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Application of a Mixed Methods Approach to Identify Community-Level Solutions to Decrease Racial Disparities in Infant Mortality

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Abstract

Objectives—This study aimed to identify community-level actions to decrease racial disparities in infant mortality (IM).

Design—Six urban multidisciplinary teams generated ideas for decreasing racial disparities in IM using a mixed methods concept mapping approach. Participants rated each idea as to its necessity and action potential and grouped ideas by theme. A cluster analysis produced a series of visual representations, showing relationships between the identified actions and the clustering of actions into themes. Multidimensional scaling techniques were used to produce analyses describing the necessity of and action potential for implementing the proposed ideas. Participants identified actions communities could take to decrease racial disparities in IM and suggested applications of the knowledge gained from the mapping process.

Results—Participants produced a total of 128 actions, within 11 thematic clusters, for decreasing racial disparities in IM. The thematic clusters contained a range of elements designed to promote knowledge and understanding of the relationship between health and racism; improve educational systems and community opportunities; facilitate community-driven health promotion, marketing, and research; improve health services for women; address physical and social environments that impact community health; prioritize resource allocation of community-based services; institutionalize strategies that promote equity across all systems; and create and support legislation and policies that address social determinants of health. Correlation coefficients of the clusters ranged from 0.17 to 0.90. Average necessity ratings ranged from 2.17 to 3.73; average action potential ratings ranged from 1.64 to 3.61.

Conclusion—Findings suggest that thematic clusters with high action potential usually represented ongoing community activities or actions communities could easily initiate. Community size, existing programs, partnerships, policies, and influential advocates were among the factors cited affecting feasibility of implementation. Clusters with lower action potential require broader, longer term, policy, institutional or system-wide changes, and significant resources. High necessity clusters often contained actions perceived as essential for change, but sometimes outside of a community's control. Participants identified a number of practical actions that were considered to hold potential for individual, community, and institutional changes which could result in decreasing racial disparities in IM.

Keywords

Infant mortality; Racial disparities; Racism; Community; Concept mapping; Mixed methods

Introduction

The relationship between racism and discrimination (i.e., social constructs of attitudes, beliefs, behaviors, and practices of individuals or institutions which systematically prescribe and attempt to legitimize the subordination of a group of people by claiming that that group is biogenetically or culturally inferior) and adverse health outcomes has been well described [1–8]. While the direct and indirect effects of racism and discrimination on health have been difficult to establish and prove [4, 9, 10], there is growing consensus among researchers that the health effects of racism and race-related exposures are cumulative [11–15]. In addition to the cumulative effects on individuals and subpopulations, racism and race-related exposures likely contribute to persistent disparities in birth outcomes over generations [14–18].

Communities have used participatory research methods and community models to explore and address disparities relating to public health policies, environment, neighborhood, transportation, housing, access to goods and services, physical activity, and a myriad of physical and mental health conditions [19–23]. Rarely, however, has the focus of community-informed disparity work been to address the nexus of racial disparities and infant mortality [24, 25]. Community-informed solutions to racial disparities and infant mortality are necessary because, despite the significance of the adverse outcome (i.e., infant mortality and persistent racial disparities in birth outcomes) [16–18, 26, 27] and the persistent conditions that contribute to poor outcomes [4, 5, 11, 28–31], much of the literature is problem focused. Medical treatment and prevention strategies tend to be narrowly focused, failing to take into account the complex nature of racism [32–35]. Byrd et al., for example, concluded that improving both prenatal care and maternal education attainment in Wisconsin would decrease infant mortality rates; however, these strategies would be unlikely to eliminate the black–white disparity in infant mortality and had the potential to widen the black–white gap [36]. Interventions, as described in Byrd, may produce an unintended consequence of increasing disparities in birth outcomes and could have far-reaching collateral implications, such as misperceptions that infant mortality problems have been solved when part of the population has been left behind, or that reducing racial disparities in birth outcomes is impossible.

Concept mapping is one approach that has been used in community settings to better understand the complexities of social conditions [37–43]. In this project, community team members from a collaborative of six geographically distinct urban areas applied the concept mapping approach to identify actions communities could take to decrease black–white racial disparities in infant mortality. The aims of this project were to gather, synthesize, and report on innovative ideas that other communities could implement to decrease black–white racial disparities in infant mortality. This report highlights results and offers strategies for implementation.

Methods

Teams comprised of state and local government representatives, federal Healthy Start program representatives, and community coalition members worked to better understand and address racism and its impacts on infant mortality (the Infant Mortality and Racism Action Learning Collaborative (the collaborative) [44]). The collaborative was facilitated by CityMatCH, the Association of Maternal and Child Health Programs (AMCHP), and the National Healthy Start Association (NHSA) (collectively, the partner organizations) with support from the W.K. Kellogg Foundation. Six participating communities (Aurora, CO; Chicago, IL; Columbus, OH; Los Angeles County, CA; Milwaukee, WI; and Pinellas County, FL) were selected through a competitive process for the collaborative. In these communities, infant mortality was at least twice as high in the African-American population as in the white population. The communities also demonstrated the capacity to address the black–white infant mortality gap in their application for participation in the collaborative.

To generate the ideas and better understand which were of greatest necessity and had the greatest potential for action from a community perspective, a mixed methods approach called concept mapping was used. This approach and its qualitative and quantitative methods have been well described elsewhere [37, 39, 43, 45–48].

Forty-one (41) participants and 11 advisory group and partner organization staff took part in qualitative information-producing activities: brainstorming, rating, and sorting. At the outset of the brainstorming session, a focus prompt—“One specific action our community could take to decrease racial disparities in infant mortality is…”—was used to generate ideas. Team participants were divided into four brainstorming groups. Groups were facilitated to ensure that all participants had an opportunity to speak and provide input during the idea generation process. Group interactions were not audio recorded; however, the ideas were posted on a flipchart to ensure that participants’ statements were captured accurately. Participants who did not wish to share their ideas in a group setting were allowed to submit their ideas to one of the group facilitators. Participants were allowed to submit as many ideas as they desired. All brainstormed ideas were collected at the end of the session.

Following the brainstorming session, the project’s principal investigator and partner organization staff reviewed the items to eliminate duplicate ideas, synthesize ideas that were similar in content and meaning, and prepare a comprehensive list of the unique ideas. The final ideas (action statements) were listed on worksheets for rating and onto index cards for sorting into themes. Rating and organizing the ideas into themes were performed individually by team participants without group interaction. Generated ideas were placed onto two different rating sheets—one for “necessity” and one for “action potential.” Necessity was defined as the “need for the specific action to be implemented or undertaken in a community.” Action potential was defined as the “potential for action of the specific activity given the availability of resources in a community (money, time, talent, etc.).” All team participants were invited to rate each idea on its own merit regarding necessity and action potential. Scales ranged from 1 to 4 (necessity rating scale: 1 = not at all necessary, 2 = somewhat necessary, 3 = necessary, 4 = extremely necessary; action potential rating scale: 1 = no potential for action, 2 = low potential for action, 3 = moderate potential for action,

4 = high potential for action). Ideas generated in response to the focus prompt also were placed onto index cards. Team participants were invited to organize the ideas into categories or themes that made sense conceptually to him or her.

