

Stakeholder Priorities for Comparative Effectiveness Research in Chronic Obstructive Pulmonary Disease

A Workshop Report

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Comparative effectiveness research (CER) is intended to address the expressed needs of patients, clinicians, and other stakeholders. Representatives of 54 stakeholder groups with an interest in chronic obstructive pulmonary disease (COPD) participated in workshops convened by the COPD Outcomes-based Network for Clinical Effectiveness and Research Translation (CONCERT) over a 2-year period. Year 1 focused on chronic care and care coordination. Year 2 focused on acute care and transitions in care between healthcare settings. Discussions and provisional voting were conducted via teleconferences and e-mail exchanges before the workshop. Final prioritization votes occurred after in-person discussions at the workshop. We used a modified Delphi approach to facilitate discussions and consensus building. To more easily quantify preferences and to evaluate the internal consistency of rankings, the Analytic Hierarchy Process was incorporated in Year 2. Results of preworkshop and final workshop voting often differed, suggesting that prioritization efforts relying solely on requests for topics from stakeholder groups without in-person discussion may provide different research priorities. Research priorities varied across stakeholder groups, but generally focused on studies to evaluate different approaches to healthcare delivery (e.g., spirometry for diagnosis and treatment, integrated healthcare strategies during transitions in care) rather than head-to-head comparisons of medications. This research agenda may help to inform groups intending to respond to CER funding opportunities in COPD. The methodologies used, detailed in the

online supplement, may also help to inform prioritization efforts for CER in other health conditions.

Keywords: health services research; research priorities; care coordination; stakeholders

Limited information exists regarding the comparative harms and benefits of treatment alternatives to guide healthcare decision making by patients, clinicians, and other stakeholders in usual practice settings (1). Also, healthcare costs have continued to increase as new and often more expensive treatments are adopted into practice, often without adequate evidence to support their use over existing alternatives (2). These considerations have sparked interest in comparative effectiveness research (CER), which consists of head-to-head comparisons of interventions, including pharmacologic agents, devices, and strategies for delivering healthcare (3). Several federally-funded programs have accelerated CER in the United States, including the Effective Health Care Program (2003), the American Recovery and Reinvestment Act (2009), and, most recently, provisions in the Affordable Care Act (2010), which authorized the creation of the Patient-Centered Outcomes Research Institute (4, 5). Funding opportunity announcements for CER, including those by Patient-Centered Outcomes Research Institute, have emphasized the importance of conducting studies that directly address the needs of patients, clinicians, and other stakeholders who use health-related information to ensure that the most important gaps in evidence for decision making are addressed. The Division of Lung Diseases of the National Heart, Lung, and Blood Institute convened a workshop on CER and also recommended engaging a diverse group of stakeholders to identify and prioritize questions for CER (6).

Chronic obstructive pulmonary disease (COPD) is a lung condition characterized by airflow limitation, progressive dyspnea, and cough, and is punctuated by episodic deteriorations (exacerbations). COPD is a leading cause of morbidity and mortality worldwide (7, 8) and the third leading cause of death in the United States (9, 10). A majority of patients with COPD have at least one other chronic condition (e.g., hypertension, heart failure, depression), receive care from more than one healthcare provider (e.g., primary care and specialist physicians, nurses, respiratory therapists), and cycle between chronic and acute care settings (e.g., outpatient clinic, hospital). Thus, CER topics for COPD need to address different aspects of COPD healthcare, including chronic care, care coordination, acute care, and transitions in care between healthcare settings.

Representatives of diverse stakeholder groups with an interest in COPD participated in premeeting teleconferences and

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in-person workshops convened by the COPD Outcomes-based Network for Clinical Effectiveness and Research Translation (CONCERT) over a 2-year period (11). Stakeholders included patient advocacy groups, private health plans/payers, physician and nonphysician professional organizations, quality improvement organizations, industry, research organizations, and government agencies that fund research (Table 1). Participants were not asked to disclose potential conflicts of interest (clinical, intellectual, or financial), but their biographies and roles in the stakeholder organization they were representing were included in meeting materials provided to all participants. Stakeholders were asked to develop a CER agenda for COPD in each of the following four areas: (1) chronic care, (2) care coordination, (3) acute care, and (4) transitions in care between healthcare settings. The workshop in Year 1 consisted of research prioritization activities for chronic care and care coordination, whereas the workshop in Year 2 focused on acute care and transitions in care for patients with COPD.

