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SHORT COMMUNICATION

Telementoring: a novel approach to reducing the osteoporosis treatment gap

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Abstract
Summary Bone Health ECHO telementors healthcare professionals to develop the clinical skills needed to provide advanced levels of care for patients with skeletal disorders. The goal of this mentorship model is to improve osteoporosis care in underserved areas, decrease the need for referral to specialty centers, and reduce the osteoporosis treatment gap.
Introduction The Project ECHO (Extension for Community Healthcare Outcomes) model of telementoring has been shown to improve the care individuals with chronic hepatitis C. ECHO has since been adapted to the address unmet needs in the care of other chronic complex diseases and recently applied to the care of osteoporosis and metabolic bone diseases.
Methods Bone Health ECHO outcomes are assessed through an electronic data collector asking qualitative questions about self-efficacy. This is a progress report of Bone Health ECHO from its launch in October 2015 through May 2016.
Results A total of 31 weekly Bone Health ECHO clinics were held over 8 months, with 43 individuals participating at least one clinic session. The number of clinics attended range from 1 to 30, with 13 learners attending more than 10 clinics and an average of 11 learners per clinic. Self-efficacy information provided by learners was diverse with many favorable anticipated changes in clinical practice.
Conclusions Bone Health ECHO telementors healthcare professionals in underserved areas to provide advanced levels of care for patients with skeletal disorders. The experience of Bone Health ECHO will guide the development of similar telementoring clinics in other locations. More data are needed to fully evaluate this novel approach to reducing the osteoporosis treatment gap.

Keywords ECHO · Osteoporosis · Telehealth · Telemedicine · Telementoring · Treatment gap

Introduction

Treatment gap is the proportion of individuals, often expressed as a percentage, who could benefit from treatment but do not receive it. Despite the availability of many medications proven to reduce fracture risk [1], the treatment gap for osteoporosis is large, well-documented, and appears to be worsening. In the European Union (EU), the osteoporosis treatment gap for women was assessed for 25 countries with the scorecard for osteoporosis (SCOPE) [2]. The treatment gap ranged from a high (i.e., worst) of 95 % in Bulgaria to a low (i.e., best) of 25 % in Spain. Overall for the EU, out of 18.4 million women who qualified for osteoporosis treatment by having met the intervention threshold of 10-year fracture probability established with several guidelines, 10.6 million were untreated—a treatment gap of 57 %. Another method of assessing the treatment gap is analysis of health insurance claims databases for post-fracture treatment. In a United States (US) study of 96,887 men and women with hip

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fractures from 2002 through 2011, only 24 % (n = 23,250) received an osteoporosis medication within 12 months—a treatment gap of 76 % [3]. Treatment rates declined over the study period, from 40.2 % in 2002 to 20.5 % in 2011 (P for trend <0.001). A population-based analysis of a large administrative data repository in Manitoba, Canada, showed that in the years 2007/2008, only 5.9 % of untreated individuals with a low trauma fracture were treated with a medication to reduce fracture risk. [4]. The treatment gap extends to patients who are prescribed medication to reduce fracture risk but do not fill the prescription, do not take it correctly, or do not take it long enough to achieve the expected benefit [5]. Regardless of how or where the osteoporosis treatment gap is measured, undertreatment of osteoporosis is common.

The origins of the osteoporosis treatment gap are multifactorial. Contributing factors probably include the misperception that osteoporosis is a normal part of aging and not a treatable disease, the false idea that it is only a woman's disease, lack of availability of bone mineral density (BMD) testing by dual-energy X-ray absorptiometry (DXA) due to poor reimbursement and/or rural environment, poor understanding of current clinical practice guidelines for osteoporosis, poor understanding of the balance of benefits and risks with osteoporosis treatment, lack of osteoporosis "ownership" by any single medical specialty, a decrease in marketing of osteoporosis medications due to patent expirations, poor awareness of clinical risk factors for fracture, lack of expertise or interest in the care of osteoporosis by some primary care providers, and limited access to a small number of osteoporosis specialists who may be located in academic centers far from patients who need their care.

There is no single remedy for closing the osteoporosis treatment gap. Understandably, a variety of strategies has been proposed and/or implemented, often with a modest but not overwhelming level of success. These include education of healthcare providers and patients, more effective DXA reporting, better clinical tools for communicating benefit and risk, the use of fracture risk assessment algorithms such as FRAX, consideration of treat-to-target for osteoporosis, development of new therapeutic agents, financial incentives or disincentives for hospitals and physicians, automated reminders integrated with electronic medical records, and a systematic method for secondary fracture prevention through a fracture liaison service (FLS). The widespread adoption of FLS, if it comes to fruition, offers the potential of improving osteoporosis care in a cost-effective manner [6] and is appropriately a focus of great attention. Still, the osteoporosis treatment gap remains unacceptably large. Other means of closing this gap deserve continuing scrutiny.