Once rating and sorting were completed, the data were entered into a database, verified for accuracy and completeness, and analyzed using the Concept Systems software (Concept Systems Incorporated, Ithaca, NY). Using multidimensional scaling [49, 50] and cluster analysis [51], the data were analyzed and a series of visual representations (concept maps) were produced to show the relationships between ideas and the clustering of ideas into themes [39]. Multidimensional scaling techniques were used to produce a number of analyses and zone maps to describe the necessity of and action potential for implementing the ideas. Selected team participants, along with the principal investigator and partner organization staff, refined the analyses, created names for each of the cluster domains, interpreted the maps, discussed the broader themes and meaning of the identified action, and suggested broad applications of knowledge gained from the mapping process.

All analyses and results in this study are based upon team member perceptions and do not necessarily represent the official position of the CDC, CityMatCH, the University of Nebraska Medical Center, AMCHP, NHSA, or any other health department or organization of the authors. The research described in this study was approved by the University of Nebraska Medical Center Institutional Review Board (IRB#480–09-EP).

Results

Team participants were highly educated (75 % had at least a Master's degree), ranged in age from 26 to 73 years (approximately 70 % were 45 years of age or older), and 48 % self-identified as African-American or Black. Table 1 describes the characteristics of both the team participants and the advisory group members. The collaborative is described in greater detail on the CityMatCH website (http://www.citymatch.org/projects/partnership-eliminate-disparities-infant-mortality-pedim).

In the brainstorming process, 41 team participants generated over 254 ideas (128 unique ideas) to decrease racial disparities in infant mortality. Table 2 presents each of the action statements by cluster domain. The final set of action statements was analyzed and grouped into 11 clusters (Table 2 and Fig. 1). Each action statement is represented by a dot and numerical reference on the point and cluster maps (Fig. 1). Action statements related to one another are represented by points placed in close proximity. Action statements not related to one another have points placed more distant from one another (e.g., on opposite sides of the map). Likewise, groups of statements that tended to be sorted frequently together are represented by the clusters. The clusters were named based upon their actionable elements and include strategies to:

- Promote knowledge and understanding of the relationship between health and racism
- Develop social messages/marketing about racism and infant mortality
- Improve educational systems and opportunities

- Facilitate community-driven health promotion activities and marketing strategies
- Ensure and improve health services for women across the lifespan
- Educate and inspire professionals and lay people to take action about racism's impacts on health
- Conduct and disseminate community-informed research
- Address physical and social environments that impact health of the entire community
- Prioritize the allocation of resources for community-based services
- Coordinate and institutionalize strategies that promote equity across all systems
- Create and support legislation and policies that address social determinants of health

Clusters contained as few as 7 and as many as 21 action statements (mean=11.6). Participants reviewed the action statements within each of the clusters and discussed how the statements related and the overall area of action implied by the group of statements. Cluster descriptors shown in Fig. 1 and in Table 2 reflect the discussion over a period of 8 months and consensus of the participants. Correlation coefficients of the clusters ranged from 0.17 to 0.90 (Table 3). Degree of correlation was interpreted as negligible (0.0–0.19), weak (0.20–0.49), moderate (0.50–0.79), and strong (0.80–1.00).

The 128 final action statements were rated by the participants. The average necessity ratings ranged from 2.17 to 3.73; the average action potential ratings ranged from 1.64 to 3.61. To better understand which statements were believed to be the most necessary and hold the greatest potential for action, we divided the ratings into tertiles and designated the lower tertile as "low," the middle tertile as "moderate," and the upper tertile as "high." In Table 2, the overall perceptions of participants on the necessity and action potential of each statement within its cluster domain are presented. The first sets of columns are the perceptions of all of the team participants (*necessity*—low=2.17–2.68; moderate=2.69–3.21; and high=3.22–3.73; *action potential*—low=1.64–2.29; moderate=2.30–2.95; and high=2.96–3.61). The remaining columns separate out the ratings provided by team participants who self-identified as African-American/Black and as non-African American/Black (African-American/Black: *necessity*—low=2.24–2.76; moderate=2.77–3.30; and high=3.31–3.83; *action potential*—low=1.76–2.39; moderate=2.40–3.04; and high=3.05–3.68; non-African-American/non-Black: *necessity*—low=2.19–2.70; moderate=2.71–3.21; and high=3.22–3.73; *action potential*—low=1.57–2.23; moderate=2.24–2.90; and high=2.91–3.57) (Table 2). Generally, the ratings were similar between African-American/Black and non-African-American/Black participants.

Discussion

The statements brainstormed by team participants represent a wide range of actions—from widely recognized, standard strategies to some rather innovative strategies. The inclusion of more widely used strategies suggested that these actions are valued strategies that

communities can use to decrease disparities in infant mortality and add to the evidence base. The novel actions represent progressive individual and team thought on viable strategies to reduce racial disparities in infant mortality, particularly at the systems level.

Action statements contained system, community, family, and individual facets of racism and racial disparities that contribute to infant mortality and poor birth outcomes. Examples of action statements that communities could promote or initiate to address disparities at the systems level included:

- Working with local, state, and national policymakers to develop and enact health equity and health care equity laws
- Educating clinical and mental health providers about racism and its impact on birth outcomes
- Creating opportunities for clinical rotations in community health centers for the poor and medically underserved
- Requiring mandatory curriculum and continuing education for clinicians regarding racism and the different levels of racism

Community-level action statements included:

- Educating people about racism, increasing awareness around infant mortality
- Taking part in community planning processes
- Creating opportunities for community viewings and facilitated discussions of *Unnatural Causes*
- Developing middle school and high school curricula on the relationships and impacts of racism, racial disparities, and health
- Taking part in and using community-based research

Individual-level action statements that could be promoted and supported by communities included:

- Teaching and using stress reduction techniques
- Teaching youth, women, and men to advocate for their health rights
- Hearing the voices of the people we serve
- Using the cultural humility framework

We anticipated that there might be differences in how statements were rated between participants who self-identified as African-American/Black and non-African-American/Black. The ratings, however, were similar. We believe that the shared racism training and experiences of the participants over the 18-month collaborative likely influenced the participants' perceptions in rating statements' necessity and action potential. Participants received specific training about race and racism from the People's Institute and used a variety of educational tools, including *Race: the Power of an Illusion* (http://www.pbs.org/race/000_General/000_00-Home.htm) and *Unnatural Causes* (http://

www.unnaturalcauses.org/), to broaden their own understanding of race and racism and its impact on birth outcomes. The participants used a common definition of racism and an understanding of its different forms. As a group, the participants worked towards an understanding of one's own connection to institutional racism and its impact on his/her work and an understanding of the historical context for how racial classifications in the USA came to be and how they are maintained. It is possible that these shared experiences played a role in how participants rated statements.