In this workshop report, we discuss the methodology and development of a national CER agenda for COPD, which may help to inform groups intending to respond to funding opportunities for CER in COPD. A detailed description of the methodology, including topic selection, voting procedures, and discussion about the strengths and limitations of the methodology, are available in the online supplement. In brief, stakeholders participated in preworkshop discussions to plan the meeting and to develop a provisional list of research priorities. Stakeholders then voted to identify provisional CER priorities before the in-person workshop, and the provisional topics were included in meeting material provided to participants (see Tables E2 and E3 in the online supplement). At the Year 1 and 2 workshops, we used the modified Delphi approach (12, 13), a standard approach to consensus development. At the conclusion of the Year 1 workshop, attendees completed a 10-question online satisfaction survey to provide anonymous feedback regarding the format and content of the meeting and to inform the planning for the second workshop. At the Year 2 workshop, we used the analytic hierarchy process (AHP; 14–16) to more easily quantify relative preferences for the various CER topics and to assess the internal consistency of voting. At the conclusion of the Year 2 workshop, stakeholders were asked to vote on the importance of various criteria used to set CER priorities. Before finalizing this workshop report, stakeholders and members of an External Advisory Committee (see ACKNOWLEDGMENTS) were invited to submit comments to a draft containing the prioritized research agenda.

STAKEHOLDER PARTICIPATION

Fifty-four stakeholder groups participated in the workshops (82% of 66 invited groups; Table 1), including 3 patient advocacy groups (4 invited), 4 health plans (5 invited), 18 professional organizations representing clinicians (24 invited), 3 quality improvement/accreditation organizations (4 invited), 1 representative of industry (2 invited), 11 research organizations (12 invited), 9 speakers (9 invited), and 5 government agencies (6 invited). Of the total 54 stakeholder groups invited for Year 1 and 2 workshops, 33 groups participated in Year 1 (38 individuals) and 42 groups participated in Year 2 (51 individuals). We did not collect information about why stakeholder groups participated in one but not both workshops. In cases in which there was more than one representative from a single stakeholder group, only one voting representative was permitted. The draft research questions and rationale proposed by stakeholders for each CER topic are provided in Tables E1 to E3. We present below the priorities for CER topics in each of the four areas (chronic care, care coordination, acute care, and transitions in care).

PRIORITIES FOR COMPARATIVE EFFECTIVENESS RESEARCH IN COPD

Chronic Care

Nine topics for chronic care were identified (Table 2). Preworkshop voting results indicated that all topics were important, with little separation (median importance scores 2–4; possible range 1–9). After discussions at the workshop, stakeholders were asked to rank the importance of topics to more easily distinguish between preferences. Final voting results indicated that *Spirometry for diagnosis and treatment* was the highest-priority topic (median rank 1). However, there remained substantial overlap in priorities. For example, three topics (*Effectiveness of pulmonary rehabilitation*, *Effectiveness of COPD care and guideline care translation*, and *Home care*) all had a median rank of 4, the second-highest priority rank. The interquartile ranges (IQRs) for ranks were also relatively wide, suggesting variable preferences among stakeholder groups.

Care Coordination

Eleven care coordination topics were identified (Table 3). As with chronic care topics, preworkshop voting results rated all care coordination topics as important. Final voting, using ranks, identified *Management of COPD in the presence of comorbidity* and *Pulmonary rehabilitation as a model for care coordination* as the highest two priorities (median ranks 3 and 3.5, respectively). However, none of the care coordination topics achieved a median rank of 1, and the IQRs for ranks were wide, indicating again substantial variability in preferences across stakeholder groups.

Acute Care

Eight topics for acute care (Table 4) were identified. Despite use of ranks for preworkshop voting, several topics had similar levels of importance (e.g., five topics had median ranks of 3–4 for acute COPD care).

Final voting results, using AHP to rank topics, indicated that *Implementation of COPD exacerbation checklist*, *Comorbid conditions in the acute setting*, and *Effectiveness and implementation of noninvasive ventilation (NIV)* were the most highly voted topics. These three topics had very similar idealized priority scores (1.0 [reference], 0.95, 0.80, respectively), indicating that *Comorbid conditions* and *NIV* topics were voted as at least 80% as important as *Implementation of COPD exacerbation checklist*. By contrast, the two lowest ranked topics (*Oxygen therapy postexacerbation* and *Interventions for acute airway obstruction*) were viewed as one-fifth as important (idealized priority scores about 0.2).

