

## 2017 Full Submission

**Title:** Musculoskeletal (MSK) Education Virtual Centre for Current and Future Primary Care Providers (PCP)

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**Focused Question:** Despite the high frequency of patients presenting with musculoskeletal (MSK) disorders, primary care of MSK disorders providers are often underprepared to deliver effective care. Our focus is to explore the extent to which an on-line curriculum aiming to scale-up core competencies, results in improved MSK knowledge and care delivery among learners.

**Background:** Musculoskeletal (MSK) disorders, including but not limited to arthritis, acute back dysfunction and chronic functional pain, affects an estimated 126.6 million American adults and accounts for about \$874 million in annual treatment cost and lost wages. The epidemiology of MSK disorders and disability are staggering: 51.8 million adults in the United States reportedly have arthritis; 75.7 million adults suffer from neck or low back pain; and one in two women and one in four men over the age of 50 years will have an osteoporosis related fracture (1). Disorders of the MSK system remain among the primary reasons that individuals consult healthcare providers in the United States and account for approximately 20 percent of visits to emergency departments and primary care clinics (2-4). A survey of 300 primary care physicians reported that 30-40% of their case load involved people presenting with MSK complaints (5). Despite the high frequency of patients presenting with musculoskeletal (MSK) disorders, and the overall impact on individuals and society, health care providers ranging from physicians, nurses, physician assistants and other primary care providers (PCPs) consistently report not being well prepared to assess, diagnose and ultimately manage the increasing complexities of MSK disorders (6). Ultimately health professionals working in primary care simply may not be well prepared to treat MSK disorders during their formative years. For instance, Freedman and Bernstein, along with others, have reported medical school graduates have a lack of cognitive mastery in MSK medicine when evaluated using a validated examination (4,7-9). Additionally, numerous surveys and evaluations have reported that residents and practicing physicians lack confidence in patient care

related to MSK medicine (8-14, 15). The published literature is rich with studies demonstrating deficiencies in MSK knowledge, and some that provide comparative studies of one profession compared to another, in their competencies to assess and treat MSK disorders (16). However, the fact remains that there is wide variation in practice and approach as it relates to the medical and therapeutic management of MSK disorder. This variation in practice patterns may partially explain the national crisis regarding opioid addictions as PCPs attempt to manage MSK disorders with pharmaceuticals (17, 18).

One organization that has advocated for greater MSK education for all health disciplines across the continuum has been the United States Bone and Joint Initiative (USBJI). Since that time 2003, the USBJI, with the help of the Association of American Medical Colleges (AAMC) has advocated, with some success, for the incorporation of dedicated MSK coursework into the core curriculum in health professional schools. In 2011, a follow-up study by Bernstein et al. to assess the rate of required instruction in MSK medicine found that as of 2010, the number of US medical schools with required MSK instruction had increased to 83%, and that 78.7% (100/127) of these MSK courses are taught in the first two years (19). While this study demonstrated an improvement in prevalence of dedicated MSK curriculum, there is still an unanswered question regarding the quality and content of required clinical courses as only 15 percent (20/136) of medical school's curriculum has required MSK clinical instruction (3). Others have articulated similar outcomes (11, 20, 21). The relative low MSK content exists in medical schools, and while not consistent, other health disciplines educational programs included within the diaspora of evolving primary care providers such as nurses, nurse practitioners, physician assistants and physical therapists have wide range of MSK content built into their curricula. This variation in preparatory experience to effectively manage MSK disorders is again juxtaposed against the high (and growing) frequency of occurrence in clinical practice.

Since 2003, national efforts to promote MSK medicine education have been a priority for the US Bone and Joint Initiative (USBJI), as there have been demonstrated inadequacies in the knowledge and comfort of both physicians and medical students. Overall, even when additional MSK content is built into curricula, the outcomes in terms of clinical competency is varied, possibly indicating a lack of integration of modern and more effective learning environments. Interactive student-centered learning using problem based learning (PBL) and team-based learning (TBL) formats have also been shown to improve student comprehension, retention, and critical thinking (21). In summary, the frequency of MSK related condition presenting in primary care is high (and growing), but the competencies and confidence among many PCPs to effectively manage MSK is low; we propose implementing and assessing an innovative on-line curriculum to bridge this gap.

### **Specific Aims:**

Aim #1: Produce an externally validated, one-month on-line MSK education course, for health professional students and multidisciplinary teams practicing as primary care providers (PCPs). The courses will employ flipped classroom teaching approaches and other educational innovations, with prepared on-line videos for independent synchronous and asynchronous viewing. This work will be connected to the national USBJI which will help to highlight the work and to increase potential distribution.

Aim #2: Develop an innovative way in which to create on-line community of learners where TBL and PBL can be applicable.

Aim #3: Use a mixed-method approach to assess the qualitative and quantitative outcomes among those preparing the content, and among the users if the content

### **Methods:**

The project will be divided into four interactive phases across 12-months.

Phase 1: (month 0-1): Early in this first phase, we will assemble the investigator team to confirm the structure, process and outcomes of the initiative, and to submit and IRB protocol (see Phase 3).