In traditional concept mapping, clusters typically are given a three- to five-word descriptor [39]. However, participants in this project opted to choose descriptors that were action oriented. The themes that emerged from the cluster analysis represent an "executive summary" of the actionable elements considered necessary for reducing racial disparities in infant mortality (see Fig. 1 legend). While cluster naming is usually a minor step in the concept mapping process, for this project, the participants spent considerable time analyzing the content of each cluster and trying to gain an understanding of how the individual statements were related. The end result of this process was a list of 11 areas which can be used as a general guide for community planning in addressing racism and its impact on birth outcomes.

Clustered domains that were viewed as highly necessary (Fig. 2; clusters 1, 3, 4, 6, 9, and 11) often were associated with education. For example, clusters 1, 3, and 6 contain elements that promote the education of both consumers and professionals and reform of educational systems. Clusters 4 and 9 contain strategies for community-driven health promotion activities and actions that are needed for effective allocation of community-based resources. Cluster 11 was the primary domain for actions around policy and legislation for health equity and addressing the social determinants of health. The general consensus of the participants was that the educational aspects are crucial to a foundational understanding of racism, how inequities are created and sustained, and how racism impacts the health and well-being of populations. In addition, the participants felt that policy and legislation would be essential for promoting and producing health equity.

Clustered domains that had high action potential (Fig. 3, below the line) were interpreted as ongoing or easily implemented groups of ideas. These clusters often contained actions that individuals or community stakeholders could do with few or no resources, such as increasing knowledge about racism, racial disparities, and how racism influences health outcomes. Nevertheless, many activities that may already be ongoing in a community—health promotion activities, community-based research, programs for improving health services—may benefit from expansion, greater community member participation, and an equity-informed approach.

Clusters that had low action potential were interpreted as containing elements that would require broader, longer term policy, institutional or system-wide changes, and that might require greater resources to initiate, implement, and sustain (Fig. 3, above the line). Low action potential clusters dealt with the need to change educational systems, improve physical and social environments which impact the health of individuals, re-prioritize and allocate resources and community assets, coordinate and institutionalize equity strategies, and create

policies and legislation that promote health equity and address social determinants of health. The clusters that contained many of the system/institutional level statements (i.e., clusters 3, 8, 9, 10, and 11) were deemed necessary but often were perceived to have low action potential. The work of "undoing" racism and its associated impacts on infant mortality is an important, large-scale work that neccessitates widespread policy changes and policy implementation. Participants recognized the need to engage policy makers, legislators, and other elected officials at the beginning of local efforts to reduce racism. Participants also felt it would be necessary to educate their elected officials on how racism contributed to health disparities and how it is related to infant mortality.

The participants also looked at zone maps for each of the domain clusters (data not shown). In cluster 1 (items related to promoting knowledge and understanding of the relationship between health and racism), participants interpreted the elements that scored high in both action potential and necessity as practical concrete approaches that could create larger and lasting changes in practice and policy. With regard to cluster 2 (developing social messages and marketing about racism and infant mortality), elements that scored high in both action potential and necessity were generally actions that could be achieved by community-level dialogues using existing discussion tools and films for initiating facilitated discussion. The elements rated as high action potential also were viewed as having existing models or best practices and information that could be used for immediate development and consumption within a community. Statements in clusters 3 and 6 that scored high in both action potential and necessity dealt with the education of government employees, public officials, and health care providers, as well as the general public on the historical and present context of racism, the impact of different types of racism on an individual, and the impact of racism and discrimination in systems of care on the health of individuals. Clusters 4, 5, and 7 had high scoring elements around community engagement, the inclusion of community members—particularly African-American women—in assessment, planning, design, and communication processes, and the need for public health research to identify strategies to address racial disparities.

We identified three immediate applications for the information generated during the concept mapping process. First, many communities could conduct needs assessments or environmental scans of the types of services or benefits that community members desire or that are being provided by various providers or stakeholders. The action statements could be compared to the needs assessment or environmental scan results to identify gaps in, redundancies, and unrecognized or underutilized services or benefits. Thus, the action statements and their domains can be used as a starting point for a community and provider discussion, planning, and assessment. Second, the action statements could be used by communities as an addendum to the strategies and action steps in the National Stakeholder Strategy for Achieving Health Equity developed by the National Partnership for Action [52].

Third, the action statements can be used to further the work of the Perinatal Periods of Risk (PPOR) approach [53–56]. PPOR, a comprehensive approach to help communities use data to reduce infant mortality, was designed for use in urban areas with high infant mortality rates. PPOR brings stakeholders together from many sectors to build consensus and partnership based on community data and provides an analytic framework and steps

for investigating and addressing the specific local causes of fetal and infant mortality and disparities in vulnerable populations. One aspect of the PPOR process characterizes the period of risk by birthweight and age at death. For each of the four periods of risk (maternal health/prematurity, maternal care, newborn care, and infant health), certain viable solutions or preventive actions are identified. The action statements generated by concept mapping can be directly transferred to the periods of risk map as potential solutions or preventive measures. An example is shown in Table 4.

Strengths

To our knowledge, this is the first time that concept mapping has been used as a technique to explore racial disparities and infant mortality. In addition, the concept mapping technique is uniquely suited for engaging the participation of people from all backgrounds, educational levels, and ages. As described in Green and Aarons, the conceptual framework of concept mapping helps capture diverse perspectives and assess levels of agreement between or among different types of stakeholders [57].

Limitations

One potential limitation of this project is that the qualitative portions with team participants were conducted within an extremely narrow window of time (less than 6 h). Normally, brainstorming, rating, and sorting are conducted over a period of days or weeks. However, the final meeting of the collaborative presented an ideal opportunity to capture the momentum and passion of the participants. Some participants did, however, find it difficult to shift focus from the ongoing work of the collaborative to the concept mapping project. Another potential limitation is the generalizability of the information produced. While the intent was to produce information that communities could use to reduce disparities in infant mortality, the statements and analyses were conducted by individuals from communities with significant infant mortality disparities but who were highly educated and deeply experienced in public health. Thus, the information may not be wholly generalizable to all communities nor may it be considered as wholly community informed. Each of the communities participating in the collaborative contributed to a final report that highlighted the specific activities in which they engaged. This report can be found at: http://webmedia.unmc.edu/Community/CityMatch/HealthEquity/TakingFirstStepBooklet.pdf.

