REVIEW

Systematic Review of Quantitative Measures of Stakeholder Engagement

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INTRODUCTION

Stakeholder engagement in research has received increasing attention in recent years.[1,2] The term "stakeholder engagement" refers to the process of meaningful involvement of those who are engaged in making decisions about programs.[3] Engaging members of the target population is often key to improving the relevance of the issues studied, the procedures used for study, and the interpretation of outcomes of research studies, health promotion activities, and disease prevention initiatives.[4–6] The utility of stakeholder engagement has been well established in the literature,[7–9] but there are few examples of measurement and evaluation of the degree to which stakeholders are engaged in these activities and the impact of engagement on positive outcomes. These types of evaluations have been limited in scope, and largely focused on qualitative approaches.[10–14] Qualitative methods cannot be easily compared across programs or institutions.[15] Necessary reliability and validity information describing self-reported levels of stakeholder engagement are also lacking, and is essential to identifying the impact of engagement on the scientific process and scientific discovery.

METHODS

We present the results of a systematic review of the existing quantitative measures of stakeholder engagement in published research and programs. We used the methods of Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA[16]) to review the literature on measures of stakeholder engagement.

Definition of sytakeholder engagement

We defined stakeholder engagement as the involvement of people who may be affected by a research finding or program. We included any type of stakeholder that was available in the literature, and included all settings and situations. We did not limit the search to research or intervention projects, because we reasoned that the field was relatively new, and therefore we might find good measures in multiple areas from which to draw our search. All authors contributed substantially to multiple aspects of the article: (1) the concept and design or analysis and interpretation of data, (2) the drafting or revision of the article, and (3) approval of the final version.

Search methods

We searched the peer-reviewed literature using two electronic bibliographic databases: PubMed (web-based) and the Web of Science (web-based). These database searches for all years until 2013 were conducted between July and September 2014. The 2014 search was conducted in January 2016.

Phase I: Searching the literature

With assistance from a reference librarian, we generated a master list of search terms to use with both databases. The following Medical Subject Headings (MeSH) terms were selected: *stakeholder engagement, community engagement, community engaged research*. These terms were then entered into the two chosen databases using quotations to ensure that search terms were verbatim and separated by "OR" to ensure inclusion if any of the search terms were present. A master list of articles was created using Endnote X8 citation management software from these search results. All published reports from 1973 to 2014 were identified and retrieved.

Phase II: Abstract review

Two authors independently reviewed each title and abstract using predetermined inclusion and exclusion criteria and resolved disagreement through rereview and discussion until they reached consensus. Included articles appear in English, in a peer-reviewed journal, report original research, and appear to use a quantitative measure for at least one construct reported to measure stakeholder engagement. The full texts of articles whose abstracts met our inclusion criteria were retrieved and then examined for further inclusion/exclusion criteria. Our primary exclusion criterion was an article that does not contain stakeholder engagement, then subsequently, lack of quantitative measures.

Phase III: Data Abstraction

To ensure consistency in data abstraction, we created a standardized codebook for use by all authors, based on a

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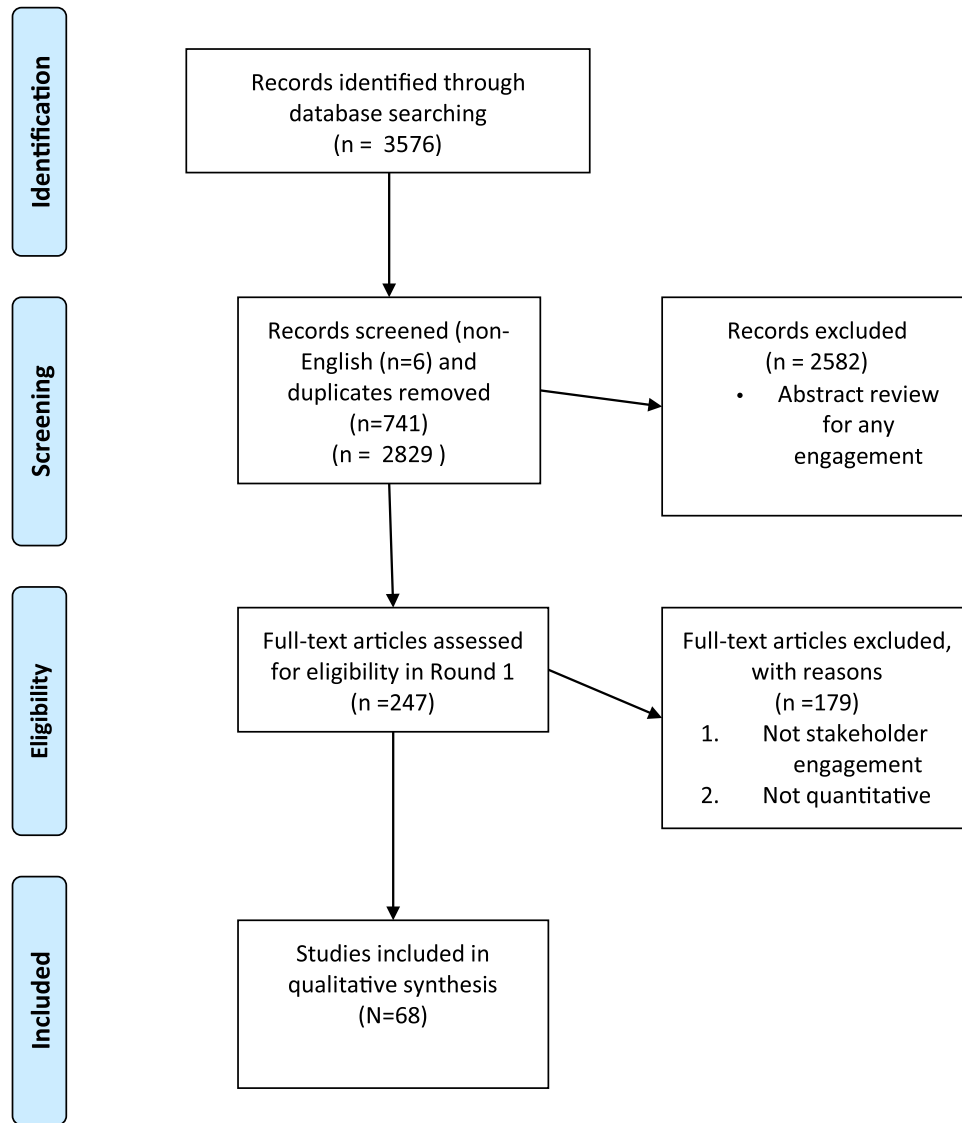
Figure 1 PRISMA 2009 Flow Diagram.

