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Partnering with churches to conduct a wide-scale health screening of an urban, segregated community

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Abstract

West Side Alive (WSA) is a partnership among pastors, church members and health researchers with the goal of improving health in the churches and surrounding community in the West Side of Chicago, a highly segregated African American area of Chicago with high rates of premature mortality and social disadvantage. To inform health intervention development, WSA conducted a series of health screenings that took place in seven partner churches. Key measures included social determinants of health and healthcare access, depression and PTSD screeners, and measurement of cardiometabolic risk factors, including blood pressure, weight, cholesterol and hemoglobin A1C (A1C). A total of 1106 adults were screened, consisting of WSA church members (n=687), members of the local community served by the church (n=339) and 80 individuals with unknown church status. Mean age was 52.8 years, 57% were female, and 67% reported at least one social

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risk factor (e.g. food insecurity). Almost all participants had at least one cardiovascular risk factor (92%), including 50% with obesity, 79% with elevated blood pressure and 65% with elevated A1C. A third of participants experienced 4 potentially traumatic events and 26% screened positive for depression and/or post-traumatic stress disorder. Participants were given personalized health reports and referred to services as needed. Information from the screenings will be used to inform the design of interventions targeting the West Side community and delivered in partnership with the churches. Sharing these results helped mobilize community members to improve their own health and the health of their community.

Keywords

African American; health disparities; surveillance; segregation

As a result of institutional racism, including discriminatory housing and lending policies, many African Americans live in segregated areas with high poverty and unemployment and high rates of chronic disease and violence.(1–3) These segregated communities lack the resources and opportunities required for good health. The geographic concentration of poverty unique to segregated African American residential areas is associated with poor health across a number of health indicators (4–6). Reflecting the impact of race and poverty, mortality is 24% higher for African Americans than whites in the US. In Chicago, this inequity is even more extreme. In Chicago, the African American mortality rate is 38% higher than the rate for White Americans.(7, 8)

The West Side of Chicago is similar to segregated African American urban residential areas throughout the US. The West Side includes four officially recognized “community areas” that are predominantly African American and have high poverty, low educational attainment, high rates of violent crime and homicide and high levels of chronic disease. The four predominantly African American West Side community areas are all in the lowest quartile of life expectancy among the 77 Chicago community areas. One has the lowest life expectancy in the city (68 years), which is 15 years lower than life expectancy in the most affluent parts of the city (83 years).(9)

Poor African American neighborhoods in Chicago and elsewhere are disproportionately in need of tailored interventions to improve health. One-size-fits-all interventions can increase disparities because the most advantaged often derive the most benefit.(10–12) In order to design interventions that accommodate the needs and values of local communities, it is necessary that researchers partner with community members in all aspects of intervention development, from needs assessment to intervention design and implementation.(13, 14)

The church is a major asset in many African American communities. The church has been a central institution in the African American community since slavery and played a major role in the civil rights movement. The church continues to play a critical role in the African American community by providing social, emotional and spiritual support as well as key social services to both church members and community residents.(15) The West Side has over 600 churches.(16) Leaders of those churches are committed to improving quality of life and health for their congregants and the surrounding community. Because the church is a

trusted institution for both members and non-members, and has the goal of improving the community well-being, churches are excellent partners for health equity researchers.

The research described here was conducted by West Side Alive (WSA), which is a partnership among West Side pastors, church members, and health researchers with the goal of achieving health equity for West Side church and community members. WSA serves as a cross-church health ministry that promotes sharing of health promotion programming and resources among multiple churches on the West Side of Chicago. The goal of WSA is to identify community health needs and develop tailored programming to address those needs. To prioritize health needs and inform future intervention development, WSA conducted a series of health screenings in seven churches. The screenings were attended by members of WSA churches and members of the local community who seek services from the churches.

Methods

Community partnership

The West Side Alive (WSA) research-community partnership was initiated by a health promotion and peer support program for pastors, called Pastors Alive. The Pastors Alive program was co-created by pastors and researchers from behavioral science and preventive medicine at Rush University Medical Center (RUMC). The program was designed to address the high levels of stress and chronic illness experienced by African American pastors as a result of their role as first responders and central sources of support in their communities. This role is particularly taxing for pastors serving in low-resource neighborhoods such as Chicago's West Side. The Pastors Alive program consisted of an overnight retreat followed by a series of nine group dinner meetings over five months. During these meetings, pastors received health education and discussed the challenges they face pastoring in their community and provided one another with emotional support.⁽¹⁷⁾ West Side pastors were the second Pastors Alive cohort.⁽¹⁷⁾ In the West Side Pastors Alive cohort, 11 pastors attended the initial 2-day retreat and all attended at least one group meeting.

Seven pastors chose to continue to partner with one another and with RUMC clinical and research staff to improve the health of their church members and community and agreed to name the partnership West Side Alive (WSA). Those seven churches participated in the health screenings described here. The seven churches were located in one of four predominantly African American West Side Chicago neighborhoods. Six of the churches have between 250–300 members and the seventh church is smaller, with approximately 75 members. All churches are Baptist in their orientation.