Team participants also struggled with the emphasis of the focus prompt on “reducing *racial disparities* in infant mortality” rather than “reducing *racism* and its impact on infant mortality.” As a collaborative, there was special emphasis on both racism and racial disparities. In hindsight, the team participants felt that the focus prompt and concept mapping process should have explored racism and potential solutions to decreasing racism and its impact on infant mortality.

Recommendations

For communities who are initiating dialogues and working on addressing racism and its impacts on infant mortality, participants recommended that communities focus their efforts in three of the key domains: promoting knowledge and understanding of the relationship between health and racism; developing social messages and marketing about racism

and infant mortality; and facilitating community-driven health promotion activities and marketing strategies. Participants underscored the need for education around racism—what it is, why the process in the USA is unique, how it is manifested, and how it is perpetuated—and how personally mediated, individual and institutional racism affects health [58]. Communities have used a number of methods and venues to initiate these dialogues, but participants found that small, diverse community groups who viewed episodes of *Unnatural Causes* and/or *Race: the Power of an Illusion* with a facilitated discussion to be particularly useful.

Public Health Implications

Concept mapping proved to be a readily adaptable approach to explore the complexities of racial disparities and infant mortality. The discussion of racial disparities may be emotionally charged as community leaders, seeing the problem through their own lenses, attempt to determine feasible approaches to tackling the issue. Grouping strategies into clusters and determining their action potentials are steps that simplify the problem. In this way, strategies with optimal action potentials are addressed as initial steps in the intervention process. With success in these initial steps, a community may be better equipped to tackle the more difficult strategies, especially those that require institutional change, political will, and considerable investment of time and effort. The concept mapping method is a tool that communities may find useful as they try to identify practical ways to address complex public health issues.

Conclusions

Initial findings suggest that thematic clusters with high action potential usually represented ongoing activities within certain communities or actions communities could easily initiate. Community size, existing programs, partnerships, and policies, and influential advocates were among the cited factors affecting ease of implementation. Clusters with lower action potential require broader, longer term, policy, institutional or system-wide changes, and more resources. The high necessity clusters contained actions perceived as essential for change, but sometimes outside of a community's control. Participants identified a number of practical actions that were considered to hold potential for individual, community, and institutional changes which could result in decreasing racial disparities in infant mortality.

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Key Messages

- Among the many social determinants of health that impact infant mortality, racism is one of the single, most important factors.
- The work of undoing racism and its associated impacts on infant mortality is an important, large-scale work that necessitates widespread policy changes and policy implementation, but must be initiated within and by communities.
- Education is crucial to developing a foundational understanding of racial disparities in health and well-being.
- The need for education about racial disparities cuts across all educational, economic, social, and geographic sectors.

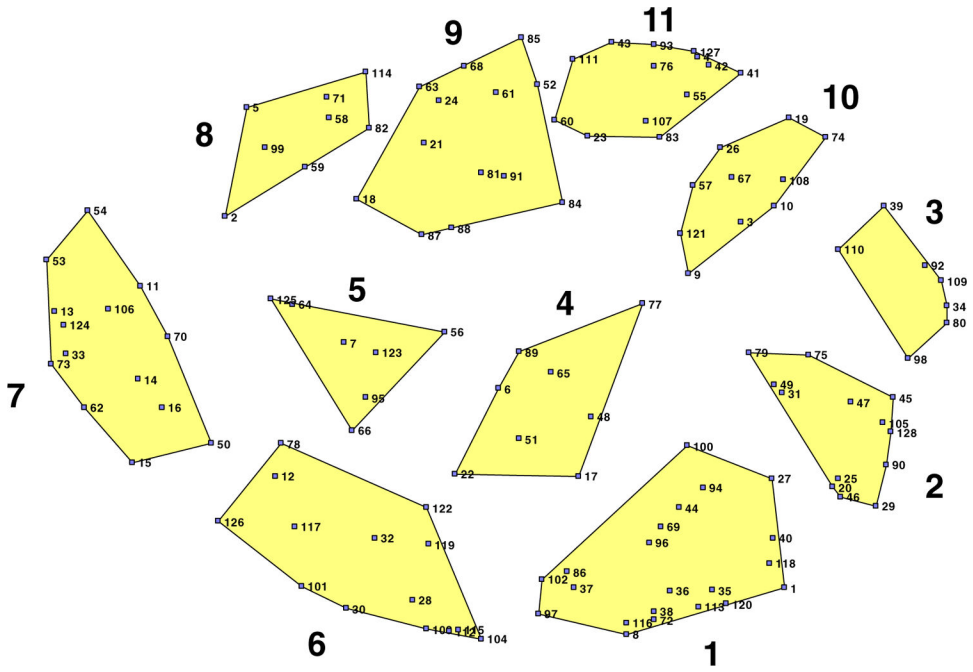

Fig. 1.

Thematic cluster map. Cluster theme descriptors: *1* Promote knowledge and understanding of the relationship between health and racism, *2* develop social messages/marketing about racism and infant mortality, *3* improve educational systems and opportunities, *4* facilitate community-driven health promotion activities and marketing strategies, *5* ensure and improve health services for women across the lifespan, *6* educate and inspire professionals and lay people to take action about racism's impacts on health, *7* conduct and disseminate community-informed research, *8* address physical and social environments that impact health of the entire community, *9* prioritize the allocation of resources for community-based services, *10* coordinate and institutionalize strategies that promote equity across all systems, and *11* create and support legislation and policies that address social determinants of health