Project ECHO (Extension for Community Healthcare Outcomes) was launched in 2003 at the University of New Mexico (UNM) Health Sciences Center in Albuquerque, New Mexico, US. The original aim was to improve the care of hepatitis C, another chronic disease for which there was a large treatment gap [7]. Lack of treatment in New Mexico was attributed to many factors, including distance from specialty care, lack of medical training, treatment side effects, and cultural issues. The ECHO model (Fig. 1) used real-time videoconferencing technology with a "hub and spoke" system linking a team of experts (the hub) at the university and primary care providers (the spokes) in rural New Mexico. Teaching (mentoring) was primarily through case-based discussions of real but de-identified patient cases, with great care to preserve patient confidentiality. Learners developed a level of expertise that allowed them to provide the bulk of care for hepatitis C patients in their communities. An analysis of outcomes for 407 patients managed at 21 ECHO sites showed a sustained virologic response (58.2 % of patients) that was similar to patients treated at the university specialty clinic (57.5 % of patients, P for difference = 0.89) [8]. These favorable findings, published in 2011, supported continuation of the Hepatitis C ECHO clinic and provided proof of concept that the ECHO model could improve clinical outcomes for a chronic complex disease in rural underserved communities. Subsequently, the ECHO model of telementoring has been replicated for other hepatitis C clinics and for other diseases in other states and countries [9–13]. This is a progress report of Bone Health ECHO, a novel approach to reducing the osteoporosis treatment gap through telementoring that was launched in 2015 [14, 15].

Bone Health ECHO

The first Bone Health ECHO clinic, developed at the UNM Health Sciences Center in cooperation with the Osteoporosis Foundation of New Mexico, was launched in October 2015. The structure was based on the established ECHO model of telementoring and intended to serve as model for replication in other geographic locations worldwide. Bone Health ECHO consists of a multidisciplinary faculty team (hub) with expertise in the care of skeletal disorders interacting with learning partners (spokes) through a weekly 1-h videoconference.

Mentoring at each Bone Health ECHO is primarily accomplished through discussion of real patient cases de-identified according to current US Health Insurance Portability and Accountability (HIPAA) regulations. The intent is not to treat the patient or provide consulting services, but rather to develop teaching points that apply to many patients with similar issues. The learning partners retain all responsibility for treatment decisions. A template for case presentations is used in order to provide a structured format that includes bone-related elements of the history and physical exam, as well as bone density tests, laboratory tests, and imaging. The template serves as an educational tool, assuring that essential information is included and omission of important information can be easily recognized. At each session, there is a short didactic

Fig. 1 Project ECHO concept. There are not enough medical specialists to manage every patient who needs the care of a specialist. This is a particular concern in rural underserved communities. Project ECHO uses videoconferencing technology to link faculty teams at an academic center to primary care providers in local communities. The learners are expected to achieve a level of expertise sufficient to provide advanced-level care in the area of interest for most patients. Reproduced with permission from Project ECHO (http://echo.unm.edu/)

presentation by an osteoporosis expert; the topic is set in advance according to an established 1-year curriculum that allows for insertion of open topics that are selected according to the interests and needs of the participants. Learning partners may participate in any or all clinic sessions for any duration of time. As with other ECHO clinics, it is anticipated that as learner level of expertise advances over time, participation may become less frequent, perhaps limited to occasional presentation of a perplexing case.

Bone Health ECHO is currently funded through grants provided by Project ECHO, providing staff, equipment, and IT support. Faculty members receive no direct financial compensation for teaching activities and learning partners are not paid for participation. Continuing medical education (CME) credits are provided at no charge to participants through UNM.

Bone Health ECHO collaborative

Bone Health ECHO represents the inaugural use of the ECHO model for osteoporosis. The New Mexico experience provides a template for Bone Health ECHO replication in other states and countries. A collaboration between the original UNM Bone Health ECHO and potential ECHO development at universities in three other states (Utah, Arkansas, and Alabama) has been explored, with plans for sharing the successes and failures of teaching strategies, using a common curriculum, and pooling outcomes data once other Bone Health ECHO programs are operational. Success with these early Bone Health ECHO initiatives may stimulate the development of more Bone Health ECHO replications.