prior measurement review. All authors reviewed the same five studies using the codebook and identified and resolved disagreements in coding. The codebook was thereafter revised. Included studies were distributed among seven coders for data abstraction. For all studies included in the review, two authors independently coded and compared their results. Coding discrepancies within pairs were resolved through discussion among authors. We opted for this group consensus method because of the enormous variability in terminology used to describe engagement characteristics and constructs across studies.

The variables extracted included constructs measured, names of measures, stakeholder group engaged, type of engagement project, whether or not the measurement was part of a training exercise, and relationship of construct to study outcome (if engagement was assessed to be related to the dependent variable in the study). Data were entered into Excel files and evidence tables were constructed, organized

by article first author, and stratified by type of construct. We divided the abstracted measures into (1) measures that were collected using participant-reported methods, no matter how the self-report was collected, such as online, paper and pencil methods ($n = 53$), and (2) observational methods, defined as a variable that asked researchers to observe and quantify behaviors relevant to engagement, such as attendance at a public event ($n = 51$).

FLOW OF ARTICLE REVIEW

Figure 1 contains the data on article eligibility and coding patterns. The search identified 3,576 (PubMed $n = 1,112$, Web of Science $n = 2,464$) articles using our key words. Six articles were excluded for being non-English language (one Chinese, two German, two French, and two Spanish language articles). The abstracts of these articles were translated and determined to not impact the outcome of this

review. From the remaining articles, 741 were excluded for being duplicate articles found because the databases used had some degree of overlap. After initial screening, we identified 2,829 non-duplicate English language titles (see **Figure 1**). Of these, 2,582 were excluded during the abstract and title screening phase of the review, leaving a total of 247 articles. We excluded 179 articles at the final coding stage because they ultimately did not meet our eligibility criteria when the full-length article was coded and discussed. A total of 68 articles contained quantified measures of stakeholder engagement and met our final criteria.[17–84]

COMPILATION OF REVIEWED MEASURES

Table 1 contains the 53 participant-reported measurements of stakeholder engagement found in 38 studies identified in our search. In each of these studies, participants indicated the extent of their engagement in the project using responses to one or more scales. The types of projects included here were broad: research projects, community input projects, and interventions. As seen from this table, none of the articles use the same stakeholder measure. Only a small number of reviewed articles (5 out of 53; 13%) reported psychometric data about the measure. Some of the measures (5 out of 53; 13%) had reliability calculated in the form of alpha coefficients, yet none of the scales presented any information on content validity or on other types of validity (i.e., criterion, construct). The stakeholder populations targeted in these studies widely varied, from members of a defined general public to participants in community groups and members of advisory boards. Only 25 of 53 (47%) measures reported assessment and testing of the significance of the relationship of participant-reported engagement measure to outcome. Of those that assessed the relationship of measure to outcome, 100% of the studies indicated a significant relationship between engagement measure and at least one of the outcomes.

A total of 50 separate observational measures were used to assess stakeholder engagement by counting or recording behaviors, from a total of 34 articles identified in the search (**Table 2**). The observational measures of engagement included "counts of referrals" and "attendance at events." No reliability data were presented along with the identification of each measure in this table. No attempts were made in any of the studies to support the validity of the observational measures of engagement through measuring a hypothetically related construct alongside the observational measures. Many of the measures were related to outcomes as part of the study but the outcome testing used a variety of measures.

SUMMARY OF FINDINGS

We systematically reviewed the literature on existing measures of stakeholder engagement. We found a variety of measurements, with differing qualities and development trajectories. Some were simply counts of event attendance, while others were theoretically based and developed with sound psychometric principles and analyses. The variability in the process of identifying these measures listed in the articles found for this review was considerable, making grouped analysis difficult.

Many of these measures were participant head counts by researchers or participants themselves. As such, these do not really measure any sort of engagement directly. Therefore, we cannot tell if these measures actually assess engagement or some other cluster of factors that motivate people to attend events and activities. On the one hand, these counted types of measures are relatively easy to obtain and can be gathered from documents that already exist, such as meeting minutes or counts of attendees at events. Thus, they are an easy measure to gather and use, and are often presented without much extra work. But likely we need more data before considering that high attendance equates to high engagement in a process, particularly in light of potential confounders such as incentives for attendance. These types of data would be relatively easy to collect and produce, and this systematic review points to the need for these corroborating data. Also, there is no consensus in the literature on defining engagement, what kind of engagement is desired, and how involved a community member must be to be considered "engaged." These are all likely context-dependent, and therefore expectations of consensus are not relevant.

The participant-reported measures of engagement are varied and diverse in their names, definitions, and purposes. Data on the psychometric properties of scales were generally lacking, although some investigators provided some limited data on scale performance, presented in **Table 1**. The scales measured a broad range of concepts, including motivations for participating, strength of relationship between researcher and community, comfort with community activities, and familiarity with community members. This breadth indicates that we need clearer definitions of the construct(s) involved in engagement before new development occurs. In most of the publications, the development process was not detailed and no plans were proposed to identify scale psychometric properties. This absence could pose a problem when comparing across multiple communities or when attempting to obtain a point estimate of engagement to better understand a research process or community or stakeholder's actual involvement, especially in large-scale research efforts. Weiner and others have identified a similar lack in the implementation science literature as well,[85] pointing to a potential challenge for new efforts, such as Patient-Centered Outcomes Research Institute and the Precision Medicine Initiative.