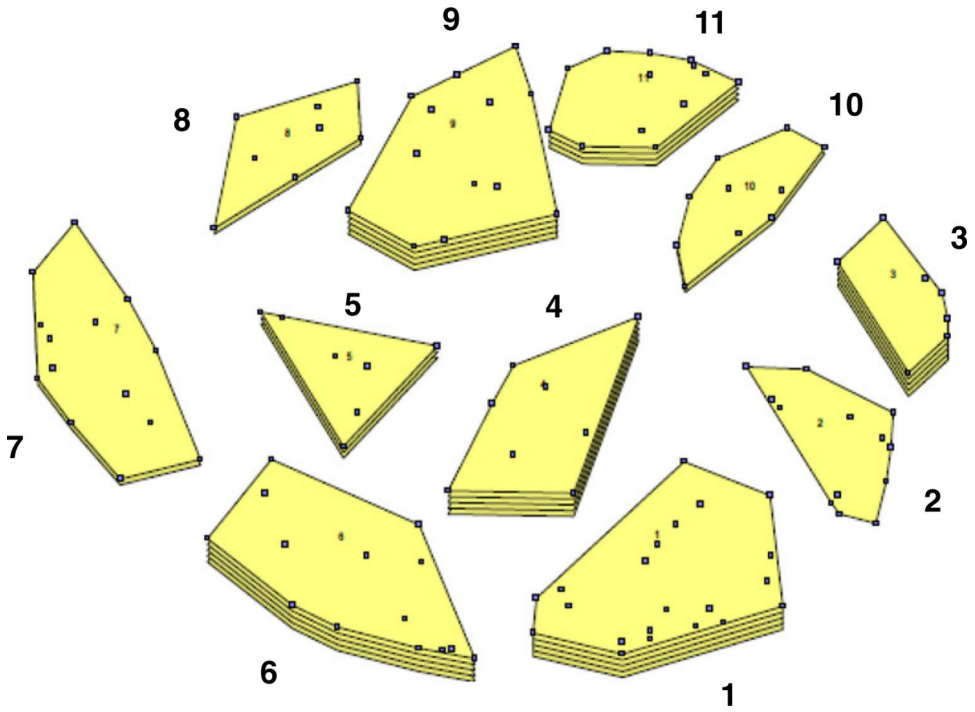

Fig. 2.
Necessity cluster rating map

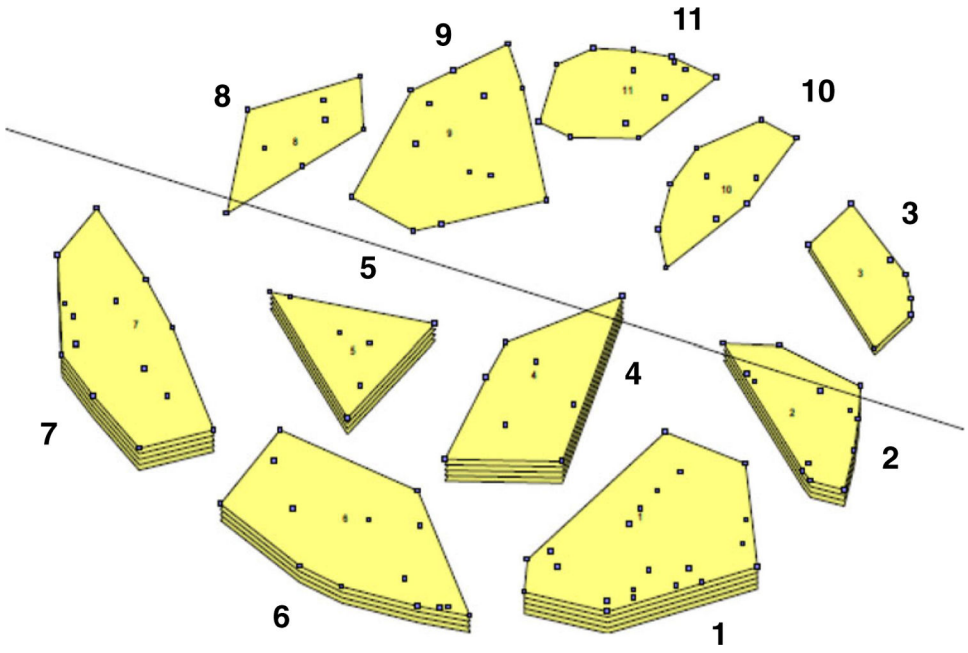

Fig. 3.
Action potential cluster rating map

Table 1

Concept mapping project participant demographics (n=52)

Demographic category		Number	Percent
Age	<45 years	15	28.9
	45–54 years	15	28.9
	>54 years	22	42.3
Self-ascribed race	African-American/Black	25	48.1
	Non-African-American/non-Black	27	51.9
Highest level of education attained	<Masters degree	13	25.0
	Masters degree	23	44.2
	≥Doctoral/MD degree	16	30.8
Representation on collaborative	Advisory group member	11	21.2
	Community team member	41	78.9
Team distribution of participants	Aurora, CO	6	14.6
	Chicago, IL	5	12.2
	Columbus, OH	8	19.5
	Los Angeles County, CA	6	14.6
	Milwaukee, WI	8	19.5
	Pinellas County, FL	8	19.5

Table 2

Average cluster and statement ratings by perceived impact on decreasing disparities in infant mortality

Cluster descriptor and statements	Rating of perceptions on impact of decreasing disparities					
	Overall perception		African-American/Black perception only		Non-African-American/ non-Black perception only	
	N	AP	N	AP	N	AP
1. Promote knowledge and understanding of the relationship between health and racism						
(69) hold public/social marketing awareness campaigns to inform the community, government, and consumers on the impacts of racism on health disparities	Mod	Mod	Mod	Mod	Mod	Mod
(96) provide books and short story materials about “before you become pregnant” at clinics for the public to read	Low	High	Low	High	Low	High
(8) begin education on preconception health from an early age	Mod	Mod	Mod	Mod	Mod	Mod
(37) educate people about racism—what it is, how it operates, what it does, what it “costs”	High	High	High	Mod	High	High
(40) educate public on ways to reduce preterm births (e.g., signs of early labor, folic acid, P17, stress, etc.)	Mod	High	Mod	High	High	High
(38) educate public health students in graduate programs on cultural factors that have a direct correlation with the health of a pregnant woman and her unborn child	Mod	High	Mod	Mod	Mod	High
(120) train providers on how to educate women about their bodies	Mod	High	Low	Mod	Mod	High
(102) provide specific training around *Unnatural Causes* and provide focus group follow-up to specific conversations	Mod	High	Mod	High	Mod	High
(72) implement age-appropriate and medically accurate health education (i.e., reproductive health, chronic disease, nutrition, etc.) beginning in kindergarten and continuing throughout school (K-12)	High	Mod	Mod	Mod	High	Mod
(36) educate mental health providers about the impact of racism	Mod	High	High	High	Mod	High
(44) encourage reproductive life planning for young men and women	High	Mod	Mod	Mod	High	Mod
(116) teach cultural competencies in medical school	High	High	Mod	Mod	High	High
(86) inform and educate the “front office” personnel about how women feel they are being treated and the effect of communication on patient populations	Mod	High	Mod	High	High	High
(94) present and provide opportunities to learn about preconception health practices across many community venues (e.g., female-only groups, youth groups in churches, female organizations in colleges, high school sports teams)	Mod	Mod	Low	Mod	Mod	High
(35) educate home visitation teams, nurses, and community health providers on the impact of race on birth outcomes	High	High	High	High	High	Mod
(118) teach young children about relationships and family building	Mod	High	Low	Mod	Mod	High
(113) require cultural competency training for all health care professionals, especially doctors and nurses	Mod	Mod	Mod	Mod	Mod	Mod
(97) provide education starting in grade school on the historical context and impact of race in the USA	Mod	Mod	Mod	Mod	High	Mod
(100) provide in-home education and support to women and their families and friends to assist with addressing resiliency, network	Mod	Mod	Low	Mod	Mod	Mod
(1) address/educate health providers on the issues of institutional racism as it affects the health outcomes for African-American women and their children	High	High	High	High	High	High

