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## Towards Scientific Equity for the Prevention of Depression and Internalizing Symptoms in Vulnerable Youth

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### Abstract

Certain subgroups of youth are at high risk for depression and elevated depressive symptoms and experience limited access to quality mental healthcare. Examples are socioeconomically disadvantaged, racial/ ethnic minority, and sexual minority youth. Research shows that there are efficacious interventions to prevent youth depression and depressive symptoms. These preventive interventions have the potential to play a key role in addressing these mental health disparities by reducing youth risk factors and enhancing protective factors. However, there are comparatively

few preventive interventions directed specifically to these vulnerable subgroups, and sample sizes of diverse subgroups in general prevention trials are often too low to assess whether preventive interventions work equally well for vulnerable youth compared to other youth. In this paper, we describe the importance and need for “scientific equity”, or equality and fairness in the amount of scientific knowledge produced to understand the potential solutions to such health disparities. We highlight possible strategies for promoting scientific equity, including: increasing the number of prevention research participants from vulnerable subgroups, conducting more data synthesis analyses, implementation science research, disseminating preventive interventions that are efficacious for vulnerable youth, and increasing the diversity of the prevention science research workforce. These strategies can increase the availability of research evidence to help determine the degree to which preventive interventions can help address mental health disparities. Although this paper utilizes the prevention of youth depression as an illustrative case example, the concepts are applicable to other health outcomes for which there are disparities, such as substance use and obesity.

### Keywords

scientific equity; health disparities; collaborative data synthesis; depression; adolescents

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Depression and elevated depressive symptoms are prevalent problems that often begin in adolescence, and cause significant distress, disability, and increased risk of other health problems (Bertha & Balazs, 2013; Kessler et al., 2012; Prince et al., 2007; Wesselhoeft, Sorensen, Heiervang, & Bilenberg, 2013). Certain youth subgroups show disparities in depression, depressive symptoms and/ or in access to mental healthcare, such as socioeconomically disadvantaged, sexual minority (i.e., lesbian, gay, bisexual, transgender), and racial and ethnic minority youth (Anderson & Mayes, 2010; Marshal et al., 2011; Primm et al., 2010; Reiss, 2013). The reduction of mental health disparities is a prominent priority for many organizations, and among the strategies to address disparities are policies to address the social determinants of poor health (e.g., poverty, lack of health insurance) and programs to improve quality and access to mental healthcare (Cummings, Wen, & Druss, 2013; Miech et al., 2008; Primm et al., 2010; Safran et al., 2009). Interventions to *prevent* depression have received less attention, despite holding substantial promise for reducing disparities by decreasing risk factors and enhancing protective factors that promote mental health in vulnerable subpopulations (APA, 2013).

In this paper, we examine the potential role of preventive interventions as part of a comprehensive strategy to reduce mental health and behavioral health disparities, using the example of youth depression and depressive symptoms to illustrate. We begin by briefly reviewing disparities in depression, depressive symptoms and access to mental healthcare among vulnerable youth. We then describe the issue of “*scientific equity*”, that is the importance and need for equality and fairness in the amount of scientific knowledge produced to understand potential causes and solutions to existing health disparities (Brown, Mohr et al., 2013). Next, we discuss the potential role that preventive interventions may have in reducing mental health disparities, including existing findings, evidence of differential intervention effects, and whether sufficient data exist to support preventive

interventions as a viable strategy to address mental health disparities. Finally, we propose that scientific equity must be advanced to reduce health disparities, and describe potential strategies for promoting scientific equity.

## Depression and Depression-Related Disparities among Youth

The lifetime prevalence for major depression in the US is high at approximately 17% (Kessler, Berglund et al., 2005). Because the risk of depression increases dramatically during adolescence, the prevention of depression during this period is an important priority (Kessler et al., 2012; Wesselhoeft et al., 2013). Elevated yet sub-threshold depressive symptoms during adolescence are also prevalent and confer continued risk of depression into adulthood (Bertha & Balazs, 2013; Wesselhoeft et al., 2013). Depression, depressive symptoms and poor mental health are also related to the development and exacerbation of other health outcomes for which health disparities exist, such as substance use, obesity, and diabetes (see CDC, 2011; Chapman, Perry, & Strine, 2005; Moussavi et al., 2007; Prince et al., 2007; Sobel & Markov, 2005).