The leadership structure of WSA was designed to have equal representation from researchers, pastors, and members of participating churches. WSA is co-led by one West Side church pastor (Epting) and a community researcher from RUMC (Lynch). Pastors of the seven churches make up the WSA Pastor Advisory Board. Church coordinators were hired from each of the seven participating churches, and make up the WSA Coordinators Board. Church coordinator candidates were referred by their pastors and were interviewed and selected by the co-directors and other research team members. The role of the church

coordinator is to serve as a liaison between WSA and the church, publicize WSA to church members, mobilize them to participate in WSA activities, provide input into the research design and measures, and manage logistics of programming within the church. Coordinators completed CIRTification, a training program created by the University of Illinois at Chicago's Center for Clinical and Translational Science, to teach community research partners about protection of human subjects.(18).

Church Health Screenings

To identify community health priorities, researchers organized a community meeting and individual interviews with WSA pastors, coordinators, and church members. Based on information from these discussions, along with local and national data on health issues in the African American community,(14, 19) WSA decided to conduct a health surveillance study to assess cardiometabolic risk and mental health in the WSA churches and surrounding community. The goal of the surveillance study was to gather detailed information on cardiometabolic risk and mental health from church members and the surrounding community in order to (1) provide individual and community-level health information to community members to prioritize future health programming, and (2) identify and address urgent clinical and social needs.

The WSA Coordinators Board, WSA Directors, and research staff met at least biweekly for three months prior to data collection and continued to meet biweekly until the data collection was completed at all churches. The Pastor Advisory Board met once during the planning phase and pastors were kept informed by their coordinators. All seven WSA pastors agreed to conduct health screenings at their churches. Meetings were held at each church with the pastor, coordinator, and WSA directors to plan for each health screening. Health screenings were held on Sundays during and after the church service in six churches and on a Saturday in the seventh church. Church coordinators organized logistics and recruited numerous church volunteers to help with the screening at their own church and the other churches. Volunteers from RUMC, including students, clinicians, faculty, and staff also served in various roles during the screenings. The study was approved by the Institutional Review Board at RUMC.

Participant recruitment

Each coordinator was asked to recruit at least 100 participants for the study. To recruit participants, church coordinators distributed flyers for the screenings to church and community members. Leading up to the screening, coordinators, the church pastor and a member of the research team announced the screening during church service.

Participants were recruited between March and April, 2018. Church coordinators recruited individuals who regularly attended their churches as well as individuals from the community who use the church for services (e.g. food pantry, job training). Age (18+) was the only inclusion criterion for the study. Screening participants were offered up to \$35 cash for completing the full screening or \$25 if the finger stick was not completed. Individuals from the surrounding community who were not members of the church were required to show a photo ID to participate so that staff could verify that the individual had not already

participated in a health screening at a different church. Individuals who were regular members of the church (as verified by the church coordinators) were not required to have a photo ID.

Screening process

Paid staff and volunteers from partner churches, RUMC, and other local universities conducted the screenings. To preserve confidentiality, no church members interacted with any participant data. On average, each screening was staffed by 15 staff and 20 volunteers.

Participants were guided through a series of stations (see Figure 1). At the first station (Check-in), participants completed the informed consent process, were assigned an ID number, and given a folder with a Participant Tracking Form to track their progress through five data collection stations. During the informed consent process, participants were asked to indicate if they were willing be contacted regarding their screening results and/or if they were willing to be contacted regarding future research projects. All participants completed the blood pressure station first and could complete the remaining stations in any order. Blood pressure was measured in a quiet room separate from all other stations. Each station had a separate waiting area and, after the blood pressure station, navigators helped direct participants to the data collection station with the shortest wait. The final station was a Results Review station where participants were encouraged to speak with a clinician (advanced medical, nursing or nutrition student, registered dietitian, medical doctor, or nurse) to discuss their results.

At each data collection station, volunteers initialed the Participant Tracking Form to indicate completion of that station and indicated any “health flags.” Health flags included above normal cardiovascular risk factors (e.g. BMI, lipids, blood pressure, A1C, smoking) and social or mental health risk factors: lack of a primary care provider, lack of health insurance, lack of secure housing, food insecurity, positive screen for alcohol misuse, positive screen for depression or PTSD, lack of transportation to medical care, or inability to pay for utilities or transportation to medical appointments.

Clinicians at the Results Review station provided participants with an information sheet documenting their measured blood pressure, BMI, lipids and Hemoglobin A1c (A1C) levels and the level of risk for each clinical measure (e.g. pre-diabetes, hypertension stage), and were provided educational materials related to their health risk factors. Social workers were on site to provide community resources to address social and mental health risk factors. The whole process took approximately 60 minutes per participant. Due to resource constraints, a maximum number of 150 people could be screened at each church.