Transitions in Care

Seven topics for transitions in care were identified (Table 5). Final voting results, again using AHP, indicated that the highest priority topic, *Integrated healthcare strategies during transitions in COPD care* (e.g., early hospital discharge to pulmonary rehabilitation) was rated as more than twice as important as the second-highest preferences (*Multimorbidity* and *Patient and family activation*).

The consistency ratio (CR) for voting patterns for acute care topics and for transition in care topics was less than 0.1 for each, suggesting that expressed preferences by stakeholders were overall internally consistent. See online supplement for further explanation.

SATISFACTION WITH WORKSHOPS

Feedback indicated high levels of satisfaction among workshop participants (Table 6). Overall, Year 1 workshop attendees supported the need for a 2-day meeting, with presentations on the first day framing the subsequent day's discussion and voting. A similar format was therefore used in Year 2.

TABLE 1. STAKEHOLDER GROUPS PARTICIPATING IN CHRONIC OBSTRUCTIVE PULMONARY DISEASE OUTCOMES-BASED NETWORK FOR CLINICAL EFFECTIVENESS AND RESEARCH TRANSLATION WORKSHOPS

Group	Representatives
Patient advocacy groups	
Alpha 1 Foundation	Robert Sandhaus, M.D., Ph.D.*
Respiratory Health Association of Metropolitan Chicago	Stacy Ignoffo, M.S.W.*†
COPD Foundation	Margaret Brown, M.S.†‡ John Walsh*†
Health plans	
Blue Cross/Blue Shield	Mike Belman, M.D., M.P.H.* Mark Mattingly, M.D.†
Health Maintenance Organization Research Network	Charlene McEvoy, M.D., M.P.H.*† Douglas Mapel, M.D., M.P.H.*†‡
Kaiser Permanente	Richard Mularski, M.D., M.S.H.S., M.C.R.*†
Wellpoint	John Whitney, M.D.†
Professional organizations representing clinicians	
American Academy of Family Physicians	Wilson Pace, M.D.†
American Academy of Sleep Medicine	Patrick Strollo, Jr., M.D.*†
American Association of Cardiovascular and Pulmonary Rehabilitation	Andrew Ries, M.D., M.P.H.*†
American Association of Respiratory Care	Sam Giordano, R.R.T., M.B.A.*†
American Association of Critical Care Nurses	Mary Lou Sole, Ph.D., R.N.†
American College of Physicians	Joe Ramsdell, M.D.*
American College of Chest Physicians	Sandra Adams, M.D., M.S.*†
American College of Emergency Physicians	Rita Cydulka, M.D., M.S.*
American Geriatrics Society	Carlos Frago, M.D.†
American Public Health Association	Judi Walden, R.C.P. II, R.R.T.* Bunny Newman, R.N.*‡
American Thoracic Society	David Au, M.D., M.S.*† Lynn Reinke, Ph.D., A.R.N.P.†‡
Association of Pulmonary and Critical Care Program Directors	Brian Carlin, M.D.†
National Association of Social Workers	Joan Levy Zlotnik, Ph.D., A.C.S.W.†
Respiratory Nursing Society	Donna Bond, D.N.P., R.N.†‡ Anne Boyle, Ph.D., R.N.† Diane Locke, A.N.P.-B.C., R.N.†‡
Society for Academic Emergency Medicine	Eddy Lang, M.D.†‡
Society of General Internal Medicine	Chayan Chakraborti, M.D.†
Society of Critical Care Medicine	Jonathan Sevransky, M.D., M.H.S.*†
Society of Hospital Medicine	Steven Deitelzweig, M.D.† Greg Maynard, M.D., M.Sc.* Robert Ryder, M.D.*‡
Quality improvement/accreditation organizations	
American Health Quality Association	Dale Bratzler, D.O., M.P.H.†
The Joint Commission	Lee Ann Baggott, M.D.* Tim Byrum, M.S.N., N.P.†
National Patient Safety Foundation	Manisha Shah, M.D.†
Industry	
Boehringer Ingelheim	Asif Shaikh, M.D., M.P.H.*‡
Researcher organizations	
Baystate Health	Peter Lindenauer, M.D., M.S.*†
Canadian Association of Emergency Physicians Research Consortium	Brian Rowe, M.D., M.Sc.*
North American Primary Care Research Group	Andrew Cave, M.B.*†
Ohio State University	Gerene Bauldoff, Ph.D., R.N.*
Olmstead Medical Center	Barbara Yawn, M.D., M.Sc.*†
Pittsburgh Regional Health Initiative	Keith Kanel, M.D.†‡
Society for Medical Decision Making	Kathryn McDonald, M.M.†
The Center for Health Research, Kaiser Permanente	Mary Ann McBurnie, Ph.D.*† William Vollmer, Ph.D.*†‡
University of Chicago	Jerry A. Krishnan, M.D., Ph.D.*† Edward T. Naureckas, M.D.†‡
University of Illinois	Todd Lee, Pharm.D., Ph.D.*†
University of North Carolina	Shannon S. Carson, M.D.*†
Speakers	
Johns Hopkins University	Cynthia Boyd, M.D., M.P.H.*‡ Robert Wise, M.D.†‡
Harvard University	Bartolome Celli, M.D.*‡
National Center for Rural Health Professions	Michael Glasser, Ph.D.*‡
The Joint Commission	Caroline Isbey, R.N., M.S.N., C.D.E.*‡
RTI International	Kenneth LaBresh, M.D.†‡
Denver Health Medical Center	Fred Masoudi, M.D., M.S.P.H.*‡
University of Alberta	Brian Rowe, M.D., M.Sc.†‡
Northwestern University	Mark Williams, M.D.†‡