There is evidence that depression and depressive symptoms are not equally distributed across the population and that there are substantial differences in mental healthcare access, quality, and outcomes across groups (Cummings & Druss, 2011; Flores & Tomany-Korman, 2008; Reiss, 2013; Safran et al., 2009). These differences affect disadvantaged groups more than advantaged groups, constituting *health disparities* or *health inequalities*. While definitions and measures of health disparities are inconsistent (Safran et al., 2009), in this paper we use the US Department of Health & Human Services definition: "...differences in health outcomes that are closely linked with social, economic, and environmental disadvantage" (USDHHS, 2011, p. 1).

Youth who experience adversity, including socioeconomic disadvantage, discrimination, victimization, and other chronic stressors are disproportionately affected by depression and other mental health symptoms (Bogart et al., 2013; Green et al., 2010; McLaughlin et al., 2012). Socio-economically disadvantaged youth are two to three times more likely to develop mental health problems than more advantaged youth and are less likely to have access to mental healthcare (Newacheck, Hung, Park, Brindis, & Irwin, 2003; Reiss, 2013). Poverty increases risk for youth mental, emotional and behavioral disorders possibly through the pervasive effects of socioeconomic disadvantage on chronic stress, and by limiting resources that can help address these risks (Butler, Kowalkowski, Jones, & Raphael, 2012; Reiss, 2013; Yoshikawa et al., 2012).

Ethnic and racial ethnic minority youth are more likely to experience socioeconomic risks associated with depression and poor mental health compared to white youth (Cummings & Druss, 2011). Although the prevalence of diagnosable mental disorders, such as major depression and dysthymia, has not always been found to be higher in minorities compared to non-minorities, certain studies have documented elevated depressive symptoms rates and higher risk of persistent mental health disorders among minorities (see Anderson & Mayes, 2010; Breslau et al., 2006; Kessler et al., 2012; Kessler et al., 2005). Disparities for these groups also include poorer access, utilization and quality of mental health services

(Alexandre, Cummings & Druss, 2011; Flores & Tomany-Korman, 2008). Differential suicide rates, such as the higher rate among Native Americans, also suggest mental health disparities (Karch et al., 2012).

Lesbian, gay, bisexual and transgender youth, herein “sexual minority youth”, represent another subgroup at higher risk of depressive symptoms and suicidality compared to other youth (Marshal et al., 2011). For sexual minority youth and racial/ ethnic minority youth, there is evidence that adversity related to discrimination and the associated chronic stress may help explain the increased risk of symptoms of poor mental health (Bogart et al., 2013; Burton, Marshal, Chisolm, Sucato, & Friedman, 2013). While this brief review of depression-related disparities in youth addresses some existing disparities, the reader is referred to the literature for a more comprehensive view of the problems, such as Cummings & Druss (2011), Marshal et al. (2011), Reiss (2013) and Safran et al. (2009). The unique adversities experienced by different, high-risk youth suggest that these may require targeted interventions to promote mental health.

## **Addressing Health Disparities: The Importance and Need for Scientific Equity**

Specific, coordinated and research-supported strategies are needed to reduce mental health disparities, including evidence-based approaches that promote health among disproportionately affected subgroups. The Federal Collaboration on Health Disparities Research (FCHDR), a group of organizations including the National Institutes of Health (NIH), the Center for Disease Control and Prevention (CDC) and the Substance Abuse and Mental Health Services Administration, has identified “mental health disparities” as one of the top four areas needing immediate national *research* attention (Safran et al., 2009). Several reports describe mental health disparities, collecting and monitoring incidence, prevalence and mortality (e.g., suicides), as well as mental healthcare data (CDC, 2011; AHRQ, 2013). The next step is to identify research-supported strategies that can reduce exiting health disparities.