Measures

Key demographic, social determinants, clinical and mental health measures are described in Table 1.

Questionnaires

Demographics, social determinants, medical history and mental health variables were collected via questionnaires. Participants had the option of completing the questionnaires using a tablet or paper. Tablet questionnaires were administered using SnapSurveys software (<https://www.snapsurveys.com/>). Participants had the option of having a staff member help them complete the survey. Further details on the questionnaires and derived measures are described in Table 1.

Blood Pressure.—An Omron HEM907XL (20–24) automated blood pressure monitor was used to measure participants' ambulatory blood pressure while they remained seated in a quiet room. Participants were asked if they smoked within the last 30 minutes prior to checking their blood pressure. The participant was to be seated for at least 5 minutes prior to checking the blood pressure with arm support and feet on the floor. Arm size was measured on all participants and the appropriate cuff size was used.

Blood Cholesterol/A1C—Point-of-care A1C and lipid panels were conducted during the screening. A1c was tested using the DCA Vantage (Siemens, Tarrytown, NY) and Afinion (Alere, Oslo) (25) analyzers. Lipid panels were conducted using the Cholestech analyzer (Alere, City) (26). A finger stick was used to collect the blood for the analysis (X 40 µl or 0.04 ml for Cholestech, 1 µl for hemoglobin A1c). Blood was processed immediately after collection so that results could be provided and discussed with participants at the Results Review station. Trained staff, primarily medical assistants, conducted specimen collection and analyses. Although participants could opt out of blood collection procedures, only 5% (n=52) did. Due to limitations with point-of-care testing procedures and devices, 3.7% (n = 39) had a failure on at least one test and results could not be provided to participants.

Physical Function.—Physical function was assessed using the Short Physical Performance Battery (SPPB). (27) The SPPB was administered to all participants, with the exception of participants who needed to use a wheelchair, though only results for participants age 40+ are presented here. Use of walking aids (walker, cane, etc.) was permitted for the gait speed test as per SPPB protocol. The SPPB consists of four tests (standing balance, usual gait speed, and chair stands) which are each worth up to 4 points, for a possible total score of 12 points, with higher scores indicating better physical function, and scores of 9 indicating limitations with physical function (27).

Height and Weight.—Height and weight were measured using a standard portable stadiometer and a calibrated digital scale (Seca, Seca North America, Chino, California). Height was recorded to the nearest 0.25 inch. Participants were weighed in light clothing with no shoes. Weight was recorded to the nearest 0.2 pounds. BMI was computed from measured height and weight.

Statistical analysis.

Means and standard deviations or medians and quartiles are reported for continuous variables. Frequency and percent are reported for categorical variables. Two sample t-test or Wilcoxon-Mann-Whitney test was used to investigate differences between community and

WSA church participants. Sensitivity analyses were conducted to determine whether health outcome differences between the WSA church and community samples were due to differences in age, gender and education level. Linear regression and logistic regression models were run regressing each health outcome variable onto sample type (WSA church member or community), age, gender and education level. Health outcome differences between the WSA church sample and the community sample did not change after adjustment for age, gender and education. Analyses were performed using SAS version 9.4 (Cary, NC).

Results

A total of 1106 participants were screened across the seven churches. Figure 1 shows the number of participants who completed each measure. Attendees (reporting attending church at least once a month) of one of the seven participating (WSA) churches constituted 62% (n=687) of screening participants. The remaining 419 participants either attended a different church (N=157), did not attend any church (N=182), or had unknown church affiliation (n=80). For results reported here, “community members” refer to the 339 participants who did not attend partner churches (either attended another church or did not attend any church).

Among church members, 87% indicated willingness to be contacted for follow up regarding their screening results and 84% were willing to be contacted for future research opportunities. The response from community members was also very high with 92% agreeing to follow up for their screening data and 88% agreeing to be contacted for future research.

Participant demographics.

Table 2 shows characteristics of screened participants by WSA membership status. Overall, the mean age was 53 years, 57% of participants were female and 90% were African American. Approximately half of participants were single (53%), 26.6% lived alone, and 32% had at least one child in the household. Half of participants were employed (51%) and half had post-secondary education (49.1%). Relative to the community sample, the WSA church sample was older, more female and less likely to be single. The WSA church sample also had higher education and was more likely to be employed.

Perception of neighborhood safety.

A majority of participants lived within 5 miles of the church. The community sample was more likely to reside within a mile of the church. A majority of participants stated that they lived in high crime neighborhoods. Most participants rated their residential neighborhood as being unsafe, especially at night. Community members perceived their neighborhood to be somewhat less safe than did WSA church members.

Healthcare Access and Social Determinants of Health.