LIMITATIONS OF THE PRESENT REVIEW

There were several choices that we made that limit the generalizability of the findings. First, we did not formally rate the quality of each measurement study. We found that our initial attempts to rate measurement quality resulted in low ratings, due to the absence of psychometric data. This is likely due to the early nature of this field, but future work will hopefully find improvements in the methodological development of measures for engagement. We did not review related constructs that could be used to assess some component of, or were related to, engagement, given the lack of definitional clarity and term usage across literatures. Therefore, we likely did not

Table 1 Observational measures of engagement 1973–2014

Citation	Type of project	Measure of Engagement	Description of measures	# items used for measurement	Stakeholder studied	Statistics on measure?	Relate measure to outcome?	If yes, what is the result?
17. An, 2008	Intervention	Utilization	Utilization measures capturing use of quitplan.com's informational resources	4	Tobacco users who are new registrants to quitplan.com	None	Yes	Use of interactive quitting tools were associated with increased abstinence rates
17. An, 2008	Intervention	Utilization	Utilization measures capturing use of quitplan.com's interaction with the online community	3	Tobacco users who are new registrants to quitplan.com	None	Yes	One-to-one messaging with other members of the online community, was associated with increased abstinence rates
18. Andreae, 2012	Cross-sectional Survey	Referrals	Referrals from community members	1	Members of the community in a network around primary care offices	None	No	
18. Andreae, 2012	Cross-sectional survey	Involvement	Referrals from primary care office staff	1	Staff of primary care offices who were engaged to participate in recruitment process	None	No	
18. Andreae, 2012	Cross-sectional Survey	Recruitment	Referrals from community members	1	Community members hired to facilitate recruitment	None	No	
19. Andrews, 2008	Survey	Citizenship-related activities	A list of opportunities for public participation in local government; respondents select the most important activities undertaken.	1	English local government officers	None	No	
19. Andrews, 2008	Survey	Citizen empowerment	Various indicators including voter turnout, website hits, attendance at events; some used Best Value Performance Indicators or community safety indicators	Many; varied across authorities	English local government officers	None	No	
20. Ayuso, 2011	Cross-sectional survey	Internal Stakeholder Engagement	Percentage of skilled employees and executives receiving a regular (e.g., at least once per year) formal evaluation of their performance, percentage of employees to follow a company training program specific to their job category, percentage of employees hired based on a validated recruitment process/selection test.	3	Employees	Alpha > .60	Yes	Knowledge sourced from engagement with internal stakeholders, and engagement with external stakeholders contributed to a firm's sustainable innovation orientation.

(Continued)

Table 1 Continued

Citation	Type of project	Measure of Engagement	Description of measures	# items used for measurement	Stakeholder studied	Statistics on measure?	Relate measure to outcome?	If yes, what is the result?
20. Ayuso, 2011	Cross-sectional survey	External Stakeholder Engagement	1) How the external company engages with external stakeholders and 2) does the company regularly conduct satisfaction surveys or perception studies of the following stakeholders?	2	Outside companies	Alpha close to .7	Yes	The engagement was correlated with company's sustainable innovation orientation.
21. Clark, 2010	Intervention	Coalition Self-Assessment Survey	Assesses level of involvement of individual coalition members suing Likert-type scale (four categories = peripheral, intermittent, ongoing, core)	Not Reported	Coalitions of community residents and community-based organizations	No	Yes	Coalitions with more engaged (core or ongoing) partners had greater asthma policy and systems changes
21. Clark, 2010	Intervention	Coalition tracking	Assesses level of involvement of individual coalition members suing Likert-type scale (four categories = peripheral, intermittent, ongoing, core)	Multiple	Coalitions of community residents and community-based organizations	No	Yes	Coalitions with more engaged (core or ongoing) partners had greater asthma policy and systems changes
22. Fahrenwald, 2013	Longitudinal study preparation	Participation	Number of each type of outreach/engagement activity	Multiple	Government, healthcare systems, social services, child care, churches and non-profits, media, major employers, other grassroots partners	No	Yes	Recruitment outcomes
23. Fothergill, 2011	Community placed research	Community engagement	Reports of regular church attendance (once per week or more) and participation in any secular organizations	unclear	Mothers of a cohort of first graders from Woodlawn, a largely Afr. Am. Community on the south side of Chicago	No	Yes	Association between social integration and health significant health
23. Fothergill, 2011	Community placed research	Community engagement	Reports of regular church attendance (once per week or more) and participation in any secular organizations	30	Mothers of a cohort of first graders from an African American community in Chicago	No	Yes	Persistently engaged women less likely to report anxious or depressed mood than those with early CE only. Persistent and diverse CE was more highly associated with better physical functioning than was persistent CE.