Among the strategies proposed to reduce disparities are policies that address the social of health, for example improving education, reducing poverty, increasing and extending health insurance coverage to include mental health treatment, as well as improving community mental health systems (Cummings et al., 2013; Marmot et al., 2008; Primm et al., 2010; Safran et al., 2009). Other strategies involve improving environmental factors that influence mental health and that affect vulnerable subgroups disproportionately, such as poor housing quality, residential over-crowding, poor quality schools, and physical and social neighborhood risks (Butler et al., 2011; Leventhal & Brooks-Gunn, 2003). Improving access to, utilization of, and quality of mental health services for vulnerable youth are approaches to promoting mental health by decreasing health services disparities (AHRQ, 2013; Cummings & Druss, 2011).

Preventive interventions that reduce antecedent risk factors and that enhance protective factors to promote youth mental health have received less attention as ways to address mental health disparities, yet have substantial potential to do so. However, an open question

is whether enough research has been dedicated to understanding whether preventive interventions are efficacious among vulnerable subgroups that show mental health disparities. For prevention programs to be successful in addressing health disparities, there must be sufficient, rigorous research establishing that these vulnerable subgroups are in fact benefiting from these interventions. This raises the issue of “*scientific equity*”, that is, the importance and need for equality and fairness in the amount of scientific knowledge that is produced to understand the potential causes and solutions to existing health disparities (Brown. Mohr, et al., 2013). It is important to emphasize that this term refers to *both* equality and fairness, and thus places an ethical obligation on scientists and policy makers to ensure that research yields knowledge to promote health for all groups. The next sections address this open question.

## **The Potential Role of Preventive Interventions in Reducing Health Disparities**

Evidence suggests that interventions to *prevent* youth mental health problems such as depression are efficacious (Horowitz & Garber, 2006; Muñoz, Beardslee, & Leykin, 2012; NRC/ IOM, 2009; Stice, Shaw, Bohon, Marti, & Rohde, 2009). Interventions to prevent depression have the potential to reach more people than treatment, can prevent personal and societal costs once these problems develop, and avoid the challenges of stigma in seeking mental health treatment (APA, 2013; Muñoz et al., 2012; NRC/ IOM, 2009). Because many youth mental, emotional and behavioral problems have common risk and protective factors, prevention interventions targeting common risk processes, such as effective parenting or youth coping skills, have the advantage of impacting multiple health outcomes simultaneously (NRC/ IOM, 2009).

In addition, preventing depression may have indirect, preventive effects on other health problems, given the relationship of depression to problems such as substance use disorders, obesity and diabetes (Chapman et al., 2005; Moussavi et al., 2012). The World Health Organization’s proposition “No Health without Mental Health” emphasizes that the true impact of mental health problems is underestimated because the connections between mental health and other health problems are often under-recognized (see Prince et al., 2007). The US National Prevention Strategy (National Prevention Council, 2011) and the Patient Protection and Affordable Care Act (2010) address the need to reduce health inequalities and call for greater emphasis on prevention. However, to determine whether preventive interventions may be viable strategy for reducing youth mental health disparities, it is important to examine the research supporting the efficacy of these interventions among vulnerable and disadvantaged youth.

### **Preventive Interventions Targeted Specifically to Vulnerable Subgroups**

Certain evidence-based preventive interventions for youth have been developed specifically for vulnerable subgroups, and have been found to have effects on depression or depressive symptoms. These interventions have been culturally tailored to fit the experiences of these groups, addressing risk-relevant issues such as acculturation and discrimination (USDHHS, 2001; Domenech Rodríguez, & Bernal, 2012). These include the Strong African American

Families Intervention, a prevention program for rural African American youth (Brody et al., 2012), the Familias Unidas intervention, a family-based preventive program that has been efficacious in reducing depressive symptoms among Hispanic youth who present with poor parent-child communication (Perrino et al., 2014; Prado et al., 2011), and the Bridges to High School Program, a preventive program found to be efficacious in reducing youth internalizing symptoms among Mexican American youth (Gonzales et al., 2012).