Recognizing that the PI and the co-investigators do not represent the full breadth and depth of PCPs involved in MSK patient management, we plan to constitute a Project Implementation Unit (PIU), which will serve as an external source to validate both the development of the content and assessment (Phase 2 & 3), as well as the gathering of all data to develop a series of 'lessons learned' (Phase 4). The composition (and confirmed participation) of the PIU is as follows: Co-chairs: Fraser Leversedge, MD (hand surgery) and Kathryn Andolsek, MD, MPH (family medicine). PIU members include a wide variety of health professionals from across Duke (Confirmed names can be provided - they were not included here due to space limitations). We do not currently have health professional student or patient advocate groups representation on this PIU, but we plan to do so leading up to the first meeting of the PIU.

Phase 2: (month 2-7): During this second phase, the focus will be on the development of the content and assessments within the videos (Aim #1). Through our connections to the USBJI, we have already developed the overall course plan into 14 different segments. Individuals from different professions have already been 14 Team Leaders recruited to lead teams that will develop videos, cases and assessments for anatomic and disease specific course segments. The planned video scheduling includes: Video #1: Low Back Pain, Video #2: Cervical, Video #3: Shoulder, Video #4: Upper Extremity Video #5; Hip & Thigh; Video #6 Pain Management; Video #7; Knee and Lower Leg; Video #8: Foot & Ankle; Video #9 Osteoarthritis; Video #10 Inflammatory Arthritis; Video #11 Osteoporosis; Video #12 Mechanical & Postural; Video #13 PCP; Video #14 MSK Anatomy.

All videos will be made produced in studio located within the Duke Doctor of Physical Therapy Division (Erwin Square). Video production is a multi-stage process that includes significant preparation and editing, all of which is familiar to the DPT as they use increasing on-line content in their curriculum. The full description of the process of pre-and post-production will not be described here due to space limitation. However, the full course will be hosted on the DPTs CANVAS site (i.e. Duke learning platform) where different participant groups can be easily matriculated, and where technical difficulties can be easily managed by DPT staff.

Phase 3: (month 8-11): We will target 3 distinct participating groups for this 1-month online educational course: Group A: Health professional students at Duke University. Expected time commitment is 5-10 hours per week, however the students group will not earn credit for participation as this course as it is not located within any of the official curricula. Group B: Primary care providers within the DUHS. Group

C: Primary Care providers within the Durham community. We plan to approach Lincoln Health Centre to explore their interest in participating. Among these 3 target groups, we also plan to offer the opportunity of participant from all groups to take the course synchronously (all participants to follow a similar weekly curriculum) or asynchronously (participants can take the course at their own pace, similar to the on-demand style of Coursera). The asynchronous and the synchronous groups will be exposed to the same content, but the synchronous group will have a greater degree collaborative learning experiences (Aim #2). The outcomes measure that will be used in this pilot project will be based on both the faculty, and the participants. Briefly, the quantitative assessment: Assessment of health profession students and providers during the course will be accomplished with pre-and post-questions imbedded in the on-line mini-lectures. Moreover, the synchronous group will have additional opportunity for team based learning modules and events. At the culmination of the course, all participants will be invited to participate in an OSCE for physical examination skills. The qualitative assessment: A sample of 10 participants from all groups will be invited to a focus group interview to explore the extent to which this strategy was beneficial, and the identify barriers and facilitators. All data will be held in locked files in the office of the PI, and data management and analysis will be led by the PI with support from the investigator team.

Phase 4: (month 12): Given the pilot nature of this initiative, we plan to come together as a group of investigators, and the PIU, to further discuss the success and challenged encountered during this process in order to arrive a set of lessons learned regarding scaling up of MSK clinical competencies.

**IRB status:** Plan to submit.

**Challenges:** There expect three primary challenges: First, instructors have already committed to working with us to provide the content. However, schedules can change fairly dramatically. We expect that the experts that have been identified will be able to provide their in-kind contribution, but this can be an unknown. We plan to mitigate this challenge with good communication and by ensuring that production of videos is streamline. Second, many participants begin on-line courses such as the one we are proposing, but we acknowledge that many participants do not finish. We plan to lessen this challenge through again good communication with participants and by providing constant and relevant commentary to their progress. Third, clinical MSK practice is not static, and thus there is a need to be continuously updating the material. We plan to mitigate this challenge by adding the most recent and useful reading materials, and by conducting annual audits of the videos to ensure relevance.

**Budget Template:**

PI Effort	\$0	PI will allocate 5% effort in kind.
Consult costs:	\$7350	Video editing @ \$75/hour. Estimated at 7 hours per one hour of productions.
Equipment:	\$1500	In order to produce videos we will require a new mobization plinth/table. We are requesting 1150 and DPT will pay the 850 balance.
Supplies:	\$1500	For purchase of 15 inch macbook pro

		with 512 GB storage. Total cost 2799.00 Balance will be paid by DPT. We require separate and dedicated computer to keep all of the files and research data secure.
Computer	\$1000	3 tablets for training/data collection
Travel:		
Total Requested:	\$11,350	

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