(Continued)

TABLE 1. (CONTINUED)

Group	Representatives
Government agencies	
Agency of Healthcare Research and Quality	Anne Elixhauser, Ph.D. ^{†‡} Supriya Janakiraman, M.D., M.P.H. ^{*†‡}
Centers for Medicaid and Medicare Services	Mark Levine, M.D. ^{*†‡}
National Heart, Lung, and Blood Institute	Antonello Punturieri, M.D., Ph.D. ^{†‡}
National Institute of Nursing Research	Karen Huss, Ph.D., R.N. ^{†‡}
National Institute on Aging	Basil Eldadah, M.D. ^{†‡}
External advisory committee	
Oregon Health Sciences University	A. Sonia Buist, M.D. ^{*†‡}
Johns Hopkins University	Cynthia S. Rand, Ph.D. ^{*†‡}
VA Puget Sound Health Care System	Steve Fihn, M.D., M.P.H. ^{*†‡}
University of Calgary	Eddy Lang, M.D. ^{*†‡}
University of Kentucky	David Mannino, M.D. ^{*†‡}
Columbia University	Peter Wyer, M.D. ^{*†‡}

Representatives of 54 stakeholder groups participated in Year 1, Year 2, or both; in some cases, there was more than one representative from a stakeholder group. Twelve groups were invited but declined or did not respond to the invitation in time to participate: American Academy of Emergency Medicine, American Heart Association, American Lung Association, American Medical Association, American Psychiatric Association, Disease Management Association of America, Improvement Science Research Network, Institute for Health Care Improvement, National Gerontological Nursing Association, PhRMA, United Health Care, and U.S. Food and Drug Administration. The members of the External Advisory Committee are also listed.

* Participated in Year 1.

† Participated in Year 2.

‡ Nonvoting participant (only one voting representative of each stakeholder group was permitted; speakers, representatives of industry, members of the External Advisory Committee, and government agencies did not vote on priorities but were invited to contribute to discussions).

CRITERIA USED BY STAKEHOLDERS FOR PRIORITIZING CER TOPICS

Stakeholders were asked to rank the importance of seven criteria when making decisions about priorities for CER (Table 7). Twenty-three (55% of 42 groups participating in Year 2) completed ballots describing the criteria used to set CER priorities, so results should be viewed cautiously. The *Impact on patient-centered health outcomes* was voted as most important, followed by *Quality of the evidence*, *Societal costs of care*, and *Variability in care*.