Most participants had health insurance (90%) and a primary care provider (84%) who they had seen within the past few months, though almost half had been to the Emergency Department within the past year. Despite having insurance, a third (31%) of the sample had

delayed healthcare due to barriers in the prior year and almost half (42%) reported difficulty paying for medications, mental health services, dental care, eyeglasses, or specialty care. A majority of participants (66.5%) experienced at least one major social determinant of health risk factor, including housing vulnerability, difficulty paying for utilities, food insecurity, or using the Supplemental Nutrition Assistance Program (SNAP). While common in both samples, barriers to healthcare access, and especially social determinants, were more prevalent in the community sample.

Cardiometabolic Risk (Table 3).

Almost half (49.7%) of the total sample had BMI in the obese range and 76% were classified as either overweight or obese. The church sample had higher BMI than the community sample; almost twice as many WSA church members had a BMI in the obese range (58.4% vs. 31.7%).

Blood pressure.—A majority of the total sample (79%) had elevated blood pressure (BP 120/80) at the time of the screening, and 42% had blood pressure 140/90. Measured blood pressure did not differ across the church and community samples. Overall, 48% of the total sample reported a prior diagnosis of hypertension with a greater awareness of hypertension in the WSA church sample (52.4%) than the community sample (39.3%). Among participants with BP 130/80, 42.2% (n=277) did not self-report hypertension.

Diabetes and A1C.—In the total sample, 44% of participants had measured A1C in the prediabetes range (5.7–6.4 mg/dL) and 21% in the diabetes range (≥ 6.5 mg/dL). Mean A1C was higher in the WSA church sample than the community sample (6.2 vs. 5.8) as was the percent of participants with A1C ≥ 6.5 (24% vs. 13%). Almost 20% of participants reported a prior diagnosis of diabetes; self-reported diabetes was higher in the WSA church sample (23.2%) than the community sample (12.7%). Among participants with A1c ≥ 6.5, 29.3% (n=56) did not self-report diabetes.

Cholesterol.—Mean total cholesterol was 184.2 mg/dL in the total sample and did not differ by WSA church vs. community sample. High density lipoprotein (HDL) cholesterol was 54.7 mg/dL in the total sample, and was slightly higher in the community sample than the WSA church sample. Of the 643 who did not report high cholesterol, 44 had high total cholesterol (≥ 240 mg/dL) and 29 had high LDL (≥ 160 mg/dL).

Smoking—prevalence was high overall, at 37.3%, but was much higher in the community sample (66.2%) than the WSA church sample (23%).

In the total sample, 92% of participants had at least one modifiable cardiovascular disease risk factor (see Table 3), and a third of participants had three or more risk factors.

Mental Health (Table 3)

Exposure to potentially traumatic events was extremely high in this sample with over 30% of participants witnessing or experiencing four or more potentially traumatic events in their lifetime. Exposure to potentially traumatic events did not differ between WSA Church

members and the community sample. However, the community sample was more likely to screen positive for depression and post-traumatic stress disorder (PTSD) and more likely to report a prior diagnosis of depression. Of those who completed the PTSD screener, which was only given to individuals that reported experiencing at least one potentially traumatic event, 12% of the church sample and 23% of the community sample screened positive for PTSD.

Physical Function (data not provided in tabular form)

Approximately 38% of the 805 participants age 40+ who completed the SPPB had scores indicating physical function limitations. This prevalence dramatically increased with age, ranging from 19% among those age 40–49 (N=170), 29% among those age 50–59 (301), 45% in those age 60–69 (210), 72% among those age 70–79 (N=94), and 83% in those age 80+ (1=30).

Social worker referrals

Among screening participants, 45% (n=500) were flagged for at least one social worker referral. Of that number, 37% spoke with a social worker at the time of the screening. Among those who saw the social worker, the most common causes for referral were food insecurity (N=82), difficulty paying for utilities (N=54), and vulnerable housing (N=40). Social workers reported that the most common topics discussed with referred participants were food insecurity (45%), smoking cessation (34%), and mental health issues (32%). There were also a small group of participants who had a larger number of individual referral flags, with 27 participants requiring referrals for four or more areas.

Discussion

The WSA partnership was able to successfully screen 1106 adults in eight days over three months. Overall, the results provide a snapshot of the social vulnerability and health needs of a population of individuals served by churches located in a segregated, urban neighborhood in Chicago characterized by high rates of violence and chronic illness and poverty. The WSA churches provide services (e.g. food pantry, job training) to both church members and members of the local community. We included both church and community members in the screening because both populations are potential targets of future WSA community health interventions.

A number of salient findings emerged from the study. Social and health risk was strikingly high in the overall study sample. A majority of participants lived within 5 miles of the church and reported high neighborhood crime which impeded their ability to walk in their neighborhood. Most participants also reported at least one social determinant of health risk factor, the most prevalent being food insecurity. While most participants had health insurance and a primary care provider, many still reported barriers to accessing healthcare.