However, more intervention trials specific to vulnerable subgroups may be needed. An appendix of the Institute of Medicine's Report "Preventing Mental, Emotional and Behavioral Disorders among Young People" (NRC/ IOM, 2009) recently provided a summary of the number and type of funded intervention trials for youth under 25 years old by the National Institute of Mental Health, the National Institute on Drug Abuse and the National Institute of Alcohol Abuse and Alcoholism in the year 2006 (2007 for NIAA). As shown in Table 1, of the total 183 trials identified, 4.4% (8) were for Hispanic groups, 8.7% (16) were for African American groups, and 3.8% (7) were for Native American groups (see NRC/ IOM, 2009; p. 536). While this is a single-year snapshot, it shows few minority-specific trials for Hispanic and African Americans when considering their representation in the US population (13% for Hispanic and 17% for African American), indicating a need for more of this research.

### **Do General Preventive Interventions Work Equally for All Youth?**

An important, unanswered research question in prevention science is whether preventive interventions that have proven efficacious in preventing depression and mental health problems in the general population are efficacious for vulnerable youth subgroups. Studies have not routinely examined whether disadvantaged subgroups respond differently to interventions (Sandler et al., 2014). In terms of race and ethnicity, a meta-analysis of depression prevention programs found greater trial-level effects for interventions involving higher percentages of non-whites (Stice et al., 2009); however, the results at the individual-level have been mixed. Marchand, Ng, Rohde & Stice (2010) found no differential effects of a cognitive-behavioral prevention program for Asian, Latino and European American adolescents, though it is noteworthy that there were insufficient African Americans participants for analyses. On the other hand, preventive interventions for the general populations have not always worked similarly for disadvantaged groups, even when tailored to address these groups' needs. For instance, the Penn Resilience Program adapted for low-income Hispanic and African American youth was found to have beneficial effects on depressive symptoms for Hispanic but not African American youth (Cardemil, Reivich, Beevers, Seligman, & James, 2007). There can be substantial behavioral and psychological variation across different populations, suggesting that generalizing findings from samples that are Western and comparatively high in income and education to others may be problematic because of their limited representativeness (Henrich, Heine, & Norenzayan, 2010).

Differential intervention effects in which more advantaged groups benefit more than disadvantaged groups could inadvertently increase health disparities. Lorenc, Petticrew, Welch, & Tugwell (2013) describe "intervention-generated inequalities," which can occur

when interventions increase inequalities by disproportionately benefiting more advantaged groups and increasing the health gap between groups (e.g., high versus low SES). For instance, a meta-analysis of parenting training interventions to prevent youth behavior problems found that socio-economically disadvantaged families benefited less from interventions in the long-term than more advantaged families (Leijten, Raaijmakers, de Castro, & Matthys, 2013). It is important to more closely examine differential intervention impact and potential reasons for any differences.

One approach is to conduct analyses of intervention *moderator* effects to help identify for whom and under what circumstances interventions are efficacious. In their meta-analysis of depression prevention interventions, Stice et al. (2009) found that age and gender moderated intervention effects, with larger effects in studies with older youth and those with larger samples of females. Certain markers of adversity have been found to moderate the effects of depression prevention interventions, sometimes increasing and other times decreasing intervention response. Initial levels of youth depressive symptoms appear to moderate intervention effects, with preventive interventions being more efficacious for youth presenting with higher levels of depression or depressive symptoms (Horowitz & Garber, 2006; Stice et al., 2009). Parental depression has been found to moderate depression prevention intervention effects for youth, as participants whose parents are actively depressed during the intervention show poorer intervention response (Garber et al., 2009). Despite evidence that risk-relevant factors can moderate the effects of preventive interventions, studies do not often examine differential intervention effects for vulnerable sub-groups (Sandler et al., 2014).