Methods

Registration for Bone Health ECHO is processed online through the website of the Osteoporosis Foundation of New Mexico (www.ofnm.org), where demographic information of learners is collected. Bone Health ECHO outcomes are assessed the Program Evaluation Electronic Roll Call & Instant CME collector, an online tool that collects attendance data and asks qualitative questions about self-efficacy and anticipated changes in clinical practice. These findings are used to generate monthly feedback reports. This is a progress report of the first 8 months of the UNM Bone Health ECHO demonstration project, from October 2015 through May 2016.

Suggestions for topics for future didactic presentations are assessed after each Bone Health ECHO clinic through evaluations submitted by learners and analyzed by research staff. Following each clinic, faculty and staff dedicate time to reviewing the progress of the clinic and modifying future clinics to address unmet needs.

In collaboration with three other universities, a study is being designed to analyze US Medicare claims data for osteoporosis diagnosis, bone density tests, and prescriptions to reduce fracture risk before and after the ECHO intervention, with a comparator group of clinicians not participating in the ECHO program who are in the same geographic region and have a similar case mix of patients. As other Bone Health ECHO replication clinics become active, we anticipate pooling of data from multiple sites. As there is about a 2-year lag time from filing of a claim to availability of the data for analysis, we anticipate that it will be at least 4 years from now before 2 years of post-intervention outcomes can be reported for the providers currently participating in Bone Health ECHO.

Results

Over the first 8 months of Bone Health ECHO, 31 weekly teleclinics were conducted. During this time, there were 50 registered learners from 15 US states and 1 other country, 13 registered observers, 5 core faculty, and 10 guest faculty. Of the registered learners, there were 43 who attended at least 1 ECHO clinic and are included in this analysis. They represented great diversity by specialty and location (Fig. 2). There were 26 physicians (60 % of total), 15 physician extenders (35 % of total, including nurse practitioners, registered nurses, physician assistants, and a nurse midwife), and 2 others (5 % of total). Physician specialties included internal medicine, family practice,