LESSONS LEARNED AND RECOMMENDATIONS FOR CER IN COPD

Four primary findings emerged from the workshops to elicit national priorities for CER in COPD: (1) engaging diverse stakeholders is feasible and can be used to identify support for CER topics; (2) efforts to develop and prioritize a research agenda based solely on requests for topics from stakeholder groups without discussion may provide different priorities for CER compared with efforts that incorporate discussion; (3) preferences for CER and criteria used

to select CER topics varied across stakeholder groups; however, stakeholder support was strongest for studies to evaluate and to improve healthcare delivery in usual practice settings; and (4) the AHP helped to quantify the relative preferences for CER and to evaluate the internal consistency of stakeholder voting patterns.

A diverse group of 54 stakeholders representing patients, clinicians, and other healthcare decision makers participated in the development of the national research agenda for CER in COPD. Survey results indicated high levels of support for the approach used by CONCERT, including preworkshop discussions to plan the meeting and elicit a provisional list of research priorities, followed by in-person workshops with presentations and discussion before final voting. We suspect that stakeholders benefited from a structured approach for information sharing and to work with those with differing perspectives. A limitation of the methodology used in setting research priorities is the potential for conflicts of interests (e.g., clinical, intellectual, or financial) to influence voting patterns of individual participants. We were not aware of standards regarding the disclosure and management of potential conflicts of interests when setting research priorities

TABLE 2. RESULTS OF YEAR 1 WORKSHOP: CHRONIC CARE FOR CHRONIC OBSTRUCTIVE PULMONARY DISEASE TOPICS

Topic	Chronic COPD Care	Preworkshop Voting	Final Workshop Voting
		Importance Scores	Importance Ranks
		1 (Very Important) to 9 (Most Unimportant)	1 (Most Important) to 9 (Most Unimportant)
		Median Score (IQR)	Median Rank (IQR)
1	Spirometry for diagnosis and treatment	3 (2–5)	1 (1–4)
2	Effectiveness of pulmonary rehabilitation	3 (1–3)	4 (2–5)
3	Effectiveness of COPD care and guideline translation	2 (1–3)	4 (1–6)
4	Home care	4 (3–5)	4 (3–6)
5	Development of performance measures	3 (1–4)	5 (3–7)
6	Oxygen therapy	2 (1–3)	5 (3–8)
7	Palliation of symptoms	3 (2–4)	7 (5–7)
8	Pharmaceutical treatment	3 (3–4)	7 (6–8)
9	Smoking cessation	2 (1–3)	8 (6–8)

Definition of abbreviations: CER = comparative effectiveness research; COPD = chronic obstructive pulmonary disease; IQR = interquartile range.

There were 33 participating stakeholder organizations in the workshop; individual participants are listed in Table 1. Preferences in the Preworkshop Voting were expressed as importance scores, whereas importance ranks were used for the Final Workshop voting. Ranks were used in an attempt to more easily separate topics by level of importance. To more clearly observe differences in priorities within each CER area, stakeholders were informed that no two topics should be assigned the same importance rank. Wide IQRs suggest variation in stakeholder preferences.

TABLE 3. RESULTS OF YEAR 1 WORKSHOP: CARE COORDINATION TOPICS

Topic	Care Coordination	Preworkshop Voting	Final Workshop Voting
		Importance Scores	Importance Ranks
		1 (Very Important) to 9 (Most Unimportant)	1 (Most Important) to 11 (Most Unimportant)
		Median Score (IQR)	Median Rank (IQR)
1	Management of COPD in the presence of comorbidity	2 (1–3)	3 (2–5)
2	Pulmonary rehabilitation as model for care coordination	3 (1–3)	3.5 (2–8)
3	Impact of depression and mental health management	3 (1–3)	5 (4–8)
4	Measurement of quality of care coordination	3 (2–4)	6 (2–7)
5	Quality of care coordination	3 (2–3)	6 (3–8)
6	Comprehensive COPD patient education	2 (1–3)	6.5 (4–9)
7	Cost effectiveness of care coordination	3 (2–4)	6.5 (5–10)
8	Case management	3 (2–5)	7 (5–8)
9	Developing a tool for risk satisfaction of patient COPD	3 (3–4)	7 (3–9)
10	Patient-centered medical home	3 (2–4)	7.5 (4–10)
11	Scheduled multidisciplinary team consultation	3 (2–3)	9 (8–10)

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when we conducted the workshops. There is emerging consensus on the need for disclosure and management of potential conflicts of interest when developing clinical practice guidelines; a similar need exists for groups developing research priorities.