Of additional value is examining intervention *mediator* and *moderated mediation* analyses that can identify whether interventions work through different mechanisms across subgroups. For example, Tein, Sandler, MacKinnon, & Wolchik (2004) examined moderators and mediators of an intervention to prevent mental health problems among children of divorcing parents. They found reductions in internalizing symptoms but among youth who initially showed low levels of mother-child relationship quality, important because strengthening parent-child relationships is a mechanism by which the intervention is believed to operate in protecting youth from mental health problems. Gonzales et al. (2012) found that Mexican American families and youth benefited in different ways from their preventive intervention depending on their characteristics; specifically, more acculturated families showed greater increases in maternal monitoring of youth which predicted fewer internalizing symptoms, while less acculturated families showed greater decreases in harsh maternal parenting, which predicted fewer internalizing symptoms. These results suggest potentially different risks and mental health needs within vulnerable groups (Safran et al., 2009) that raise questions about whether interventions should target specific risks and adversities experienced by different disadvantaged youth.

Despite the important insights that can be gained from moderation and moderated mediation analyses, prevention studies have not consistently conducted or reported such analyses, perhaps because individual studies are often statistically underpowered to detect intervention moderation and mediation effects (Brown, Sloboda et al., 2013). Also, studies may not routinely assess key vulnerability factors (e.g., sexual orientation), and if they do, samples

may not be sufficiently diverse or have sufficient numbers of vulnerable youth to examine differential intervention effects. Even when sample sizes reflect the minority group's actual representation in the overall population, the number of subgroup participants in trials may still be too small to identify differential intervention effects (Miranda, Nakamura, & Bernal, 2003). Once again, this points to a need for greater research.

## **Initiatives to Promote Scientific Equity to Address Mental Health Disparities**

The evidence of differential efficacy of preventive interventions across youth subgroups suggests that more data and analyses are needed to determine which interventions are efficacious for different subgroups. Below we describe strategies for strengthening scientific equity, such as increasing the number of vulnerable subgroup participants in research, conducting data synthesis studies, conducting implementation science research, disseminating preventive interventions efficacious for vulnerable youth, and increasing the diversity of the research workforce.

### **Increasing the Number of Participants from Vulnerable Subgroups in Research Studies**

Several agencies and initiatives that focus on the elimination of health disparities have identified the need for additional data and research to guide the development of effective strategies to reduce health disparities, including increasing the number of research participants from vulnerable and disadvantaged groups (CDC, 2005; NIH, 2008). The National Institutes of Health's (NIH) *Health Disparities Strategic Plan and Budget- Fiscal Years 2009–2013* (2008), describes the guiding principles for NIH's health disparities agenda and describes NIH work to determine how science, practice and policy can be "... leveraged to improve health and ultimately eliminate health disparities in the United States" (NIH, 2008, pp. 17–18). Among the specific strategies outlined is increasing the number of participants in clinical trials from racial/ ethnic minority populations and other health disparity populations through its grant requirements (NIH, 2008). Table 2 shows the inclusion of racial and ethnic minorities in NIH Phase III Clinical Trials during Fiscal Years 2008 and 2009 (NIH, 2011, pp. 22–3; pp. 25–6), and the representation of these groups in the US population. While the percentage of participants who identify as non-White has been increasing (45% in 2008 and 58% in 2009), the Hispanic percentage does not reach the levels that reflect their representation in the population. Hispanics represent approximately 17% of the US population (US Census, 2014), yet they made up 9% and 8% of participants during 2008 and 2009 respectively (NIH, 2011). It should be noted that the stated goal of these NIH policies is not to achieve proportional representation based on census data, but to ensure that research will be generalizable to the entire US population (NIH, 2008).