The vast majority of participants in the current study (92%) had at least one risk factor for cardiovascular disease. Health risks were substantially higher in the current study sample than what has been reported in nationally representative samples of African Americans. The prevalence of hypertension (defined as BP 130/80 or self-reported hypertension) in the

current study was 75% versus 61% reported for US African Americans.(28) The prevalence of diagnosed diabetes in the current study was 20% versus 13% reported for US African Americans,(29) and the prevalence of pre-diabetes in the current study was 44% versus 36% for US African Americans.(30) The prevalence of current smoking in the current study was 37% versus 21% among US African Americans.(31) Overall, participants in the current study showed rates of cardiovascular risk factors that far exceed rates in the general US population of African Americans.

In addition to high cardiovascular risk, over 30% of participants had experienced four or more potentially traumatic events in their lifetime, and 26% of participants screened positive for depression and/or PTSD. Comparable depression and PTSD prevalence rates for US African Americans were unavailable. However, one study using the PHQ-8 estimated prevalence of depression at 8.6% in the general population, which is substantially lower than the 16% of participants who screened positive for depression in the current study.(32) To our knowledge there is no population-based estimate of PTSD prevalence to compare with the 15% prevalence rate of depression from the current study. However, the prevalence of PTSD in primary care settings has been estimated to be 11%.(33) The experience of trauma and its sequelae may also be higher in this sample than in the overall population.

While social and health risk factors were quite prevalent in the total sample, marked differences in such factors were observed between the WSA church sample and the local community sample on most of the measured variables. Relative to the WSA church sample, the community sample was more socioeconomically vulnerable, younger, and more likely to be male. Sensitivity analyses showed that health differences between the samples were not due to differences in age, gender or education. Prevalence of smoking was almost three times higher in the community sample. While the two samples reported experiencing or witnessing an equivalent number of potentially traumatic events, the community sample was almost twice as likely to screen positive for depression or PTSD (12% vs 23%).

While the community sample experienced greater social disadvantage and worse mental health, the WSA church sample had higher BMI, A1C, and total cholesterol than the community sample. These differences may be due to differences in weight; 79% of the WSA church sample was overweight or obese versus 57% of the community sample. A number of studies have found that frequency of church attendance is related to higher body weight, particularly among African American women, perhaps due to lower rates of smoking.(34, 35)

In sum, this study suggests that this sample of African American church and community members in the West Side of Chicago has poorer cardiovascular and mental health than that of the general population of African Americans in the United States. These findings are consistent with what is expected given other evidence documenting the geographic clustering of poverty, social risk, cardiovascular risk and mental health issues.(36, 37) This clustering of risk is often masked in studies of single health issues or prevalence rates that collapse across geographically dispersed members of racial/ethnic groups. The poor health evident in the current study sample may reflect the phenomenon of “weathering,” in which

long-term exposure to stressors associated with poverty and other social risks results in disruption of multiple biological systems.(38, 39)

In addition to capturing important data about this community to help inform and prioritize future intervention research, another benefit of this health screening methodology is that we were able to inform many individuals about their health risks and refer them to social services. Many participants (42%) with measured blood pressure in the hypertensive range ($130/80$), reported that they had not been diagnosed with hypertension. Almost half of all participants (44.3%) had measured A1C in the pre-diabetic range, and were given information about how to prevent diabetes. Finally, social workers met individually with 37% of participants and provided referrals to local social services to address social needs that might negatively impact health. The research team made follow-up phone calls to 144 participants whose blood pressure was very high ($160/90$) at the health screening. Of 76 participants reached, 27 reported that they had seen their provider and either started medication for the first time or changed their blood pressure medications as a result of the screening; a number also reported making changes to diet ($n=16$) or physical activity ($n=9$). The WSA health screening may have activated some individuals to address health issues that they had not been aware of previously. However, the data indicate a need for effective health interventions targeted to this community.

This study addressed a number of barriers faced by researchers attempting to understand and address health inequity. First, researchers often lack lived and other experience with disadvantaged populations. The community partners reviewed all measurements for the current study to assure that the measures would be acceptable to participants. They reworded some questions, rejected some measures (e.g. health literacy) and suggested others. Second, there is a lack of local data that describes the health of populations living in disadvantaged neighborhoods. High resolution local data is generally not available and is especially rare for poor areas with high levels of chronic disease. Data from the current study can help clusters of co-morbidities and social risk factors that should be targeted by interventions. Third, interventionists often lack data on higher-risk subpopulations because they are less likely to participate in research studies.(40) Participants in this study were recruited by trusted pastors and community members who specifically tailored their recruitment efforts to address the widespread mistrust of research in the community. It is likely that the current study sample represents individuals who are rarely included in research. Finally, individuals from disadvantaged communities may not realize the extent of the risk level among themselves and their neighbors and therefore may be less motivated to engage in health interventions. We found that church members and pastors were very receptive to results of this study because they were involved in designing and implementing the study and the data reflects their own community. Not only did this study identify clusters of needs that should be targeted by interventions, but it also helped to mobilize the community to partner with researchers to develop interventions and hopefully, to participate in them.