Other groups, including the Institute of Medicine Committee on Comparative Effectiveness Research Prioritization and the AHRQ Community Forum, have engaged stakeholders in developing CER priorities (but none specifically for COPD) based on questionnaires, written comments, and oral presentations (1, 17). By contrast, the methodology used by CONCERT included sustained interactions over a 2-year period. We used a modified Delphi approach to facilitate discussions and consensus building during the in-person workshops; it is therefore not surprising that results of preworkshop votes and final votes at the workshops differed. These findings suggest that prioritization efforts relying solely on requests for topics from stakeholder groups without discussion may provide different priorities for CER compared with efforts that incorporate discussion. The sustained interest among COPD stakeholders to participate in prioritization efforts over this 2-year period also raises the possibility for additional multistakeholder collaborations, including the development of specific research proposals (e.g., translating research topics into specific research questions and study designs), dissemination of results, and implementation of findings.

In a previous effort to identify CER priorities for COPD over a shorter (2 mo) period, we asked clinicians and researchers to nominate potential research topics and then convened a separate meeting with a limited number of other stakeholder groups (two health plans, one patient advocacy group, two government agencies, and eight professional societies) for a final overall prioritization vote (18). We observed substantial variation in stakeholder preferences, with none achieving an overall rank of 1 (most important CER topic). In the current effort, we sought to develop consensus by promoting and sustaining interactions across all stakeholder groups and by developing a separate list of CER priorities for different aspects of COPD care (i.e., chronic care, care coordination, acute care, transitions in care). We also involved a larger number and more diverse group of stakeholders (e.g., organizations involved in quality improvement or accreditation) and promoted dialogue with experts in effectiveness and implementation research in the current effort.

Studies to evaluate and to improve healthcare delivery received the greatest levels of support, rather than head-to-head comparisons of specific medications. However, preferences for CER varied across stakeholder groups even within a specific aspect of COPD care (e.g., chronic care), likely because decision making appears to be governed by a complex matrix of criteria.

TABLE 4. RESULTS OF YEAR 2 WORKSHOP: ACUTE CHRONIC OBSTRUCTIVE PULMONARY DISEASE CARE

Topic	Acute COPD Care	Preworkshop Voting	Final Workshop Voting		
		Importance Ranks	Normalized and Idealized Priorities		
		1 (Most Important) to 8 (Most Unimportant)	Priority Scores Using AHP		
		Median Rank (IQR)	Median Normalized Priority	Normalized Priority IQR	Idealized Priority
1	Implementation of COPD exacerbation checklist	4 (2–6)	0.22	(0.12–0.26)	1.00 (reference)
2	Comorbid conditions in the acute setting	3 (2–5)	0.20	(0.06–0.36)	0.95
3	Effectiveness and implementation of NIV in acute respiratory failure	4 (2–5)	0.17	(0.07–0.25)	0.80
4	Role of antibiotics in acute exacerbations	4 (3–6)	0.14	(0.06–0.14)	0.63
5	Quality of care assessment	4 (2–6)	0.12	(0.04–0.19)	0.57
6	Dyspnea in COPD	5 (3–6)	0.07	(0.03–0.08)	0.31
7	Oxygen therapy post exacerbation	7 (4–8)	0.04	(0.02–0.04)	0.19
8	Interventions for acute airway obstruction	6 (4–7)	0.04	(0.02–0.04)	0.18

Definition of abbreviations: AHP = analytic hierarchy process; COPD = chronic obstructive pulmonary disease; IQR = interquartile range; NIV = noninvasive ventilation.

There were 42 participating stakeholder organizations in the workshop; individual participants are listed in Table 1. Wide IQRs suggest variation in stakeholder preferences. Preferences in the preworkshop voting were expressed as importance ranks, whereas AHP was used to develop normalized and idealized priorities in the final voting. AHP was used in an attempt to quantify the level of separation in importance across ranked topics. The normalized priorities represent the proportion of the total importance across all topics that voters ascribe to a particular research topic. The ratio of normalized priorities for any two topics indicates their relative importance (idealized priority). Thus, the AHP approach ranks topics from most important to least important, but the process also offers the advantage of quantifying the separation between any two options (e.g., how much more important is the most highly ranked topic compared to any other topic).