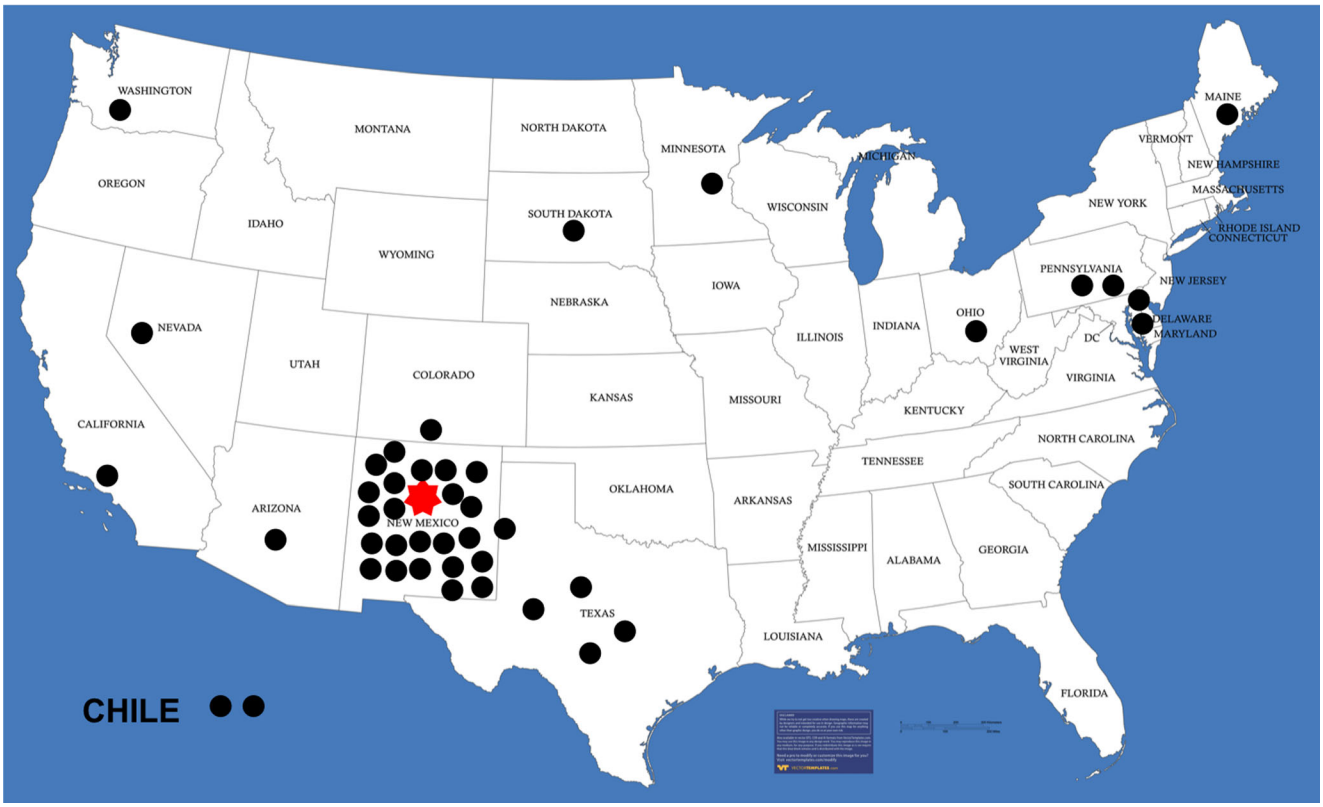

Fig. 2 Geographic distribution of UNM Bone Health ECHO learning partners. The *star* represents the hub in Albuquerque. Each *mark* represents one of the 43 learning partners who participated in at least 1 Bone Health ECHO clinic in the first 8 months of activity. Many others (not marked on this map) participated as observers and guest faculty. (source: Bone Health ECHO attendance records, October 2015 through May 2016; map template obtained with permission from www.vectortemplates.com)

endocrinology, rheumatology, and orthopedics. Geographic distribution was New Mexico (n = 24), other states (n = 17), and other country (n = 2). The number of ECHO clinic sessions attended by learners ranged from 1 to 30, with an average of 11 at each clinic, plus faculty, observers, and support staff. There were 6 learners who attended more than 20 clinics, 13 who attended more than 10, 15 who attended more than 5, and 26 who attended more than 1. A few individuals have registered but attended no clinics or attended clinics without registering. At total of 34 case presentations were discussed, with each presenter receiving a brief written summary of the key "take-home points" that were developed. Anticipated clinical practice changes reported by learners included more thorough evaluation of risk factors for osteoporosis, more effective DXA screening, better use of lab tests to assess secondary causes of osteoporosis, better selection of patients for treatment based on current guidelines, educate colleagues on care of osteoporosis, correct use of FRAX for fracture risk assessment, better use of dietary history for nutritional factors contributing to osteoporosis, advocate for FLS, use vitamin D supplementation more appropriately, better use of physical therapists, better appreciation of benefits and risks of bisphosphonate therapy, understanding of the clinical relevance of low serum alkaline phosphatase level, and more effective use of sequential osteoporosis therapy.

Discussion

There is no single remedy to close the osteoporosis treatment gap. Since the origins of the treatment gap are multifactorial, the solutions must also be many-faceted. Telementoring with Bone Health ECHO addresses several shortcomings with conventional osteoporosis care (or lack of care). Healthcare professionals in underserved areas are provided the opportunity to develop advanced clinical skills in the management of skeletal diseases without the cost and inconvenience of traveling to a distant medical education meeting. The collegiality of interacting with mentors and peers on an ongoing basis helps to combat professional isolation that is common in rural communities. When advanced clinical skills are attained, patients benefit by having better medical care closer to home, avoiding the cost and inconvenience of travel to a specialty clinic that may be far from home. The recognition of patients at high risk for fracture and appropriate treatment to reduce fracture risk can reduce the economic and personal burden of osteoporotic fractures.

The impact of a single Bone Health ECHO clinic with 43 learning partners may appear to be modest. However, the force multiplier effect can be large when the impact on patient care is considered. As the learning partners become more proficient in treating osteoporosis and this

becomes known in their communities, they are likely to receive referral patients from other local providers. If more Bone Health ECHO clinics are replicated in other states and countries, the effect could be very much greater. Other potential applications for the ECHO strategy include education of FLS coordinators to enhance the effectiveness of secondary fracture prevention, education of residents and fellows in programs that lack in-house expertise in bone diseases, system-wide education of clinicians in healthcare delivery systems such as the US Veterans Administration and Indian Health Service, and education of DXA technologists and interpreters in quality bone density testing.

There are challenges to initiating and maintaining a Bone Health ECHO clinic. A dedicated "champion" with a strong interest in osteoporosis education is needed to spearhead the effort. An ideal ECHO hub includes a place for faculty to meet and broadcast, with necessary equipment and staff support. Learning partners must be recruited and their educational needs must be met as evidenced by outcomes. Time must be set aside to organize and coordinate case presentations and didactic presentations. The budget for Bone Health ECHO includes the cost of meeting space, computer equipment with IT support, staff time, and faculty time. The costs can be minimized if space and computer equipment are already available in a university or practice setting. The cost of personnel may be partly or totally covered through university budgets. Faculty may be willing to volunteer their time. Grants may be available from federal, state, or private sources. Since cost savings in terms of avoidance of fracture-related healthcare expenses could ultimately exceed the cost of Bone Health ECHO, payers of healthcare services may be willing to provide financial support. The cost-effectiveness and benefits with improved clinical outcomes are unproven at this time.

