

Position Statement

Comparative Effectiveness Research

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The American Academy of Orthopaedic Surgeons (AAOS) believes that the development of high quality information that defines which diagnostic, treatment, and prevention services are most effective for specific patients and populations will improve informed patient choice and shared decision-making. Such efforts will maximize the improvement of health status of individuals and populations.

Overview and History

Comparative effectiveness research (CER) seeks to determine what works in real life situations such as those encountered in an individual practitioners practice setting for their particular patients. This differs significantly from randomized controlled studies (RCT) that seek to identify the maximal effect of an intervention under carefully controlled clinical and research circumstances. CER is defined by the Institute of Medicine (IOM) as the generation and synthesis of evidence that compares the benefits and harms of alternative methods to prevent, diagnose, treat, and monitor a clinical condition or to improve the delivery of care¹. The purpose of CER is to assist consumers, clinicians, purchasers, and policy makers to make informed decisions that will improve health care at both the individual and population levels. There has been a long history of efforts to assess new biomedical research by the Federal government culminating in the Patient Protection and Affordable Care Act (PPACA) of 2010.¹⁻⁸ These efforts have been accompanied by concerns that CER could lead to rationing of health care.

The marked expansion of federal governmental support for biomedical research led to the development of academic medical institutions after WWII. With the introduction of the Drug Amendment of 1962, the Social Security Amendments of 1965, and the Medical Device amendments of 1976 modern safety and efficacy regulations were first established.⁹⁻¹¹ Largely due to advances in biomedical technology, the costs of Medicare rose at unexpected levels leading to concerns about the federal government's ability to make good decisions about paying for new technology. Through the 1970's and 80's, the Technology Assessment Act created the Office of Technology Assessment (OTA), congress established the National Center for Health Care Technology (CHCT) and the National Center for Health Services Research and Development (NCHSR) within the Department of Health Education and Welfare which was the predecessor of the Department of Health and Human Services (DHHS). All had the purpose of determining whether Medicare should pay for new biotechnology and along with the Health Care Financing Administration (HCFA) predecessor of the Centers for Medicare and Medicaid Services

(CMS) funded research on the efficacy of medical treatments and delivery. Controversy and political opposition led to the elimination of the OTA and defunding of the CHCT with replacement of the NCHSR by the Agency for Health Care Policy and Research (AHCPR) in 1989. The AHCPR had broad responsibilities in determining whether Medicare should pay for medical technologies and in doing so was charged to consider the "safety, efficacy, and effectiveness, and as appropriate, the cost-effectiveness and appropriate uses of such technologies." A series of controversial decisions culminating with the development of guidelines for the treatment of low back pain led to the replacement of the AHCPR by the Agency for Healthcare Research and Quality (AHRQ) through the Health Care Research and Quality Act of 1999. The AHRQ was broadly charged to improve health care quality without setting national standards for care in an effort to avoid the political challenges faced by the AHCPR.^{5,6,9-11}

In 2003, the Medicare Modernization Act expanded the AHRQ's role in generating and disseminating evidence about the comparative effectiveness of medications, devices, diagnostic tools, and other interventions. A series of administrative and legislative actions, demonstration programs, and the economic recession of 2008 culminated in the American Recovery and Reinvestment Act of 2009 (ARRA). This act called for coordination of comparative effectiveness research across the federal government with the establishment of the Federal Coordinating Council for Comparative Effectiveness Research, a large expansion in funding for the AHRQ and research dollars for the NIH to fund CER (\$1.1 billion), creation of a list of national CER research priorities by the institutes of medicine (IOM), and funding to the FDA to improve methodologies for CER.^{1,5,6,13}

The passage of the PPACA in 2010 established the Patient-Centered Outcomes Research Trust Fund (PCORTF) and the Patient-Centered Outcomes Research Institute (PCORI).^{2,3,7,12,14} The stated purpose of this publicly supported, independent, non-profit institute is: "to assist patients, clinicians, purchasers, and policy makers in making informed health decisions by advancing the quality and relevance of evidence concerning the manner in which disease, disorders, and other health conditions can effectively and appropriately be prevented, diagnosed, treated, monitored, and managed through research and evidence synthesis that considers variations in patient subpopulations, and the dissemination of research findings with respect to the relative health outcomes, clinical effectiveness, and appropriateness of the medical treatments, services, and items described". In contrast to the British National Institute for Health Care and Excellence (NICE), PCORI is specifically restricted to "not develop or employ a dollars-per-quality adjusted life year (or similar measure that discounts the value of a life because of an individual's disability) as a threshold to establish what type of health care is cost effective or recommended. The secretary shall not utilize such an adjusted life year (or such a similar measure) as a threshold to determine coverage, reimbursement, or incentive programs under title XVIII."¹⁴⁻¹⁸