TABLE 5. RESULTS OF YEAR 2 WORKSHOP: TRANSITIONS IN CHRONIC OBSTRUCTIVE PULMONARY DISEASE CARE

Topic	Preworkshop Voting Importance Ranks 1 (Most Important) to 9 (Most Unimportant)	Final Workshop Voting Normalized and Idealized Priorities Priority Scores Using AHP			
	Transitions in COPD Care	Median Rank (IQR)	Median Normalized Priority	Normalized Priority IQR	Idealized Priority
1	Integrated healthcare strategies during transitions in COPD care	2 (1–3)	0.40	(0.23–0.52)	1.00 (reference)
2	Multimorbidity and transitions in COPD care	3 (2–4)	0.16	(0.07–0.24)	0.40
3	Patient and family activation during transitions in COPD care	4 (3–5)	0.15	(0.06–0.20)	0.38
4	End of life/palliative care and transitions in COPD care	4 (2–6)	0.12	(0.05–0.20)	0.31
5	Early diagnosis and treatment of COPD	5 (2–6)	N/A*	N/A*	N/A*
6	Psychosocial barriers during transitions in COPD care	5 (4–6)	0.09	(0.04–0.12)	0.22
7	Modeling effects of interventions and transitions in COPD status	6 (4–7)	0.08	(0.03–0.11)	0.22

Definition of abbreviations: AHP = analytic hierarchy process; COPD = chronic obstructive pulmonary disease; IQR = interquartile range; N/A = not applicable.

There were 42 participating stakeholder organizations in the workshop; individual participants are listed in Table 1. Wide IQRs suggest variation in stakeholder preferences. Preferences in the preworkshop voting were expressed as importance ranks, whereas AHP was used to develop normalized and idealized priorities in the final voting. AHP was used in an attempt to quantify the level of separation in importance across ranked topics. The normalized priorities represent the proportion of the total importance across all topics that voters ascribe to a particular research topic. The ratio of normalized priorities for any two topics indicates their relative importance (idealized priority). Thus, the AHP approach ranks topics from most important to least important, but the process also offers the advantage of quantifying the separation between any two options (e.g., how much more important is the most highly ranked topic compared to any other topic).

*Topic 5 (Early diagnosis and treatment of COPD) for Transitions in COPD care was not voted on at the workshop because it was folded into Topic 3 (Patient and family activation during transitions in COPD care) after discussion at the in-person meeting.

Stakeholders indicated that the *Impact on patient-centered health outcomes* was the most important criterion, although a number of other criteria were also used when selecting among different COPD CER topics. Importantly, the relative importance of these criteria in setting research priorities varied across stakeholder groups. Collectively, these observations suggest that opportunities to reach uniform consensus for a single research priority in CER are limited; it is, however, feasible to differentiate the higher (vs. lower) priority topics and to build a pipeline of stakeholder-supported CER. Our observations also suggest that stakeholder support for CER topics may vary depending on which groups are invited to participate in setting priorities. This issue highlights the importance of engaging a diverse group of

stakeholders to ensure broad input, which may need to be enriched further depending on the purpose (e.g., greater involvement of patients for applications in response to funding opportunities in response to the Patient Centered Outcomes Research Institute). The workshops included only one representative of industry, despite our efforts to attract greater involvement by contacting PhRMA, the leading trade organization for the pharmaceutical industry and biotechnology companies. Also, other industry representatives (e.g., device manufacturers) were not participants, and future efforts may benefit from including a wider cross-section of industry representatives. The optimal size and breadth of stakeholder organizations for research prioritization activities needs further study (19).

We also found that asking stakeholders to rank rather than simply rate the importance of topics to be more informative. We were able to better quantify the relative preferences for different CER topics using the AHP methodology in Year 2 to calculate “idealized priorities.” The AHP methodology also provided the opportunity to detect inconsistent voting patterns; results were fortunately reassuring. Of note, we used a limited version of the AHP in Year 2 and only asked stakeholders to compare the overall importance of topics. A fully deployed AHP would require: (1) defining and prioritizing the universe of criteria used by stakeholders, (2) using AHP to determine how well each topic satisfies each criterion, and (3) pooling the votes to develop a prioritized list of research topics. For each criterion, there would be $n(n-1)/2$ pairwise comparisons, where n is the number of research topics being compared. For the full deployment of the AHP in Year 2, there would then be 196 pairwise comparisons of acute care topics (28 pairwise comparisons of topics per criterion \times 7 criteria) and another 147 pairwise comparisons of transitions in care topics, or a total 343 pairwise comparisons. Such an effort was believed to be impractical for a single meeting and suggests the need for defining and selecting a more parsimonious list of criteria and CER topics. Furthermore, only about half the stakeholders provided information about criteria used by their organization for setting research priorities. Findings in this report may help inform future efforts to more fully deploy AHP and thereby more explicitly link the criteria proposed by stakeholders to the selection