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Table 1 Continued

Citation	Type of project	Measure of Engagement	Description of measures	# items used for mea-surement	Stakeholder studied	Statistics on measure?	Relate measure to outcome?	If yes, what is the result?
24. Frew, 2008	Cross-sectional	Community Involvement	Survey of evaluative measures, demographics, social interaction, and health information-seeking behaviors.	32	Attendees of public LGBT and AIDS awareness events in Atlanta	No	Yes	Community involvement associated with likelihood to return to another HIV vaccination research event in the future.
25. Frew, 2011	Cross-sectional	Community Engagement in HIV Vaccine Research	Cross-sectional survey consisting of evaluative measures, demographics, social interaction, and health information-seeking behaviors was conducted. Multivariate analysis.	3	Prospective study participants at public events	No	No	
26. Galichet, 2010	Application analysis	Level of stakeholder inclusiveness in the application process	Assessment of inclusiveness based on 4 criteria: 1) evidence of Health Systems Coordination Committee meeting 2x/year, 2) at least 4 int'l stakeholders participate in application process, 3) presence of 1 or more-private sector, civil society, independent health professionals, academics, 4) evidence of stakeholder attendance at prep meetings. Each criteria = 1 point. Applications rated 1–4 (highly inclusive to non-inclusive).	4	Gov't stakeholders, external stakeholders in-country, int'l (i.e., Ministry of Finance, NGOs, health professionals)	No	Yes	Higher levels of inclusiveness correlated positively with application approval Strong correlation between the evaluation of inclusiveness and the assessment of the proposals by the Independent Review Committee.
27. Gregson, 2013	Cross-sectional survey (at two time points)	Participation	Self-reported participation in activities of local community organizations to which participants reported membership.	Unclear	5260 adults interviewed in two consecutive rounds Between 2003–2008	No	Yes	No relationship between participation and outcomes
28. Hess, 2001	Cross-sectional surveys	Citizen input index	Index combining data from seven situations where engagement in district is possible	7	District is focus	No	No	
29. Hood, 2010	Online questionnaire	Level of community engagement	Studies categorized in either Level 1 or Level 2 of community engagement. Level One included activities that had CBPR principles such as a community advisory Group or other meaningful involvement.	2	NIH-funded Investigators at a large Midwestern University that has an NIH CTSA	No	No	

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Table 1 Continued

Citation	Type of project	Measure of Engagement	Description of measures	# items used for measurement	Stakeholder studied	Statistics on measure?	Relate measure to outcome?	If yes, what is the result?
29. Hood, 2010	Community connected research	Level of community engagement	Focus groups for community input; MOA/MOU with non-univ group; data collection not at univ site; special events or recognition for participants; share study findings with community reps.	5	NIH-funded Investigators at a large Midwestern University that has an NIH CTSA	No	No	
29. Hood, 2010	Community connected research	Community involvement in individual steps of research process	Online survey e-mailed to principal investigators of recent NIH-funded studies	11	NIH-funded Investigators at a large Midwestern University that has an NIH CTSA	No	No	
30. Hughes, 2006	National random telephone survey	Community Life	Community Connections (number of group memberships), Community Norms (feelings of trust and reciprocity in community)	2	Australian adults who responded to 'Families, Social Capital, and Citizenship' Project.' National random sample	No	Yes	Family life measures predicted both measures of community life
31. Jolibert, 2012	Cross-sectional survey	Participation	Counts of stakeholders involved in the biodiversity research project	1	Selected project coordinators and partners in 38 biodiversity research projects	No	No	
31. Jolibert, 2012	Cross-sectional survey	Communication	Types of communication between research projects and stakeholders	1	Selected project coordinators and partners in 38 biodiversity research projects	No	No	
32. Kagan, 2012	Survey	Community involvement	How people viewed (a) the frequency of activities indicative of community involvement, (b) the means for identifying, prioritizing, and supporting CAB needs, and (c) mission and operational challenges.	25	Community advisory boards	No	No	
32. Kagan, 2012	Survey	Frequency of activities reflective of community involvement	Rated (on a 7-point Likert-type scale of 1 [never] to 7 [always]), the perceived frequency of occurrence of 25 best practice activities, 11 of which were CAB-based and 14 describing RS functions.	11	Community advisory boards	No	No	

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Table 1 Continued

Citation	Type of project	Measure of Engagement	Description of measures	# items used for measurement	Stakeholder studied	Statistics on measure?	Relate measure to outcome?	If yes, what is the result?
32. Kagan, 2012	Survey	Relevance of research activities	Rated (on a 7-point Likert-type scale of 1 [never] to 7 [always]), the perceived frequency of occurrence of 25 best practice activities, 11 of which were CAB-based and 14 describing RS functions.	6	Community advisory boards	No	No	
32. Kagan, 2012	Survey	Communication and collaboration activities	Rated (on a 7-point Likert-type scale of 1 [never] to 7 [always]), the perceived frequency of occurrence of 25 best practice activities, 11 of which were CAB-based and 14 describing RS functions.	8	Community advisory boards	No	No	
33. Kamuya, 2013	Cross-sectional survey	Participation	Number of meetings attended number of members	2	Community representatives	No	No	
34. Kyle, 2010	Cross-sectional Survey	Ratings of home and community protection activities	Respondents first indicated Y/N to whether they did specific activity. Then rated likelihood of doing activity in the future along 5-point scale Items grouped into 4 conceptual domains.	13	Residents in Southern CA; primarily white, educated men	No	Yes	Community attachment was strongly predictive of community-based activities.
35. Litt, 2013	Cross-sectional Survey	Stakeholder engagement.	Questions on 10 community activities on a 5-point Likert scale (1 = never, 2 = rarely [<2 times], 3 = sometimes [2–5 times], 4 = often [most of the time], 5 = very frequently or ongoing) (19).	15	Active living collaborations	No	No	
36. McNaughton, 2012	Community engagement case study	engagement activities	number of each type of outreach/engagement activity	3	Community members and community leaders (Australian)	No	Yes	