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Tools

Despite the focus of the federal government to separate the use of CER from the actions of defining public policy, investigators have viewed CER as combining elements of clinical effectiveness (CE), cost effectiveness analysis (CEA), and pragmatic trials in which benefits of treatments in routine clinical practice are assessed.¹⁹⁻²² Clinical effectiveness has been the focus of most traditional clinical research over time and has typically been highly controlled with the randomized controlled clinical trial being the gold standard research design to evaluate clinical efficacy.

The tools used to assess the comparative effectiveness are similar to those used in conventional evidence based medicine (EBM), but the methodology of this research is unfamiliar to many researchers and training programs.^{3,23} Systematic reviews, randomized clinical trials, and

analyses of observational databases are widely used in EBM as explanatory studies to determine clinical efficacy. By controlling for confounding variables, they maximize our understanding of intervention's singular effect, thus facilitating an understanding of if and how an intervention may work. In CER these tools can also be utilized, but the focus is on application of methods under routine practice situations without variable factors control (internal validity) using tools like the PRECIS²⁴ to determine how pragmatic or explanatory their trial is under non-ideal situations. By using more heterogeneous populations and clinical conditions, the impact upon priority populations is believed to be more definable and the resulting information potentially more useful to decision makers such as health care providers, patients, and policy makers. In essence, CER can be construed as a natural endpoint of EBM.

The AAOS believes that comparative effectiveness research using pragmatic study designs will be beneficial to the development of knowledge of which specific treatment interventions are most effective for patients under specific circumstances taking into account the specific medical, cultural, social, and unique needs of differing subpopulations.

The AAOS supports continued EBM research and explanatory studies that will continue to bring forth new technological developments in areas related to musculoskeletal health and care, increase our understanding of how specific interventions work and the conditions necessary to optimize improvements in health status.

The AAOS further believes that CER and more traditional EBM research are not mutually exclusive efforts and that rather than defunding one over the other, both should be highly supported as initiatives to enhance the value of health care.

Cost Effectiveness

The laws governing PCORI do not allow for the application of cost analysis that would discount the value of a life because of an individual's disability and because of fears of health care rationing. The rising cost of health care, however has created a need for better value within our health care system. CEA is a methodology utilized to help decision-makers allocate scarce resources. Incremental cost-effectiveness ratio (ICER) is an analytical tool used to do this. It divides the difference in costs between two treatments by the difference in outcomes. When both cost and health outcomes are portrayed in monetary amounts the same analysis becomes a Cost Benefit Analysis (CBA).

One of the outcomes measures widely used in CEA is the Quality-Adjusted Life Year (QALY) as a unit for measuring the health gain of an intervention. It assumes that health is a function of quantity of life and quality of life and that a year lived in perfect health is worth 1 QALY. If health status is less than perfect (utility value), then the QALY is adjusted accordingly based upon the degree of health status loss and/or the length of the year at a given health status. QALY's can then be incorporated with medical costs as cost/QALY to develop a CEA for any treatment or diagnostic tool.^{19, 21}

The AAOS supports comparative cost effective analyses of interventions done to prevent, diagnose, monitor, and manage the musculoskeletal health of diverse populations. The AAOS however, strongly believes that cost should not be the primary driver of policy decisions related to the comparative effectiveness of treatments of patients, and that strong consideration of efficacy, potential harms, and the unique circumstances of health status for each sub-population should be given.

Harms

Incorporation of harms into calculations of comparative effectiveness has not been widely used. These assessments have often been developed by FDA, FTC, and CMS evidentiary standards²⁵ or derived from observational studies. As harms are patient specific events, future research initiatives by PCORI are expected to incorporate more of this into comparative effectiveness assessments.