There are limitations to this study. First, because this was not a representative sample, results cannot be generalized to other individuals in this neighborhood or other similar neighborhoods. Our best estimate is that approximately 30% of active members participated across churches. Second, the self-report questionnaires used in this study were conducted in

a group setting so individuals may not have answered as carefully as they might in a less distracting environment or in individual interviews. Despite these limitations, the method used in the current study, conducting wide-scale health screenings within a particular disadvantaged neighborhood, has the benefit of providing relevant data to inform interventions that are targeted to this particular population.

Conclusion

Within the United States there are extreme variations in health and mortality across race/ethnicity and socioeconomic status. To promote health equity it is necessary to better understand the needs of under-resourced communities in order to co-create programming that will improve health. The current study provides an example of an efficient, community-engaged way to gather health data in partnership with disadvantaged communities that also provides individualized health information and education to individuals who may be hard-to-reach. This effort also serves to mobilize community members to engage both themselves and their neighbors in better health practices.

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Figure 1.

Layout of health screening stations and total Ns for each station for West Side Alive Health Screenings.

Table 1.

List of Measures for West Side Alive Surveillance Study, Chicago, IL, 2018.

Variable	Measure
Participant demographics	Self-reported demographic questionnaires included questions about income, education, employment, insurance, housing, transportation and household size
Subjective Social Status	Subjective social status was measured with the MacArthur Scale of Subjective Social Status.(41)
Neighborhood Safety	Items from the Neighborhood Environment Walkability Scale (NEWS) (42)
Social Determinants	Participants were asked whether they receive government assistance for food (e.g. SNAP, WIC), have housing vulnerability (homeless now or in the next two months), or have difficulty paying for utilities.
Food security	Food security was measured using the Household Food Security Scale Short Form. This measure has 6 items. (43)
Healthcare access	Items from the Access to Healthcare and Utilization module of the National Health Interview Survey were used to assess access to healthcare (https://www.cdc.gov/nchs/nhis/index.htm).
Medical History	Self-reported participant medical history information such as disease diagnosis, medications for diabetes, high cholesterol, blood pressure, statin use, aspirin regimen and health status,
Glycemic control	Hemoglobin A1c levels were measured using blood samples collected via finger stick and processed through the DCA Vantage (Siemens Healthcare Diagnostics, Inc., Tarrytown, New York) and Afinion (Abbott, Santa Clara, California) (25) analyzers systems.
Blood cholesterol	Blood samples were collected via finger stick. Lipid panels were tested using the Cholestech analyzer (Abbott, Santa Clara, California) (26).
Blood pressure	Blood pressure was measured by trained research staff using an Omron HEM907XL Digital Blood Pressure Monitor (Omron Healthcare, Inc. Lake Forest, Illinois). Final value was average of three readings taken 2 minutes apart while participant was seated.
Body Mass Index	BMI was calculated using height and weight. Weight measured using a calibrated digital scale and portable stadiometer (Seca North America, Chino, California). Participants were asked to remove shoes and heavy items before being weighed.
Physical function	The Short Physical Performance Battery (SPPB) was used to measure participants' level of physical function and mobility. Participants performed gait speed, balance and sit to stand tests to assess lower-extremity function. Scores ranged from 0 to 12 points.(27)
Depression	The Patient Health Questionnaire (PHQ-8) (32) has eight items with a response format from 0–3 (<i>Not at all to nearly every day</i>). Higher scores indicate greater depressive symptoms. Scores range from 0–24. Score 10 suggests moderate or severe depressive symptoms
Exposure to Potentially Traumatic Events	Exposure to potentially traumatic events was measured with the Life Event Checklist for DSM-5 (LEC-5) (44)
Post-traumatic stress disorder (PTSD) symptoms	PC-PTSD 5 (45), has five items that ask in a given timeframe if the participant has experienced certain symptoms. Responses are "yes/no" and a score of 3 or higher suggests severe PTSD symptoms. This screener was only given to those who reported exposure (experiencing or witnessing) to at least one potentially traumatic event.

Table 2.

Demographic characteristics of participants in the West Side Alive Surveillance Study, Chicago, IL, 2018.