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Table 1 Continued

Citation	Type of project	Measure of Engagement	Description of measures	# items used for measurement	Stakeholder studied	Statistics on measure?	Relate measure to outcome?	If yes, what is the result?
37. Nahar, 2012	Intervention	Attendance	Number of and attendance at women's groups	2	women of childbearing age and new married in rural Bangladesh	No	Yes	Approximately 29% of women who gave birth and were interviewed as part of the community-surveillance system during the period January 2009 to June 2010 reported attending women's groups, compared to 3% prior to scale-up.
38. O'Brien, 2009	Intervention	Change in the use of community services	The number of services used by each patient one year before the CTO was issued (range 1–3). Measures the number of services used one year after the CTO is issued (range 1–4).	1	Psychiatric patients in Ontario, Canada	No	Yes	A significant increase in the number of community services was found for patients following the issuance of a CTO.
39. Overstreet, 2005	Cross-sectional survey	Community engagement behaviors (predictor variable)	Parent reporting of voting, church attendance, and activity at their local community center.	3	159 economically disadvantaged African American parents living in an urban setting	No	Yes	Parent engagement and contextual variables predicted school involvement outcomes, but specific predictors varied by child's grade level.
39. Overstreet, 2005	Cross-sectional survey	Parental involvement in schooling (outcome variable)	Parent reporting of visiting their child's classroom, attending events at school, and membership of the parent–teacher organization. Summed to composite measure.	4	159 economically disadvantaged African American parents living in an urban setting	alpha = .62	Yes	Parent engagement and contextual variables predicted school involvement outcomes
40. Phillips, 2014	Cluster randomized trial	Competency in partnership, collaboration, and community engagement	Self-assessment of competency in partnership collaboration and community engagement	1	Mentees in the research to reality pilot mentorship program of NCI	No	No	

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Table 1 Continued

Citation	Type of project	Measure of Engagement	Description of measures	# items used for measurement	Stakeholder studied	Statistics on measure?	Relate measure to outcome?	If yes, what is the result?
41. Pitama, 2011	Description of CBPR epidemiological study	Study response rates in three groups of study samples	The final disposition for each person selected was coded according to the American Association for Public Opinion Research (AAPOR) guidelines for in-person household surveys and response rates were calculated conservatively using Response Rate 1 which includes all persons of unknown eligibility in the denominator.	1	Wairoa Maori, Christchurch Maori, Christchurch non-Maori	No	Yes	Maori research approach successfully recruited participants
42. Polson, 2013	Cross-sectional survey	How many formal or informal groups or clubs do you belong to, in your area, that meet at least monthly?	Count of formal or informal groups or clubs	1	general male public	Factor loading from principal component analyses presented	No	
43. Rinner, 2009	GIS case study	Participation (type and amount)	Measure of participation in the ArguMap application. Factors: registrations, active participants, starter threads, contributions, new threads, replies (first-order, second-order, third-order, and fourth-order).	10	Residents within or near the 'Queen West Triangle' in Toronto	No	No	
44. Rose, 2008	Cross-sectional survey	Active engagement with thecommunity	Measured frequency of active and passive types of community involvement.	5	Older adults in 7 Latin American and Caribbean cities	No	Yes	No significance in the association active community engagement and active living.
45. Saewyc, 2008	Cross-sectional survey	Community engagement	Level of involvement in extracurricular activities and volunteering.	Unclear	Adolescents in British Columbia	No	Yes	High levels of protective factors were strongly linked to lower rates of self-reported risk behaviors and greater health.
46. Shah, 2002	Cross-sectional Survey	Civic engagement	An additive index from three items.	3	Residents of defined community	alpha = .3	Yes	Internet use related to civic participation

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Table 1 Continued

Citation	Type of project	Measure of Engagement	Description of measures	# items used for mea-surement	Stakeholder studied	Statistics on measure?	Relate measure to outcome?	If yes, what is the result?
47. Sirin, 2011	Cross-sectional survey	Developmental Assets Profile (Search Institute, 2004).	Single item measure of community engagement (In the past year, have you worked with others in your neighborhood to address a problem or improve something?)	1	general male public	No	No	
48. Tiffany, 2012	Intervention	Intensity	Analysis of how long involved in program	1	Adolescents engaged in after school activities in NYC	Extensive factor analyses reported; alphas = .66-.	No	
48. Tiffany, 2012	Intervention	Duration	Analysis of how long involved in program	1	Adolescents engaged in after school activities in NYC	Extensive factor analyses reported; alphas = .66-.	No	
49. Van Voorhees, 2008	Survey	Community environment and engagement	Neighborhood relations, community involvement, religious activities, delinquency, and adverse events.	15	Representative sample of U.S. adolescents in grades 7–12 with oversampling of African American youth from high educational backgrounds	No	Yes	A supportive community and constructive involvement were related to new-onset depressive episodes.
50. Westfall, 2012	Survey	community engagement	Participation with new colleagues	2	Conference attendees	No	No	
51. Wilkins, 2013	Intervention	Inventory of community involvement	Inventory made up of (1) Number and type of community representatives (CRs) with formal roles in each CTSA. (2) Roles of CRs in the CTSAs. (3) Inclusion of CRs in committee and overall leadership. (4) Policies that govern CRs involvement. (5) Time commitments expected of CRs. (6) Types and amount of compensation to CRs. (7) Best practices in engaging CRs. (8) Barriers to engaging CRs.	8	CTSAs	No	No	

Table 2 Participant-reported measures of engagement, 1973–2014

Citation	Type of project	Measure of engagement	Description of measures	# items used for measurement	Stakeholder studied	Statistics on measure?	Relate measure to outcome?	If yes, what is the result?
52. Algesheimer, 2005	Survey	Community identification	Strength of the consumer's relationship with the brand community.	5	Car club members	alpha = .92	Yes	Community engagement related to normative community pressure
52. Algesheimer, 2005	Survey	Community engagement	Consumer's intrinsic motivations to interact and cooperate with community members.	4	Car club members	alpha = .88	Yes	Community engagement related to normative pressure positively; community participation intentions, community recommendation intentions, membership continuance intentions
19. Andrews, 2008	Survey	Effective citizenship	Importance of supporting citizenship through engagement, and delivery structures (government departments) utilized to do so	2	English local government officers	No	No	
19. Andrews, 2008	Survey	Engaging local citizens	Successful citizenship-related activities to build culture of engagement in local government, and changes in internal working practices to enhance this.	2	English local government officers	No	No	
20. Ayuso, 2011	Cross-sectional survey	Customer and employee engagement	Single item on how the company incorporates customer feedback. For employees: lay-offs and worker displacement policies, company systems for collecting and handling employee grievances and complaints, company-specific job training, and selection rigor in company recruiting systems.	1 and 4	Employees and customers	No	Yes	engagement related to corporate social responsibility measured in terms of fiscal investment in socially responsible areas
53. Brown, 2003	Cross-sectional survey	Future service	Likelihood of practicing in underserved areas	1	Practitioners of community and public health	No	No	