Yet, this is a critical benchmark condition for achieving scientific equity, and it is noteworthy that even aiming for minority sample sizes proportionate to their representation in the general population may not be sufficient to yield useful findings for these groups (Miranda et al., 2003). For example, if all trials were designed to achieve say 80% statistical power to detect a large main effect with an effect size of 0.5, and the proportion of minorities in the sample was say 40%, the overall statistical power for examining impact within this subsample would only be 0.42, half that of the overall experiment. Depending on sample size, minority participants sample sizes in traditional trials routinely fail to yield



sufficient statistical power to test questions of intervention effects within subpopulations or variation in impact (Brown, Sloboda, et al., 2013).

### Data Synthesis Studies

There are novel approaches for addressing the shortage of data on vulnerable groups to better understand intervention response across subgroups and the possible role of preventive interventions in addressing health disparities. One approach is to combine existing datasets and conduct synthesis analyses using the pooled data, which has been made possible through advances in statistical methods such as integrative data analyses (or IDA; see Curran & Hussong, 2009). IDA involve combining individual, and sometimes item-level data across multiple studies to yield larger sample sizes, increase statistical power, and permit analyses of a wider range of measures (Brown, Sloboda, et al., 2013; Curran & Hussong, 2009). Synthesis analyses can help address the problem of scientific equity by increasing sample sizes of vulnerable subgroups that are underrepresented in research, such ethnic minority, sexual minority and socioeconomically disadvantaged youth. They can help answer intervention moderator and mediator questions such as “for whom and under what circumstances do interventions work?” and “what are the mechanisms by which preventive interventions have their effects?”

An existing and ongoing data synthesis effort is the National Institute of Mental Health-funded Collaborative Data Synthesis on Adolescent Depression Trials Study-CDSADT (R01-MH040859; PI- C. Hendricks Brown). This study has developed partnerships among researchers testing interventions to prevent or treat adolescent depression. It aims to synthesize research findings and develop scientific guidelines for conducting the next generation of intervention trials and to inform the adolescent depression field about what works and for whom, as well as the underlying mechanisms by which interventions work. To date, this study has gathered de-identified datasets from 19 prevention trials that examine youth depression intervention effects. While the study is in progress, gathering larger numbers of diverse participants provides a chance to examine the efficacy of these interventions in preventing youth depression based on race, ethnicity, socioeconomic status and other indicators of adversity that could signal vulnerability. Although measures across trials are often different, methodological strategies for harmonizing measures across studies permit analyses with the combined data. Mediation and moderated mediation analyses can also decompose findings to be maximally informative. If interventions work through different mechanisms for different subgroups, identifying these mechanisms can permit matching interventions to youth depending upon initial risks or needs.

The potential that synthesis studies represent for improving scientific equity is substantial. While the CDSADT study has gathered datasets from 19 prevention trials on adolescent depression, a literature search conducted by our team suggests even greater potential for synthesis analyses to understand differential effects by risk subgroup (e.g., race/ ethnicity) if trials beyond these 19 participating trials were to also share data. This literature search yielded over 20,000 articles, of which 36 trials met criteria including: aimed to prevent adolescent depression, depressive or internalizing symptoms as outcomes; were randomized controlled trials; were not exclusively educational programs delivered by teachers; and were

not targeted to youth with other illnesses/ conditions (e.g., cancer, diabetes). Trials delivered outside the United States were not included because these typically did not report on participant race/ ethnicity.

As shown in Table 3, the race and ethnicity of participants in these 36 trials indicate that if these datasets were shared, an additional 1,324 African American, 1,535 Hispanic, 245 Asian, 35 Native American and 204 non-White participants would be available for analyses, greater than what analyses of broad-based prevention programs have conducted with several of these groups. If data from these 36 trials could be obtained and combined for synthesis analyses, there would be sufficient statistical power to conduct mediation and moderation analyses by race/ ethnicity for the African American and Hispanic groups. This table also suggests that not all 36 trials would have to share data to substantially increase the number of minority participants available for analyses, given that a smaller subset of these trials had significant numbers of minority participants (i.e., 7 trials had 20–49 minority participants, and 15 trials had 50 or more participants). At this time, the ongoing CDSADT study has requested datasets from 2 of these 36 trials. It is noteworthy that the potential of data synthesis is dependent on data sharing and collaboration among investigators. Despite NIH policies requiring the sharing of data, barriers to data sharing still exist, as described in other papers (see for example Perrino et al., 2013).