	Total^I (n=1106)	WSA Church Member (n=687)	Community (n=339)	p-value
Age, mean (std)	52.8 (15.6)	54.7 (15.8)	48.1 (14.6)	<0.001
Age Groups, N(%)				<0.001
18–29	130 (11.8)	71 (10.3)	58 (17.2)	
30–44	170 (15.5)	105 (15.3)	51 (15.1)	
45–64	565 (51.4)	326 (47.5)	201 (59.5)	
65–80	202 (18.4)	159 (23.1)	25 (7.4)	
80	32 (2.9)	26 (3.8)	3 (0.9)	
Female, N(%)	626 (57.4)	451 (65.6)	144 (42.5)	<0.001
Hispanic, N(%)	19 (1.9)	11 (1.6)	8 (2.4)	0.402
African American, N(%)	989 (90.2)	667 (97.1)	311 (91.7)	<0.001
Relationship Status				<0.001
Single	547 (52.9)	314 (45.8)	225 (66.6)	
Married or Living with Partner	330 (31.9)	247 (36.1)	81 (24.0)	
Separated/Divorce/Widow	158 (15.3)	124 (18.1)	32 (9.5)	
Live Alone, N(%)	273 (26.6)	170 (25.0)	99 (29.6)	0.122
At least 1 child in household, N(%)	325 (32.0)	221 (32.7)	99 (30.0)	0.381
Attend Church 1 per month, N(%)	745 (73.4)	635 (93.0)	110 (33.1)	<0.001
Employment Status, N(%)				<0.001
Employed ²	518 (50.9)	364 (53.5)	152 (46.1)	
Student/Retired/Caregiver	259 (25.5)	216 (31.8)	43 (13.0)	
Disabled or Unemployed	240 (23.6)	100 (14.7)	135 (40.9)	
Education, N(%)				<0.001
< High School	138 (13.4)	74 (10.8)	63 (18.8)	
High School	387 (37.5)	206 (30.1)	174 (51.8)	
Post-secondary education	507 (49.1)	405 (59.1)	99 (29.5)	
McArthur Ladder, median (Q1,Q3)	6.0 (4.0, 7.0)	6.0 (5.0, 7.0)	5.0 (3.0, 6.0)	<0.001
Have at least 1 functioning car, N(%)	627 (62.1)	498 (74.3)	129 (38.9)	<0.001
Distance of residence from church				<0.001
<= 1 Miles	280 (26.1)	133 (19.8)	133 (40.3)	
1–5 Miles	419 (39.1)	259 (38.6)	129 (39.1)	
6–9 Miles	180 (16.8)	133 (19.8)	41 (12.4)	
10 Miles	194 (18.1)	146 (21.8)	27 (8.2)	
Perception of residential neighborhood				
High crime rate, N(%)	654 (64.6)	399 (59.6)	245 (75.4)	<0.001
Unsafe to walk in day, N(%)	539 (53.1)	325 (48.5)	208 (63.8)	<0.001

	Total^I (n=1106)	WSA Church Member (n=687)	Community (n=339)	p-value
Unsafe to walk at night, N(%)	671 (65.8)	412 (61.3)	248 (75.4)	<0.001
Social Determinants of Health				
Vulnerable Housing, N(%)	97 (8.8)	37 (5.4)	58 (17.1)	<0.001
Difficulty paying for utilities, N(%)	291 (29.6)	159 (23.9)	125 (40.5)	<0.001
On SNAP, N(%)	421 (41.4)	207 (30.7)	207 (62.3)	<0.001
Food Insecure, N(%)	490 (47.6)	234 (34.3)	251 (74.7)	<0.001
Vulnerable housing, food insecurity, SNAP, or Utility prob, n(%)	676 (66.5)	369 (55.1)	297 (88.7)	<0.001
Healthcare Access and Utilization				
Has Health Insurance, N(%)	909 (89.9)	630 (93.6)	274 (83.0)	<0.001
Has a Primary Care Provider, N(%)	893 (83.8)	580 (87.9)	256 (76.6)	<0.001
Weeks since PCP visit ³	8.7 (2.0, 13.0)	8.7 (2.0, 13.0)	8.7 (3.0, 13.0)	0.4489
Been to Emergency Dept. in last year				<.0001
0	552 (53.9)	395 (58.1)	151 (45.3)	
1	252 (24.6)	172 (25.3)	77 (23.1)	.
2+	220 (21.5)	113 (16.6)	105 (31.5)	.
Delayed health care due to barriers last 12 months, N(%)	321 (31.4)	189 (27.8)	126 (38.1)	<0.001
Difficulty paying for medications, N(%)	218 (21.4)	121 (17.8)	94 (28.5)	<0.001
Difficulty paying for mental health services, N(%)	88 (8.7)	47 (7.0)	38 (11.6)	0.014
Difficulty paying for medications, mental health, dental care, eyeglasses, or specialty care, N(%)	433 (42.0)	268 (39.3)	161 (47.8)	0.001

^I 80 Participants are included in the total column that are not included in WSA Church Member or Community due to unknown church attendance.

² Employed full-time (≥ 32 hours a week) or Employed part-time (<32 hours a week) or Self-employed.

³ Only asked of participants who had a provider or clinic.

Table 3.

Clinical characteristics of participants in the West Side Alive Surveillance Study, Chicago, IL, 2018.