Summary

The osteoporosis treatment gap is a major public health concern. Many methods to reduce the treatment gap have been proposed and evaluated. Telementoring of healthcare professionals using the Bone Health ECHO model offers the potential of improving osteoporosis care in underserved communities and reducing the osteoporosis treatment gap. More study is planned to evaluate the long-term effects on clinical outcomes.

Compliance with ethical standards

Conflict of interest E. Michael Lewiecki has received institutional grant/research support from Amgen, Merck, and Eli Lilly; he has served on scientific advisory boards for Amgen, Merck, Eli Lilly, Radius Health, Alexion, and Shire. Jeannie F. Boyle, Sanjeev Arora, Matthew F. Bouchonville II, and David H. Chafey declare that they have no conflict of interest. No writing assistance or funding was utilized in the production of this manuscript.

References

1. Drake MT, Clarke BL, Lewiecki E (2015) The pathophysiology and treatment of osteoporosis. Clin Ther 37:1837–1850
2. Kanis JA, Borgstrom F, Compston J, Dreinhofer K, Nolte E, Jonsson L, Lems WF, McCloskey EV, Rizzoli R, Stenmark J (2013) SCOPE: a scorecard for osteoporosis in Europe. Arch Osteoporos 8:144
3. Solomon DH, Johnston SS, Boytsov NN, McMorrow D, Lane JM, Krohn KD (2014) Osteoporosis medication use after hip fracture in U.S. patients between 2002 and 2011. J Bone Miner Res 29:1929–1937
4. Leslie WD, Giangregorio LM, Yogendran M, Azimaee M, Morin S, Metge C, Caetano P, Lix LM (2012) A population-based analysis of the post-fracture care gap 1996-2008: the situation is not improving. Osteoporos Int 23:1623–1629
5. Cramer JA, Gold DT, Silverman SL, Lewiecki EM (2007) A systematic review of persistence and compliance with bisphosphonates for osteoporosis. Osteoporos Int 18:1023–1031
6. Yates CJ, Chauchard MA, Liew D, Bucknill A, Wark JD (2015) Bridging the osteoporosis treatment gap: performance and cost-effectiveness of a fracture liaison service. J Clin Densitom 18:150–156
7. Arora S, Kalishman S, Dion D, et al. (2011) Partnering urban academic medical centers and rural primary care clinicians to provide complex chronic disease care. Health Aff (Millwood) 30:1176–1184
8. Arora S, Thornton K, Murata G, et al. (2011) Outcomes of treatment for hepatitis C virus infection by primary care providers. N Engl J Med 364:2199–2207
9. Dubin RE, Flannery J, Taenzer P, et al. (2015) ECHO Ontario Chronic Pain & Opioid Stewardship: providing access and building capacity for primary care providers in underserviced, rural, and remote communities. Stud Health Technol Inf 209:15–22
10. Kauth MR, Shipherd JC, Lindsay JA, Kirsh S, Knapp H, Matza L (2015) Teleconsultation and training of VHA providers on transgender care: implementation of a multisite hub system. Telemed J E Health
11. Katzman JG, Comerci G Jr, Boyle JF, et al. (2014) Innovative telementoring for pain management: project ECHO pain. J Contin Educ Heal Prof 34:68–75
12. Mitruka K, Thornton K, Cusick S, et al. (2014) Expanding primary care capacity to treat hepatitis C virus infection through an evidence-based care model—Arizona and Utah, 2012-2014. MMWR Morb Mortal Wkly Rep 63:393–398
13. Scott JD, Unruh KT, Catlin MC, et al. (2012) Project ECHO: a model for complex, chronic care in the Pacific Northwest region of the United States. J Telemed Telecare 18:481–484
14. Lewiecki EM, Bouchonville MF 2nd, Chafey DH, Bankhurst A, Arora S (2016) Bone Health ECHO: telementoring to improve osteoporosis care. Women's Health (Lond Engl) 12:79–81
15. Lewiecki EM, Baron R, Bilezikian JP, Gagel RE, Leonard MB, Leslie WD, McClung MR, Miller PD (2016) Proceedings of the 2015 Santa Fe bone symposium: clinical applications of scientific advances in osteoporosis and metabolic bone disease. J Clin Densitom 19:102–116