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Table 2 Continued

Citation	Type of project	Measure of engagement	Description of measures	# items used for measurement	Stakeholder studied	Statistics on measure?	Relate measure to outcome?	If yes, what is the result?
54. Bruning, 2006	Cross-sectional survey	Resident engagement with the local university	Attendance a public event at the university in the past 6 months.	1	Local residents	No	Yes	Attendance a university event is positively associated with respondent's positive perception of the university, and consideration of the university as an asset to the community.
55. Chiu, 2005	Cross-sectional Survey	Cynicism about community engagement	"I don't see the point in participating in social services or community affairs, there is not much you can change."	1	Employed Hong Kong residents	No	Yes	Cynicism about community engagement is the outcome variable; 5 categories of predictor variables were tested.
55. Chiu, 2005	Cross-sectional Survey	Judgment of a good society	Importance of having more people who are willing to serve that society in a good society	1	Employed Hong Kong residents	No	Yes	Increased importance placed on having more people willing to serve in a good society was found to predict less cynicism about community engagement.
55. Chiu, 2005	Survey	Perception of deprivation	Other people having more opportunities	1	Employed Hong Kong residents	No	Yes	Increased perception of one's own social deprivation was found to predict increased cynicism about community engagement.
55. Chiu, 2005	Survey	Perception ofbrk one's value to society	"I feel valued by society"	1	Employed Hong Kong residents	No	Yes	Decreased perception of value to society was found to predict increased cynicism about community engagement.
55. Chiu, 2005	Survey	Social Trust	General view of trusting others; Levels of trust in five groups of people. Mean of these values taken as composite variable.	2	Employed Hong Kong residents	No	Yes	Increased social trust found to predict less cynicism about community engagement.
56. Chung, 2009	Survey	Community engagement	The perception that individual problems (in the study, depression and mental wellness) are problems of the community as a whole, on a 5 point scale (ranging from strongly agree to strongly disagree)	4	Eligible attendees at the Talking Wellness events	No	Yes	Collective efficacy to improve depression care related to community engagement

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Table 2 Continued

Citation	Type of project	Measure of engagement	Description of measures	# items used for measurement	Stakeholder studied	Statistics on measure?	Relate measure to outcome?	If yes, what is the result?
56. Chung, 2009	Survey	Collective efficacy	Ability of group to improve depression care	1	Eligible attendees at the Talking Wellness events	Factor analysis mentioned but no data reported	Yes	Collective efficacy related to community engagement in terms of addressing depression. In confirmatory analyses, exposure to spoken word presentations and previous exposure to CPPR initiatives increased perceived collective efficacy
57. Beringer, 2012	Cross-sectional Survey	Stakeholder engagement'	Two-dimensional, 6 × 9 question matrix: Stakeholders marked a cross next to the position in the organization responsible for each of the nine specified activities.	9	Internal stakeholders of 223 portfolios, managers who were supposed to be operatively involved in project portfolio management processes.	No	No	
58. Cuillier, 2008	Cross-sectional Survey	Attitudes toward community engagement	Importance of six activities in the respondent's life.	6	Public via random-digit dial national phone surveys	alpha at least .70	Yes	Community engagement is positively related to support for press access.
59. Davis, 2012	Cross-sectional survey	Questions on engagement with ARS	Survey of participants on their views of using the ARS agreed or strongly agreed that they felt comfortable sharing their thoughts and opinions	3	Town hall meeting participants	No	No	
60. De Freitas, 2013	Cross-sectional survey	Stakeholders' views and understanding of the public participation process	Survey: choose among a set of five definitions for an effective communication and engagement process.	1	Participants were representative of diverse and key stakeholder groups and sectors in the region	No	No	
60. De Freitas, 2013	Cross-sectional survey	Perceptions of public participation processes	Ratings of the level of importance (with categories 1 = not at all important to 5 = extremely important) for 17 statements about possible outcomes and attributes of an effective engagement program in natural resource management.	1	Participants were representative of diverse and key stakeholder groups and sectors in the region	alpha = .80	No	

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Table 2 Continued

Citation	Type of project	Measure of engagement	Description of measures	# items used for measurement	Stakeholder studied	Statistics on measure?	Relate measure to outcome?	If yes, what is the result?
61. Deverka, 2012	Survey	1. Representation 2. Process 3. Information 4. Outcomes	A online Likert-scale for each component	29	Variety (Patients, consumers, healthcare providers, industry, purchasers and payers, and policymakers and regulators)	No	Yes	Engagement related to goal of establishing a stakeholder-driven priority-setting process for cancer genomics comparative effectiveness research in a clinical trials cooperative
62. Khodyakov, 2012	Survey	Community Engagement Research Index	List of 12 research activities that community partners participate in, (1 = "Community partners did not participate in this activity"; 2 = "Community partners consulted on this activity"; and 3 = "Community partners were actively engaged in this activity.")	12	Community partners	No	No	
63. Durrant, 2012	Survey	Community involvement	"I help out in the community." And "I am an active member of a club or community organization."	2	pupils participating in the Youth Community Action pilot	factor analysis mention	No	
64. Haga, 2013	Survey	Positive feelings	Survey instrument with trust and worry items	7 and 4	Middle school students and their parents/guardians	alpha = .7 alpha = .6	No	
65. Henderson, 2013	Survey	Preferences for knowledge exchange preferences for research collaboration perspectives on the proposed research agenda	Stakeholders knowledge exchange preferences, stakeholders research collaboration preferences, stakeholder research agenda perspectives	3	Multiple stakeholders primary sectors for survey respondents include: mental health, health, addictions, child welfare, education, justice, and others such as housing, shelters, outreach or employment services	No	No	
66. Hoffman, 2010	Survey	Community service questionnaire	Perceptions of the importance of community service activity and civic engagement. Likert-based scale	12	Undergrad students from Metropolitan State University in St. Paul, MN	No	No	