The AAOS believes that there should be ongoing research to identify potential harms of interventions or the withholding of interventions that takes into account the heterogeneity of patient populations and "real world" issues of health care delivery. The AAOS supports the development of CER methods that take into account these potential harms in the comparison of effect.

Implants and Medical Devices

Implants and medical devices have FDA regulated approval processes and FTC regulated marketing oversight that significantly impacts usage, litigation, and limits availability of measurement tools and outcomes data. CER for implants and medical devices has added complexities due to the large variation in pricing, complex methods for setting pricing, lack of unifying standards governing the industry of devices due to the broad scope of types of devices, and learning curves associated with the use of implants and devices that impact safety and efficacy in differing ways over time.^{16,23,26} Lack of agreement about how to conduct such assessments, lack of knowledge and expertise in how to construct and perform outcomes and effectiveness research, and limited access to measurement tools and outcomes data have been identified as needs in this area going forward.^{23,27,28}

The AAOS is committed to working with a broad range of stakeholders to develop methods for CER related to musculoskeletal care and specifically for procedures that involve implants. These methods should include increased use and transparency of outcome data through shared databases and should seek to eliminate outcome variations due to training and use.

Structure and Knowledge

In the United States, passage of the PPACA has stimulated much funding and interest in CER. Establishment of the federally supported, but independent PCORI has created a vehicle for these efforts in close collaboration with the NIH and AHCRQ who continue to fund efficacy studies while supporting efforts to develop and implement tools to support CER.

The methodology being used by PCORI has been to:¹⁶ :

- Prioritize research questions
- Develop and use appropriate study designs and analysis for CER
- Incorporate patient and stakeholder perspectives throughout the research continuum
- Foster efficient dissemination and implementation of results.

To implement this, PCORI has created patient focused questions to frame research efforts:

- Given my personal characteristics, conditions, and preference, what should I expect will happen to me?
- What are my options and what are the benefits and harms of those options?
- What can I do to improve the outcomes that are most important to me?

- How can the health care system improve my chances of achieving the outcomes I prefer?

The AAOS supports the role of an independent public-private entity that prioritizes, funds, conducts, and coordinates comparative effectiveness research. The AAOS supports the existing principles of CER as articulated in the charter for PCORI. These include:

- Having a single entity coordinate CER initiatives to avoid redundant efforts
- Maintaining stand-alone governance with federal and political independence
- Maintaining stable dedicated public and private financing of CER
- The use of rigorous research methods with transparency of methods, decision-making, and findings.
- Broad public and stakeholder involvement and representation in the development and dissemination phases of a CER
- Production of timely and objective research
- Development of accessible centralized repositories of CER activities
- Wide dissemination of information on a regular, recurring basis
- Maintaining a separation between research and policy setting

Unresolved are issues related to the transparency of process and information generation and the dissemination of information.²⁹ A prior IOM study has shown an average 17 years for the broad adoption of more effective treatment that has been linked to failure to trust new information, physician engagement to abandon less effective treatments, and acceptance of new treatments by the public and policy makers.^{2,30,31} Adoption of CER by policy makers and patients and consumer groups is believed to require continued independence of process, expanded education of consumers, and the creation of an increasing array of real time tools.^{31,32}

Coincident with the focus on CER and patient centered outcomes has been the push towards expansion of electronic health records, integrated health care systems, and greater detail in documentation. Much of this is driven by the PPACA, but realization of enhancements in patient care and safety is still limited with an increasing recognition of the need for accuracy in documentation and incorporation of patient centered outcomes into these processes.³³⁻³⁵

The AAOS believes that expanded use of electronic health records to capture patient related outcomes is of benefit in CER in real world settings and should be encouraged and supported by CER initiatives.

The AAOS strongly supports widespread dissemination of the findings of CER and believes that this should be done through partnerships with professional medical specialty organizations such as the AAOS and its specialty societies.

Gaps in the knowledge to execute CER have been increasingly identified.³⁶ Its application to diagnostic and population health issues is uncertain given the need to not only assess technology, but it's application and interface between disciplines.³⁶ Concerns also about the opportunity cost of shifting resources to this work and its impact upon technological advancement and innovation have been raised.^{12,36-38}

The AAOS believes that support of education and training in the methodology of CER by a broad range of public and private entities is needed to optimize the ability of CER to positively impact health status and health care spending in a meaningful way.

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