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Cluster descriptor and statements	Rating of perceptions on impact of decreasing disparities					
	Overall perception		African-American/Black perception only		Non-African-American/ non-Black perception only	
	N	AP	N	AP	N	AP
(27) develop a toolkit about racism and infant mortality to increase awareness for dissemination to health care providers, etc.	High	High	Mod	High	Mod	High
2. Develop social messages/marketing about racism and infant mortality						
(20) create a social marketing campaign focused on safe sleep	Low	High	Low	High	Low	High
(29) develop consistent media messages regarding infant mortality that run continuously throughout the community	Mod	Mod	Mod	Mod	Mod	Mod
(49) engage libraries as stakeholders in raising awareness of social justice issues, racism, disparities, linkages to health outcomes	Low	Mod	Low	Mod	Low	Mod
(90) maintain a multicultural speakers bureau and utilize speakers to help raise awareness of social justice issues, racism, disparities, linkages to health outcomes	Mod	Mod	Mod	Mod	Low	Mod
(25) create more awareness in those areas of communities that have the highest rates of infant mortality	High	High	High	High	High	High
(46) engage and educate the celebrity community on racism and its impacts on infant mortality so they will bring awareness to the cause	Low	Mod	Low	Mod	Low	Mod
(105) put up bill boards in the community to showcase the connection between racism and infant mortality (e.g., “racism kills babies”)	Low	Mod	Low	Mod	Low	Mod
(79) increase educational achievement for African-American families, especially African-American males and low-income children (e.g., Harlem Kids Zone)	High	Mod	High	Mod	High	Mod
(128) write editorials to raise community awareness about disparities and the association of racism with infant mortality	Low	High	Mod	High	Low	High
(31) discuss social determinants of health impacting infant mortality	High	High	High	High	Mod	High
(75) include businesses (e.g., laundromats, grocery stores, barber shops, and beauty salons, taxi companies) in the dissemination of information in infant mortality	Mod	High	Mod	High	Mod	High
(47) engage community members in dialogue about the life course perspective and its application (identify key factors to address)	Mod	Mod	Mod	Mod	Mod	High
(45) encourage students to go to college and prepare themselves for the future	Mod	Mod	Low	Mod	Mod	Mod
3. Improve educational systems and opportunities						
(110) replicate successful early childhood programs to meet the needs of all low income children to ensure a foundation for income equality in adulthood	Mod	Mod	Mod	Mod	Mod	Mod
(39) educate public officials and community business leaders to garner support for change	High	High	Mod	High	High	Mod
(98) provide educational opportunities for racially oppressed groups of children	Mod	Low	Mod	Mod	High	Low
(92) offer low cost, secondary educational opportunities to low income, working families	Mod	Low	Mod	Mod	Mod	Low
(109) reintroduce health and physical education in the school system	Mod	Mod	Mod	Mod	High	Mod
(80) increase racial diversity in medical schools, public health settings, and nursing schools	High	Mod	Mod	Mod	High	Mod

Cluster descriptor and statements	Rating of perceptions on impact of decreasing disparities					
	Overall perception		African-American/Black perception only		Non-African-American/ non-Black perception only	
	N	AP	N	AP	N	AP
(34) educate employees of government agencies that provide health services about the discriminatory impacts of their agency policies	High	Mod	Mod	Mod	High	High
4. Facilitate community-driven health promotion activities and marketing strategies						
(48) engage community members in message development and design (e.g., use billboards, flyers, the internet, MySpace, buses, PSAs like MADD, and antitobacco groups)	Mod	High	Mod	High	High	High
(89) listen to families when they express concerns about health behaviors and practices	Mod	High	Mod	High	Mod	High
(51) engage the whole community to increase awareness of racism, take ownership of it, and take action on/against it	Mod	Mod	High	Mod	High	Mod
(65) hear the voices of the people we serve and capture disparities from their perspectives	High	High	High	High	High	High
(17) coordinate messaging across all entities and individuals working on infant mortality to ensure consistency	Mod	Mod	Mod	Mod	Mod	Mod
(6) assure that any community planning process engages affected communities (oversample, increase numbers of affected persons)	High	High	High	High	High	High
(77) include more African-American women in the design of program interventions that increase numbers of affected persons)	High	High	High	High	High	High
(22) create community-wide “cribs for kids” programs with evidence-based “safe-sleep” educational components	Low	Mod	Low	Mod	Low	High
5. Ensure and improve health services for women across the lifespan						
(56) establish a community health worker program as a tier in the public health infrastructure	Low	Mod	Mod	Mod	Low	Mod
(123) use the CenteringPregnancy model as the standard of care for high-risk pregnant women	Low	Mod	Low	Mod	Low	Mod
(7) assure that any perinatal outreach/home visiting program is focused for communities at greatest risk for poor health and social outcomes	High	High	Mod	High	High	High
(66) hire and train community health workers/home visitors to provide services to pregnant women	Mod	High	Mod	High	Mod	Mod
(95) promote trust between mothers and medical providers	Mod	Mod	Mod	Mod	Mod	Mod
(64) have a higher proportion of affected community members as participants in group coalitions	High	High	Mod	High	High	High
(125) utilize the life course theory as a foundation to improve birth outcomes in the African-American/Black population	Mod	High	Mod	Mod	Mod	Mod
6. Educate and inspire professionals and lay people to take action about racism’s impacts on health						
(115) rotate medical and nursing students through community health centers as a part of the cultural competency training	Mod	Mod	Mod	Mod	Mod	High
(104) pursue mandatory curriculum in medical and nursing schools on the role of MDs and RNs in eliminating racism and disparities	High	Mod	High	Mod	High	Mod
(112) require continuing education for relicensure for all health care providers on interpersonal/institutional racism	Mod	Mod	Mod	Mod	Mod	Mod
(103) provide training and education for staff of medical and nursing schools making the connection between racism and infant mortality	High	Mod	High	Mod	High	High