Table 2 Continued

Citation	Type of project	Measure of engagement	Description of measures	# items used for measurement	Stakeholder studied	Statistics on measure?	Relate measure to outcome?	If yes, what is the result?
67. Human-Vogel, 2012	Survey	Community engagement	One overall scale with four subscales, each using five items to measure Satisfaction, Quality of alternatives mindfulness, and investment size	30	Midcourse undergraduates	alpha = 0.91	Yes	Several aspects of commitment to Community engagement related to spending time with cultural groups other than their own.
68. Jaskiewicz, 2013	Intervention	Institutional recruitment scales	1. What planned and actual procedures were used by Healthy HotSpot staff to recruit community institutions 2. What planned and actual procedures were used by community partners to recruit stores	3	Community partners are municipal governments, nonprofit organizations and faith-based institutions in addition to the corner stores they recruited	No	No	
69. Kang, 2013	Survey	Neighborhood belonging	The 4-item subjective belonging index measuring feelings of attachment to a residential area.	4	225 elders recruited from five elderly colleges in Daegu, S. Korea	alpha = .76	Yes	Korean elders who used media frequently connected with local organizations, were actively involved in neighborhood activities and volunteering."
69. Kang, 2013	Survey	Perceived collective efficacy	Measure level of confidence regarding their neighbors' willingness to participate in neighborhood problem solving process	3	225 elders recruited from five elderly colleges in Daegu, S. Korea	alpha = .76	Yes	Korean elders who used media frequently connected with local organizations, and had conversations with neighbors often were actively involved in neighborhood activities and volunteering.
69. Kang, 2013	Survey	Volunteering	The degree to which respondents believed their neighbors would volunteer in the future based on past experiences.	2	225 elders recruited from five elderly colleges in Daegu, S. Korea	alpha = .68	Yes	Korean elders who volunteered with local organizations, and had conversations with neighbors were actively involved in neighborhood activities and volunteering.

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Table 2 Continued

Citation	Type of project	Measure of engagement	Description of measures	# items used for measurement	Stakeholder studied	Statistics on measure?	Relate measure to outcome?	If yes, what is the result?
69. Kang, 2013	Survey	Length of residence and homeownership	Indicate the number of years they had lived at their current residence	1	225 elders recruited from five elderly colleges in Daegu, S. Korea	alpha = .84	Yes	"Results found that Korean elders who used media frequently connected with local organizations, and had conversations with neighbors often were actively involved in neighborhood activities and volunteering."
69. Kang, 2013	Survey	Scope of connections to community organizations	Belonging to any of five different types of organizations: (1) sports or recreational, (2) religious, (3) neighborhood, (4) political, (5) other.	1	225 elders recruited from five elderly colleges in Daegu, S. Korea	Alpha = .76	Yes	"Results found that Korean elders who used media frequently connected with local organizations, and had conversations with neighbors often were actively involved in neighborhood activities and volunteering."
70. Kazemipur, 2011	Survey	Canadian General Social Survey	Self-Interest Social Engagement, Cultural–Community Participation, Political party activism, Political Information acquiring and sharing, Confidence in private institutions, Voting, Trust, Volunteering, Neighborliness, Group activity, Political expression, Social networks, Donation–Youth–Business, Confidence in public institution, Religion	45	General public, stakeholder in government	Factor analysis and alphas presented for 15 subscales	No	
71. Krauss, 2012	Survey	School engagement	6-item scale measuring the respondents' adherence to the education goals and values of their school.	6	895 third year Muslim high school students from 19 schools throughout the Klang Valley (greater Kuala Lumpur region).	alpha = .74	Yes	School engagement significantly predicted religiosity for the full sample of students from both types of families

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Table 2 Continued

Citation	Type of project	Measure of engagement	Description of measures	# items used for measurement	Stakeholder studied	Statistics on measure?	Relate measure to outcome?	If yes, what is the result?
71. Krauss, 2012	Survey	Mosque involvement	6-item scale measuring the respondents' adherence to the education goals and values of their school.	2	895 third year Muslim high school students from 18 public secondary schools throughout the Klang Valley (greater Kuala Lumpur region).	No	Yes	Mosque involvement significantly predicted religiosity for the full sample of students from both types of families
71. Krauss, 2012	Survey	Youth organization involvement	6-item scale measuring the respondents' adherence to the education goals and values of their school.	2	895 third year Muslim high school students from 18 public secondary schools throughout the Klang Valley (greater Kuala Lumpur region).	No	Yes	Youth organization involvement significantly predicted religiosity for the full sample of students from both types of families
34. Kyle, 2010	Survey	Community attachment scale	Items measured along 5-point scale of 1 = strongly disagree to 5 = strongly agree.	9	Residents in Southern CA; primarily white, educated men	Alpha = .91	Yes	Those most attached to their homes and community were more likely to report current use of the Firewise techniques and expressed greater likelihood of future use. Community attachment was more strongly predictive of community-based activities.
72. Lee, 2009	Author report/ literature review	Percent skilled attendance at birth	Meta-analysis of community mobilization using 4 studies	9	Skilled birth attendant	No	Yes	There was evidence that community mobilization with high levels of community engagement can increase institutional births and reduce perinatal and early neonatal mortality.
73. McComas, 2011	Survey	Perceived fairness of university decision makers	Respondents were asked how respondents perceived university decision makers would behave toward them and their community.	9	Tompkins county property owners selected from property tax rolls	alpha = .93	Yes	A significant positive relationship between fairness and support.
74. Narsavage, 2003	Survey	Effects of service learning	Quantitative pre and post-testing.	14	Students from a service learning class	No	No	