To facilitate future data synthesis analyses, it is also important to increase data consistency and quality across studies. For example, a limited number of national and state reports collect data about participant sexual orientation (see Truman et al., 2011). Given evidence of mental health disparities among sexual minority youth (Marshal et al., 2011), these data limitations preclude analyses that might help address these disparities. A key NIH strategy is to: “improve research data collection systems, and enhance data quality regarding health disparities, and develop uniform data systems that facilitate strategies for the elimination of health disparities” (NIH, 2008, pp. 17–18). Similarly, the Patient Protection and Affordable Care Act’s section 4302 requires federally funded health programs and surveys to “... enhance their collection and reporting of data on race, ethnicity, sex, primary language, disability status”, and the National Prevention Strategy also supports the need for research to improve our understanding of health inequalities, recommending that researchers “standardize and collect data to identify and address health disparities” (National Prevention Council, 2011, p. 26). Clear and practical guidelines on data collection could help identify vulnerable groups and permit meaningful disparities research.

### **Implementation Science Research**

Together with understanding which preventive interventions are efficacious for which youth subgroups, implementation research can help ensure that these evidence-based interventions are available in communities affected by health disparities, that vulnerable groups can access these interventions, and that there are mechanisms to ensure they are delivered with fidelity and with high probability of being sustained across time. Implementation research involves “...the use of strategies to adopt and integrate evidence-based health interventions and change practice patterns within specific settings” (NIH, 2006). Currently, the availability and implementation of evidence-based preventive interventions in community settings is

limited, leaving a gap between science and practice (see Wandersman et al., 2008). Implementation research can address health disparities by explaining why more evidence-based interventions are not implemented in high-risk communities, offering data about barriers that interfere with intervention adoption and maintenance, and identifying strategies for enhancing implementation.

Many communities in which health disparities are evident are resource-poor and encounter special challenges to implementing evidence-based programs. Promising models to guide implementation efforts in these communities stress the importance of understanding the contexts where interventions are implemented and addressing intervention-context fit (Chambers, Glasgow, & Stange, 2013). Community engagement and community based participatory research approaches have been proposed as a way to address health disparities and to overcome barriers to effective implementation in vulnerable communities, reducing attrition in research studies, improving efficacy, and promoting program sustainability (Wallerstein & Duran, 2010). Effectively integrating evidence-based interventions in communities and enhancing their sustainability across time is important for addressing health disparities (Brown, Mohr, et al., 2013; Prado, Lightfoot, & Brown, 2013). Similarly, for prevention to be an effective approach for reducing health disparities, it will be necessary to promote the utilization of efficacious prevention services among vulnerable individuals, as research suggests that individuals with less education, less income and from ethnic minority backgrounds are less likely to engage in preventive interventions (Prinz et al., 2001)

### **Dissemination of Efficacious Preventive Interventions: Research & Policies**

The wider dissemination of evidence-based preventive interventions for vulnerable youth is a closely related goal in terms of improving health equity through prevention efforts. Although several preventive interventions have met criteria for efficacy, effectiveness and readiness for dissemination (Flay et al., 2005), not enough have been widely adopted (Mason, Fleming, Thompson, Haggerty, & Snyder, 2013). Policy-level approaches mandating the utilization of evidence-based approaches could increase the availability and sustainability of these programs. Frameworks for promoting the diffusion and dissemination of evidence-based interventions have been proposed; yet, further dissemination research is required (Mason et al., 2013).