	Total (n=1106 ¹)	WSA Church Member (n=687)	Community (n=339)	p-value
Poor or Fair Health, N(%)	333 (32.6)	194 (28.4)	133 (39.9)	<0.001
Cardiometabolic Risk				
BMI, mean (std)	31.4 (8.5)	33.0 (8.2)	28.2 (8.3)	<0.001
Weight Classification, N(%)				<0.001
Under Weight	20 (1.8)	7 (1.0)	13 (3.9)	
Normal Weight	240 (22.1)	96 (14.2)	131 (39.1)	
Overweight	285 (26.3)	179 (26.4)	85 (25.4)	
Obesity Class I	240 (22.1)	168 (24.8)	55 (16.4)	
Obesity Class II	138 (12.7)	102 (15.1)	27 (8.1)	
Obesity Class III	161 (14.9)	125 (18.5)	24 (7.2)	
Systolic BP (mmHg) , mean (std)	133.9 (20.1)	134.1 (20.1)	132.8 (20.6)	0.320
Diastolic BP (mmHg), mean (std)	82.2 (13.3)	82.2 (13.1)	81.8 (14.1)	0.657
Blood Pressure Control, N(%)				
Systolic< 120 & Diastolic <80	228 (21.0)	136 (20.1)	81 (24.2)	0.228
Systolic 120–130 & Diastolic <80	130 (12.0)	80 (11.8)	45 (13.4)	
Systolic 130–139 or Diastolic 80–89	275 (25.4)	180 (26.6)	73 (21.8)	
Systolic 140 or Diastolic >90	451 (41.6)	281 (41.5)	136 (40.6)	
Uncontrolled Blood Pressure ²	545 (50.3)	350 (51.7)	155 (46.3)	0.104
Self-Reported Hypertension, N(%)	483 (48.2)	350 (52.4)	128 (39.3)	<0.001
Self-Reported Hypertension or BP 130/80, N(%)	830 (75.0)	538 (78.3)	236 (69.6)	0.002
A1c (%), mean (std)	6.1 (1.2)	6.2 (1.2)	5.8 (0.9)	<0.001
A1c Control, N(%)				<0.001
<5.7	365 (34.9)	196 (30.0)	148 (45.8)	
5.7–6.4	463 (44.3)	300 (45.9)	133 (41.2)	
6.5	217 (20.8)	157 (24.0)	42 (13.0)	
Self-Reported Diabetes, N(%)	199 (19.9)	155 (23.2)	41 (12.7)	<0.001
Total Cholesterol, mean (std)	184.2 (65.4)	186.1 (75.1)	180.6 (42.7)	0.239
Total Cholesterol 240, N(%)	87 (8.6)	48 (7.6)	31 (9.8)	0.2332
HDL, mean (std)	54.7 (17.6)	54.0 (17.7)	56.6 (17.6)	0.038
HDL < 40, N(%)	195 (19.7)	140 (22.6)	43 (14.1)	0.0022
Self-Reported Dyslipidemia, N(%)	285 (29.0)	219 (33.2)	64 (20.3)	<0.001
Current Smoker, N(%)	384 (37.3)	158 (23.1)	221 (66.2)	<0.001
Number of CVD Risk Factors, ³ N(%)				0.2248
0	93 (8.4)	54 (7.9)	24 (7.1)	
1	235 (21.2)	133 (19.4)	79 (23.3)	

	Total (n=1106 ¹)	WSA Church Member (n=687)	Community (n=339)	p-value
2	425 (38.4)	259 (37.7)	136 (40.1)	
3+	353 (31.9)	241 (35.1)	100 (29.5)	
Mental Health				
Traumatic Events Witnessed or Experienced in lifetime, N(%)				0.562
No Events	442 (40.3)	256 (37.3)	132 (38.9)	
1–3 Events	318 (29.0)	215 (31.3)	95 (28.0)	
4 Events	337 (30.7)	216 (31.4)	112 (33.0)	
PHQ-8 Score, median (Q1, Q3)	3.0 (0.0, 7.0)	3.0 (0.0, 6.0)	5.0 (1.0, 9.0)	<.0001
Probable Depression (PHQ-8 ≥ 10), N(%)	166 (16.1)	91 (13.4)	74 (22.7)	<0.001
Self-Reported Depression, N(%)	97 (13.1)	51 (10.3)	45 (18.7)	0.002
Traumatic Events and PTSD Symptoms, N(%) ⁴				<0.001
No Events	442 (40.3)	256 (37.3)	132 (38.9)	
1 Event and Negative PTSD Screen	490 (44.7)	348 (50.7)	128 (37.8)	
1 Event and Positive PTSD Screen	165 (15.0)	83 (12.1)	79 (23.3)	
PHQ-8 ≥ 10 or 1 Event and Positive PTSD Screen, N(%)	272 (26.4)	147 (21.7)	121 (37.0)	<.0001

¹ 80 Participants are included in the total column that are not included WSA Church Member or Community due to unknown church attendance

² Blood Pressure ≥ 140/90; or Blood Pressure ≥ 130/80 with self-reported heart attack, stroke, heart failure, or diabetes; or systolic BP ≥ 130 and age ≥ 65

³ High cholesterol, current smoker, BMI ≥ 30, Diabetes/High A1c ≥ 6.5, or Self-Reported Hypertension or BP ≥ 130/80

⁴ PTSD screener was only given to those who had experienced at least 1 potentially traumatic event.