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Table 2 Continued

Citation	Type of project	Measure of engagement	Description of measures	# items used for measurement	Stakeholder studied	Statistics on measure?	Relate measure to outcome?	If yes, what is the result?
75. Nokes, 2005	Intervention	Civic engagement	Attitudes toward community involvement, influence of the service learning experience on choice of major and profession, and personal reflections on the service learning experience	12	Nursing students	alpha = "acceptable"	Yes	Participants' civic engagement scores increased significantly after the intervention.
76. Orians, 2009	Survey	Characteristics of networks (assessed both before and after the implementation)	Participants rated several aspects of PACE involvement	4	Individuals in communities implementing PACE	No	No	The measures were outcomes of program implementation.
77. Peterson, 2006	Survey	Coalition structure and processes	Factors identified as important for community involvement.	Unclear	Members of Allies Against Asthma coalitions	No	No	
78. Phillipson, 2012	Survey	Perceived impact on the stakeholders policies or practices and knowledge or understanding	Response on 4 point scale	1	Multiple types of stakeholders in projects	No	Yes	A close relationship is found between mechanisms and approaches to knowledge exchange and the spread of benefits for researchers and stakeholders.
78. Phillipson, 2012	Survey	Perceived impact on research relevance and scientific quality	Response on a 5 point scale	1	Multiple types of stakeholders in projects	No	No	
79. Puddifoot, 2003	Survey	Twelve items measuring personal community identity and 12 items measuring general community identity	Personal view of the quality of community life and others view of community life	24	residents of defined community	No	No	
80. Rawstorne, 2007	Cohort study	Community engagement	Dependent variable; Whether or not participants felt they were part of a positive community.	1	People living with positive HIV diagnosis	No	Yes	Historical time of diagnosis and factors related to living with HIV help explain HIV-positive community engagement.
43. Rinner, 2009	Survey	Assessment of the engagement experience	Participants were asked to rate six statements on a five-point scale from strongly agree to strongly disagree.	7	Residents within or near the 'Queen West Triangle' in Toronto	No	No	

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Table 2 Continued

Citation	Type of project	Measure of engagement	Description of measures	# items used for measurement	Stakeholder studied	Statistics on measure?	Relate measure to outcome?	If yes, what is the result?
81. Rosenberger, 2014	Survey	Community engagement	Which of gay or bisexual functions or activities they had participated in the city where they lived.	18	Coalition members affiliated with CTC	Alphas not less than .55	No	
82. Shapiro, 2013	Survey	Goal-directedness Efficiency Opportunity for participation Cohesion	Participant surveys	17	Coalition members affiliated with CTC	Factor analysis, with "reasonable" loadings	No	n/a
83. Thompson, 2010	Post-test following a participatory planning workshop	Participants' perceived benefits of attending the workshops	New Ecological Paradigm Scale assessment and four questions.	Unclear	Scientists, decision makers and stakeholders	No	Yes	Participants gained a greater understanding of complexity and system dynamics related to urban air shed
84. Tiernan, 2013	Survey	Community Integration Measure	1. Feel like they belong in their community; 2. Know their way around their community; 3. Know the rules; 4. Feel accepted; 5. Can be independent in their community; 6. Like where they live, 7. Feel close to others; 8. Know people well enough to say hello; 9. Have fun things to do; and 10. Have productive activities to do in their community.	10	Older African Americans who participate in research	alpha = .83	Yes	Community engagement significantly related to well-being.
48. Tiffany, 2012	Intervention	Tiffany-Eckenrode Program Participation Scale (TEPPS)	Measuring theoretically significant characteristics of program participation: Personal Development, Voice/Influence, Safety/Support, and Community Engagement	21	Adolescents engaged in after school activities in NYC	alpha = .90	No	

include measures that could have provided some information on this topic. Our focus on English-language articles is a limitation of the data as presented; however, our assessment of the non-English articles we were able to translate indicates that this did not seem to bias the review.

FUTURE DIRECTIONS FOR RESEARCH AND PRACTICE

What is the right kind of engagement measure to use? First, we clearly need to develop better scales that (1) use a theory or model, (2) provide psychometric data, (3) can be short and used with large-scale projects, and (4) pick up the key elements of engagement that are critically important for involvement in health-related projects. These are high standards indeed, but feasible. Some scales exist, but because relationships and purposes of engagement vary so widely, selecting the right scale for the situation will depend on context, goals, and relationship. It is possible that no single scale will likely meet every need. This ultimately is an empirical question.

Given the increasing interest among researchers and funders in improving health outcomes through engagement of diverse stakeholders (communities, groups, individuals) in health-related research and programs, we recommend greater attention to developing good quality (validated, yet flexible) measures that can help us assess the level of engagement throughout an ongoing process, specific to varying types of engagement, and health outcomes related to the engagement process. Better measures would be particularly helpful in assessing engagement of diverse groups of stakeholders in a research project. When stakeholders can communicate their values in a research team, those values often influence the research process and can be an important source of new research questions, as well as a source of more accurate interpretations of the research findings.[86]

Some of the most interesting conceptual work is going on in qualitative projects. Qualitative data can accompany or inform quantitative approaches in mixed methods projects. For example, Schulz and colleagues[10,12] applied both qualitative and quantitative approaches to evaluate process and group dynamics in community-based participatory research (CBPR) projects. Their evaluation addressed perceptions of openness, trust, and ownership, and informed an annual quantitative survey in which partnership members rated these aspects of group functioning. Questions such as one's "sense of ownership/belonging to the group" may be construed as measuring a deep level of engagement. More qualitative research can improve the field's understanding of how various stakeholders describe their expectations for levels of engagement and inform quantitative scales representing engagement in the words and thoughts of the original stakeholders. The volume of research in this area has increased over the last few years, so we are hopeful that we will see the development of high-quality measures in these large studies.

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