### **Increasing the Diversity of the Intervention Research Workforce**

Programs that support and encourage diversity in the research workforce can increase the availability and quality of data about health disparity and vulnerable populations. Greater diversity among researchers can improve the recruitment of diverse participants in research and ensure that the most appropriate research questions are being asked to address health issues relevant to these groups, thus increasing capacity to address health inequalities. Despite initiatives to increase researcher diversity, further efforts appear to be needed. In an analysis of who receives NIH grants, Ginther et al. (2011) found statistically significant differences in the chances of receiving R01 grants by race, with Asian or Black investigators being less likely to receive grants than White investigators, even controlling for education, previous grants and publication record. Continued efforts to promote research workforce

diversity are important, including programs from the National Institutes of Health such as grant supplements to promote diversity and research centers in minority institutions (NIH, 2008).

## Conclusion

At a time when the elimination of mental health disparities has become a national priority, it is important that multiple strategies be identified and pursued to achieve mental health equity. Evidence-based preventive interventions have the potential to contribute to a comprehensive strategy to reduce mental health disparities. However, further data and research are needed on whether preventive interventions are efficacious for vulnerable subgroups. To draw informed conclusions, research requires large sample sizes of vulnerable youth that will likely exceed their proportion representation in the US population. Once effective preventive interventions for vulnerable youth are identified, research is needed to determine how these can be implemented and disseminated to promote health equity. Without “scientific equity”, attaining health equity is unlikely. The strategies to promote greater scientific equity outlined in this paper provide a starting place. It should be noted that while this paper has used youth depression as a case illustration, scientific equity is a consequential issue for other health outcomes for which there are health disparities, for example substance use and obesity. Research that increases available scientific evidence and that addresses the efficacy of preventive interventions among vulnerable groups and can play a part in addressing health disparities and inequalities.

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Targeted populations from the one-year intervention research portfolio summary analysis: NIMH, NIDA and NIAA (NRC/ IOM, 2009, pp. 533–537), with group’s representation in the US population (Census, 2014)

**Table 1**

	<b>NIMH- 2006 (n=51)</b>	<b>NIDA -2006 (n=79)</b>	<b>NIAAA- 2007 (N=53)</b>	<b>Totals (n=183)</b>	<b>Representation in US Population</b>
<b>Hispanic/ Latino</b>	6% (n=3)	5% (n=4)	2% (1)	4.4% (n=8)	13%
<b>African American/ Black</b>	12% (n=6)	9% (n=7)	6% (n=3)	8.7% (n=16)	17%
<b>American Indian/ Native American</b>	2% (n=1)	8% (n=6)	0	3.8% (n=7)	1%

Inclusion of minority participants in NIH Phase III Clinical Trials (NIH, 2011) \*, with group's representation in the US population (US Census, 2014)

**Table 2**

NIH Funding Year	FY 2008 (reported in FY2009)	FY 2009 (reported in FY 2010)	US Population
<b>Total Number of Phase III Clinical Trials Protocols</b>	630	696	-
<b>Total Number of Participants</b>	652,300	769,885	-
<b>Total Minority Participants</b>	291,949 45% of total	447,187 58% of total	-
<b>Black/ African American Participants</b>	131,189 20% of total	261,626 34% of total	13%
<b>Hispanic/ Latino Participants</b>	58,707 9% of total	63,843 8% of total	17%

\* This summary data combines Old Form/ 1977 OMB Standards and New Form/ 1997 OMB Standards (NIH, 2011; pp. 22-6)

**Table 3**

Number of minority participants and number of trials with significant minority participants from the 36 adolescent prevention RCTs identified in the Collaborative Data Synthesis on Adolescent Depression Trials (CDSADT) study literature search

	African American/ Black	Hispanic/ Latino	Asian American	Native American	Non-White	All Minorities
<b>Number of participants from different races/ ethnicities across the 36 trials</b>	1,324	1,535	245	35	204	3,343
<b>Of the 36 trials, number of trials with:</b>						
- 20-49 participants from these groups	4	4	1	1	4	7
- 50 or more participants from these groups	6	6	2	0	0	15