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Cluster descriptor and statements	Rating of perceptions on impact of decreasing disparities					
	Overall perception		African-American/Black perception only		Non-African-American/ non-Black perception only	
	N	AP	N	AP	N	AP
(119) teach youth, women. and men to advocate for their health rights throughout their lifespan	High	High	High	High	High	High
(122) use public transportation as a medium for educating the public on racism, racial disparities, and infant mortality	Low	Mod	Low	Mod	Low	Mod
(30) discuss/teach males about their role in preconception health	High	High	High	High	High	High
(32) discuss the historical and present context of racism and its impacts in our public health agencies	High	High	Mod	Mod	High	High
(28) develop and implement middle school and high school student curricula on the relationship/impact of racism, racial disparities, and health	Mod	Mod	Mod	Mod	Mod	Mod
(12) conduct community conversations in nontraditional settings	Mod	High	Mod	High	Mod	High
(101) provide opportunities for men/fathers to understand the impact of racial disparities in infant mortality and the related impacts on their home, family, and community	High	Mod	High	High	Mod	Mod
(78) include screening questions on perceived racism and stress in prenatal visits	Mod	High	Mod	High	Mod	High
(117) teach stress reduction techniques to women	Mod	High	Mod	High	Mod	High
(126) utilize viewings of *Unnatural* Causes/When the Bough Breaks to create dialogues and to enhance the understanding of racism and its impact on infant mortality	Mod	High	Mod	High	Mod	High
7. Conduct and disseminate community-informed research						
(106) recognize community-driven and community-based evidence in addition to published evidence	Mod	High	High	High	Mod	High
(14) conduct survey on what community wants/ways to improve health outcomes	Mod	High	High	High	Mod	High
(124) utilize community-based evidence to build programs—do not just wait for recognized, evidence-based practices	Mod	Mod	Mod	Mod	Low	Mod
(53) ensure research includes/controls for race, class, gender, income	Mod	Mod	Mod	Mod	Mod	Mod
(54) ensure that FIMR data is collected, analyzed, translated, and disseminated timely and to the community	Mod	Mod	Low	Mod	Mod	Mod
(73) implement community participatory research techniques to develop and implement strategic plans	Low	Mod	Low	Mod	Low	Mod
(70) identify and support all of the factors that can make African-American families resilient	Mod	Mod	Mod	Low	Mod	Mod
(16) convene home health parties to allow residents to strategize on developing programs to address racial disparities in their community	Low	Mod	Mod	Mod	Low	Mod
(13) conduct public health research which identifies strategies to address racial disparities	High	High	Mod	High	High	High
(11) conduct an analysis of your infant mortality rate for your target population (PPOR)	Mod	High	Mod	High	Mod	High
(50) engage the faith community in a common message about disparities and social justice	Low	High	Low	High	Mod	High
(62) gather men/fathers opinions, views, experiences on infant mortality	Mod	High	Mod	High	Mod	High
(15) contact faith-based organizations to engage their congregations	Mod	High	Mod	High	Mod	High
(33) disseminate findings of progress/strategies to eliminate racism and rank communities in a report card on racism	Mod	Mod	Mod	Mod	Mod	Mod

Cluster descriptor and statements	Rating of perceptions on impact of decreasing disparities					
	Overall perception		African-American/Black perception only		Non-African-American/ non-Black perception only	
	N	AP	N	AP	N	AP
8. Address physical and social environments that impact health of the entire community						
(82) increase stable housing for pregnant women and infants and their families	High	Low	High	Mod	High	Low
(58) examine the impact of industry placement in community neighborhoods and the resulting impacts (e.g., toxins) on health	Low	Mod	Mod	Low	Low	Mod
(114) require insurance companies to have pay and performance measures on cultural competence in medical and dental practices	Mod	Low	Low	Low	Mod	Low
(99) provide for basic family needs to reduce racial stress for both women and men that impact birth outcomes	Mod	Low	Mod	Mod	Mod	Low
(71) identify cost/benefit savings to insurance companies, hospitals, and doctors for addressing contributing factors to high-risk infant mortality	Mod	High	Mod	Mod	Mod	Mod
(59) examine the legal system practices (i.e., bail, bond, lawyer expense) that keep fathers in jail and not at home with their families before trial	Low	Low	Low	Low	Mod	Mod
(5) assure that all neighborhoods are safe and walkable	Mod	Low	Mod	Mod	Mod	Low
(2) adopt Michael Lu's 12-Point Plan	Mod	Mod	Mod	Mod	Mod	Mod
9. Prioritize the allocation of resources for community-based services						
(85) influence public funding (e.g., federal and state grants) decisions to supplement efforts to address racism and disparities	High	Mod	Mod	Mod	High	Mod
(52) ensure private and public health insurance reimbursement for screening and referral of women and families needing mental/emotional health services	Mod	Low	Mod	Low	High	Low
(91) make family planning services and contraceptives widely available and affordable to support planned pregnancies	Mod	Mod	Mod	Mod	High	Mod
(84) increase the availability of and easy access to fresh fruits and vegetables in communities	High	Mod	High	Mod	High	Mod
(21) create affordable transportation systems that link neighborhoods and people with jobs	Mod	Low	Mod	Low	High	Low
(24) create jobs in underserved neighborhoods where jobs are not readily available	High	Low	High	Low	High	Low
(81) increase resources available to clinics/hospitals that reach low-income families like mental health services, health education classes with incentives	Mod	Mod	High	Mod	Mod	Mod
(61) fund and implement a system of pre- and interconceptional care services for women of reproductive age	Mod	Mod	Mod	Mod	High	Mod
(88) leverage/target existing community resources to communities of greatest need	High	Mod	High	Mod	Mod	Mod
(68) hold Medicaid HMOs accountable for birth outcomes	Mod	Low	Low	Low	Mod	Low
(63) get businesses to recognize the cost factors (savings) when their employees (male and female) have prenatal care and the outcome of having healthy babies	Mod	Mod	Mod	Mod	High	Mod
(18) create a 1-stop neighborhood health center for preventive care, immunizations, well care check-ups, etc.	Mod	Mod	Mod	Mod	Mod	Mod
(87) involve large corporations to fund public awareness campaigns of racism, racial disparities, and infant mortality	Mod	Mod	Mod	Low	Mod	Mod