TABLE 6. SATISFACTION SURVEY COMPLETED BY STAKEHOLDERS

	1 (Strongly Disagree) to 5 (Strongly Agree)
1. The workshop met my expectations.	4 (4–5)
2. I feel that the products of the workshop will have impact.	4 (4–5)
3. The format and content of the first day was very useful.	4 (4–5)
4. I would recommend less lecture time for Day 1.	3 (2–4)
5. I would recommend more discussion time for Day 1.	4 (3–4)
6. The format and content of the second day was very useful.	4 (3–4)
7. I believe that the workshop objectives could be met in a 1-day instead of a 2-day workshop.	2 (2–2.3)
8. I would recommend others to participate in this event.	4 (3–4)
9. If given the opportunity, I would participate in this event again.	5 (4–5)
10. Overall, I was very satisfied with this workshop.	4 (4–5)

Definition of abbreviations: CONCERT = COPD Outcomes-based Network for Clinical Effectiveness and Research Translation; IQR = interquartile range.

Data are presented as median (IQR). Stakeholders were asked to complete an anonymous satisfaction survey at the end of the Year 1 workshop to help CONCERT plan for the workshop in Year 2. Thirty-three stakeholder organizations completed the satisfaction survey.

TABLE 7. CRITERIA USED BY STAKEHOLDERS TO SELECT COMPARATIVE EFFECTIVENESS RESEARCH TOPICS

Criterion	1 (Most Important) to 7 (Most Unimportant) Importance Rank
1. Impact on patient-centered health outcomes in efficacy studies (magnitude of benefit demonstrated in efficacy studies and likelihood to guide daily practice)	1 (1–2.5)
2. Quality of the evidence about patient-centered outcomes in efficacy studies	3 (2–4.5)
3. Societal costs of care	4 (3–5)
4. Variability in care, including health disparities in care	4 (3–5.5)
5. Potential for a difference between efficacy and effectiveness	5 (2.5–6)
6. Feasibility of effectiveness studies and implementation studies	5 (4–6)
7. Informs healthcare across diverse areas	5 (4–7)

Data are presented as median rank (interquartile range). Twenty-three stakeholder organizations completed a survey on criteria used to select comparative effectiveness research topics after the final prioritization vote at the Year 2 workshop.

of CER priorities. It has been 2 years since the last workshop, and priorities in COPD CER may have shifted since then. However, input in CONCERT workshops was broad, and further input can occur through subsequent efforts to update priorities.

SUMMARY AND CONCLUSIONS OF WORKSHOPS

We used a standard approach to consensus development, the modified Delphi approach, as well as a novel application of AHP for developing a national CER agenda for COPD in collaboration with a diverse set of stakeholders. Studies to improve healthcare delivery, rather than head-to-head comparisons of medications, were rated as highest priority. As there was substantial variation in preferences among stakeholders for specific research topics, researchers may need to collaborate with different groups of stakeholders depending on which research topics are proposed for study. The various “lessons learned” from the workshops may help to inform similar efforts to identify and prioritize CER topics for other health conditions.

A complete list of stakeholder-supported CER priorities is available in Tables 2 through 5. The rationale and draft research questions linked to the CER topics is available in Tables E1 to E3. Stakeholder preferences were strongest for the following CER topics:

- **Chronic care:** Spirometry for diagnosis and treatment, Effectiveness of pulmonary rehabilitation, Effectiveness of COPD care and guideline translation, and Home care.
- **Care coordination:** Management of COPD in the presence of comorbidity, and Pulmonary rehabilitation as a model for care coordination.
- **Acute care:** Implementation of COPD exacerbation checklist, Comorbid conditions in the acute setting, and Effectiveness and implementation of NIV in acute respiratory failure.
- **Transitions in care:** Integrated healthcare strategies, Multimorbidity, and Patient and family activation.

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