 6.1: Basic Research

As noted in the introduction, musculoskeletal conditions are under-researched relative to the burden of disease at essentially every level, lagging behind other chronic diseases. The discrepancy between research funding and the prevalence of disease impairs progress in reducing the burden of musculoskeletal disease in all countries. Basic research questions, many of which are narrowly focused, lack integration across other relevant organ systems and informative disciplines. The primary goal of the organization “beyond the decade” should be to increase the quantity, quality, and relevance of musculoskeletal research. A secondary goal should be to foster translation of basic results into new prevention measures, risk assessment tools, products, approaches, and therapies for musculoskeletal disease.

Priority Area 6.2: Comparative Effectiveness Research

One mechanism to facilitate translation of research to clinical practice is through comparative effectiveness studies that overcome the limitations of clinical trials and provide data on how to choose among therapeutic strategies. The organization should help define critical therapeutic areas, such as evaluation of treatments for osteoporosis and osteoarthritis, that can allow investigators to assess differences in effectiveness of treatments among demographic groups.

Priority Area 6.3: Clinical Research and Innovative Trial Designs

Enhanced musculoskeletal research may require more innovative clinical trial designs than randomized controlled trials, which can be prohibitive in the modern environment because of difficulty attaining an appropriate sample size and because of cost. The organization, in collaboration with participating organizations, should seek to identify surrogate end points in some studies, and it should foster more collaborative public-private partnerships to allow for the breadth and depth of expertise necessary to design, implement, and analyze clinical data and to provide greater financial support for important trials. It is important that the organization work to include patient advocacy groups in this effort.

Priority Area 6.4: Translation to the Community

New knowledge generated from comparative effectiveness and clinical research must be translated to the patient populations it is intended to serve and to their health-care providers. Despite

considerable progress in tools to diagnose musculoskeletal diseases and the availability of new drugs and surgical treatments, there are substantial obstacles in translating these advances into patient care. The major obstacles include insufficient recognition of the importance of musculoskeletal conditions as well as access to care. The USBJI should work with other groups to facilitate improved access to high-quality care, especially to eliminate differences in outcome based on sex, race, ethnicity, and geographic location.

Priority Area 6.5: Health-Care Reform and Public Health Interventions

Ultimately, issues of patient care are dependent on satisfactory health-care delivery systems and an emphasis on prevention. Scientific evidence backs public health interventions for musculoskeletal conditions, but these interventions must be expanded, made more accessible, and utilized by patients and the public. The organization should promote greater engagement of the public health community in advocacy efforts.

Priority Area 6.6: Rare Musculoskeletal Diseases

Greater collaboration is necessary to achieve progress in rare musculoskeletal diseases, which are often overlooked because of their lower prevalence. Expertise in these areas is difficult to achieve without a coherent and coordinated information network. Patient populations are small in number and widespread, thus presenting unique challenges for scientists. The organization should strive to identify and coordinate a network of information resources, hold forums, and coordinate efforts to enhance and encourage research and professional and public education.

Priority Area 6.7: Training Programs

Because these issues in research and health-care delivery are long-term challenges, and will likely outlive the current generation of scientists, it is vitally important to recruit, train, and support the next generation. Multidisciplinary training should be broadened, attracting the best minds and engaging under-represented populations. It is important, as a musculoskeletal community, to provide more stable training opportunities with shorter career tracks, to broaden training opportunities, and to create multidisciplinary research consortia that provide new opportunities to recruit students into the field.

The disincentives for entering a research career, often financial, are particularly striking for physician-scientists. One benefit of involvement of physician-scientists in translational and basic research is that they bring a clear sense of the problems that need to be solved, and their absence creates the possibility of a rift between those in the research laboratory and those at the bedside, detracting from research that easily translates to patient care and improved health.

There is currently no formal curriculum for training students and health-care professionals in the concepts of basic and translational musculoskeletal research and no continuous focus on research through all educational levels (e.g., medical school, residency, fellowship). Ideally, training of health-care

professionals in research should occur at all levels of education to inform them regarding the increasing amount of data and knowledge; this should be the immediate goal as curricula change in response to recent mandates from accrediting organizations.

Priority Area 6.8: Raise Public Awareness and Promote Advocacy for Research

Advocacy ultimately involves dissemination of information to the public, governmental legislative agencies, and the private sector. There is a large gap in knowledge among the general public about bone and joint health that may eventually affect the success of public health interventions. The role played by a good understanding of behavior and lifestyle choices is critical. The USBJI should promote partnerships with various media sources to develop and provide resources and materials that can be disseminated to the widest possible populations.

Legislative authority too often places obstacles in the path of solutions to these problems. Dwindling pharmaceutical company support, in part the result of increasing regulatory oversight, has negatively impacted bone and joint health research and has limited partnerships, which need to be restored, between industry and musculoskeletal health-focused researchers. Action plans should focus on legislation and regulatory oversight to enable the conduct of clinical trials that are safe, efficient, and reasonable to perform.

Conclusions

The experts who participated in this strategic planning process for the USBJI have provided a detailed framework cataloging the most urgent needs of musculoskeletal health-care providers, researchers, and patients “beyond the decade.” Although much has been accomplished during the ten years of the global Bone and Joint Decade and the USBJI, many gaps and challenges remain. It is not feasible for one organization to address all of the priority areas listed, but the USBJI can serve as a catalyst, bringing disparate organizations in the musculoskeletal community together to collectively address the many challenges itemized above. As such, the organization has a critical role to play “beyond the decade” in reducing the burden of musculoskeletal disease. ■

Joshua J. Jacobs, MD
Department of Orthopaedic Surgery,
Rush University Medical Center,
1611 West Harrison Street, Suite 300,
Chicago, IL 60612

Toby R.W. King, CAE
U.S. Bone and Joint Initiative,
6300 North River Road,
Rosemont, IL 60018

John H. Klippel, MD
Arthritis Foundation,

1330 West Peachtree Street, Suite 100,
Atlanta, GA 30309

Sigurd H. Berven, MD
Department of Orthopaedic Surgery,
University of California San Francisco,
500 Parnassus Avenue MU-320W,
San Francisco, CA 94143-0728

David B. Burr, PhD
Department of Anatomy and Cell Biology,
Indiana University School of Medicine,
MS 5035, 635 Barnhill Drive,
Indianapolis, IN 46202

Paul M. Caskey, MD
Shriners Hospitals for Children Spokane,
911 West 5th Ave,
Spokane, WA 99204-2901

Ann L. Elderkin, PA
American Society for Bone and Mineral Research,
2025 M Street N.W., Suite 800,
Washington, DC 20036-3309

Paul W. Esposito, MD
Children's Hospital & Medical Center,
8200 Dodge Street—Pavilion 4th Floor,
Omaha, NE 68114

Eric P. Gall, MD
Arizona Arthritis Center,
University of Arizona,
1501 North Campbell Avenue,
Tucson, AZ 85724

Steven R. Goldring, MD
Hospital for Special Surgery,
535 East 70th Street,
New York, NY 10021

Andrew N. Pollak, MD
Orthopaedic Surgery—Shock Trauma Center,
University of Maryland Medical Center,
22 South Greene Street,
Baltimore, MD 21201-1595

Christy I. Sandborg, MD
Pediatric Rheumatology,
Stanford University School of Medicine,
Lucile Salter Packard Children's Hospital,
300 Pasteur Drive, A085 A MC 5208,
Stanford, CA 94305

Kimberly J. Templeton, MD
Musculoskeletal Oncology,
University of Kansas Medical Center,
3901 Rainbow Boulevard, SM 3017,
Kansas City, KS 66160

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