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Cluster descriptor and statements	Rating of perceptions on impact of decreasing disparities					
	Overall perception		African-American/Black perception only		Non-African-American/ non-Black perception only	
	N	AP	N	AP	N	AP
10. Coordinate and institutionalize strategies that promote equity across all systems						
(57) establish an education/job/housing comprehensive initiative for communities of need	Mod	Low	Mod	Mod	High	Low
(26) develop a system of maternal and child health that is connected by mission, not by source of funding	Mod	Low	Mod	Low	Mod	Mod
(121) unify all community groups in a city working on separate infant mortality issues, plans, grants	Mod	Mod	Mod	Mod	Mod	Mod
(19) create a health department platform for addressing racism	Mod	Mod	Mod	Mod	High	Mod
(108) reduce the availability of alcohol and tobacco in communities	Low	Low	Mod	Low	Low	Low
(3) adopt the WHO 3 action steps to address the social determinants of health on local, state, and national levels	Mod	Mod	Mod	Mod	Mod	Mod
(9) broaden the definition of reproductive health to reproductive justice (i.e., it is not just contraception and abortion)	Low	Mod	Low	Mod	Low	Low
(67) hold mandatory yearly hearings on status of health disparities and racism in the community	Mod	Mod	Low	Mod	Low	Mod
(10) build neighborhoods that allow for social cohesion and support social networks	Mod	Low	Mod	Low	High	Low
(74) improve funding of educational systems to reduce disparities in school financial support and opportunities for students	Mod	Low	Mod	Low	High	Low
11. Create and support legislation and policies that address social determinants of health						
(93) pass health care legislation that would provide health care for all citizens	High	Mod	High	Mod	High	Low
(127) work with local, state, and national policymakers to develop and enact laws related to health equity and health care equity for all citizens regardless of SES, race, ethnicity, geographic location, community, or neighborhood	High	Mod	High	Mod	High	Mod
(42) enact legislation and funding to support successful reentry for formally incarcerated men and women	Low	Low	Mod	Low	Low	Low
(4) advocate for policy change to promote health care coverage and preconception health education during health encounters	Mod	Mod	Mod	Mod	High	Mod
(43) enact mandatory paid sick leave for all workers	Low	Low	Low	Low	Mod	Low
(76) include government officials in efforts as full participants throughout the process	Mod	Mod	Mod	Mod	Mod	Mod
(41) elect officials that have a commitment to reducing disparities	High	Mod	High	Mod	High	Mod
(23) create family supporting jobs for low-skilled workers	Mod	Low	Mod	Low	Mod	Low
(107) reduce poverty levels by creating good jobs and ensuring people have skills	Mod	Low	Mod	Low	Mod	Low
(55) establish a 100-year commitment to address this issue (e.g., the Native American 5 Generations Plan, forest/ timber industries 100-year plans)	Low	Low	Low	Low	Low	Low
(83) increase support for breastfeeding in workplaces and schools	Mod	Mod	Mod	Mod	Mod	Mod
(111) require a state/county/local collaborative for addressing racism, racial disparities, infant mortality that includes key community leaders and gatekeepers	Mod	Mod	Mod	Mod	Mod	Mod
(60) examine the racial disparity in sentencing and the criminal justice system	Mod	Mod	Mod	Mod	Mod	Mod

The 128 statements are presented within their clusters and the parenthetical numbers refer to the actual statement number and can be used to link the table information to Fig. 2. The numbers do not have any substantive meaning; they are merely for identification of the individual statements. Ratings (necessity, action potential) represent how strongly each statement is thought to have potential impact on reducing disparities in infant mortality. Ratings were split into tertiles and computed for community team members only, African-American/Black only, and non-African-American/non-Black only. Community teams: necessity—low=2.17–2.68; moderate=2.69–3.21; and high=3.22–3.73; action potential—low=1.64–2.29; moderate=2.30–2.95; and high=2.96–3.61. African-American/Black: necessity—low=2.24–2.76; moderate=2.77–3.30; and high=3.31–3.83; action potential—low=1.76–2.39; moderate=2.40–3.04; and high=3.05–3.68. Non-African-American/non-Black: necessity—low=2.19–2.70; moderate=2.71–3.21; high=3.22–3.73; action potential—low=1.57–2.23; moderate=2.24–2.90; and high=2.91–3.57

N necessity, *AP* action potential, *PSAs* public service announcements, *MADD* Mothers Against Drunk Driving, *FIMR* fetal and infant mortality review, *PPOR* Perinatal Periods of Risk, *HMO* health maintenance organization, *SES* socioeconomic status

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Table 3

Correlation coefficients between necessity and action potential by cluster

Cluster no.	Cluster theme descriptor	Correlation coefficient (*r*)
1	Promote knowledge and understanding of the relationship between health and racism	0.24
2	Develop social messages/marketing about racism and infant mortality	0.32
3	Improve educational systems and opportunities	**0.69**
4	Facilitate community-driven health promotion activities and marketing strategies	**0.58**
5	Ensure and improve health services for women across the lifespan	**0.90**
6	Educate and inspire professionals and lay people to take action about racism's impacts on health	0.23
7	Conduct and disseminate community-informed research	0.17
8	Address physical and social environments that impact health of the entire community	0.27
9	Prioritize the allocation of resources for community-based services	0.24
10	Coordinate and institutionalize strategies that promote equity across all systems	0.24
11	Create and support legislation and policies that address social determinants of health	**0.55**

Degree of correlation was interpreted as negligible (0.0–0.19), weak (0.20–0.49), moderate (0.50–0.79), and strong (0.80–1.00)

The bolded values represent those that are more significant

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Table 4

Perinatal periods of risk (PPOR) solutions map

Perinatal period of risk	Traditional solutions	Example of inclusion of concept mapping action statements
Maternal health/ prematurity	• Address chronic diseases • Address harmful health behaviors • Ensure perinatal care • Etc.	• Make family planning services and contraceptives widely available and affordable to support planned pregnancies • Optimize preconception health • Ensure access to quality prenatal/perinatal care • Reduce/quit smoking • Reduce the availability of alcohol and tobacco in communities
Maternal care	• Ensure prenatal care • Ensure high-risk referrals • Ensure appropriate obstetric care • Etc.	• Access to quality prenatal and obstetric care • Increase women's knowledge about signs of early labor • Improve systems for high-risk referrals • Educate mental health providers about the impact of racism • Include screening questions on perceived racism and stress in prenatal visits
Newborn care	• Ensure perinatal management • Ensure neonatal care • Provide pediatric surgery • Etc.	• Increase stable housing for pregnant women and infants and their families • Require continuing education for relicensure for all health care providers on interpersonal/institutional racism • Educate home visitation teams, nurses, and community health providers on the impact of race on birth outcomes
Infant health	• Protect against sleep-related deaths • Prev ent injuries • Prevent/treat infections • Etc.	• Improve knowledge/practices to address sleep-related deaths, injuries, early childhood infections • Increase support for breastfeeding in workplaces and schools • Create more awareness in those areas of communities that have the highest rates of infant mortality • Ensure that F1MR data is collected, analyzed, translated, and disseminated timely and to the community

FIMR fetal and infant mortality review