
Health Inequalities in Infectious Disease Epidemics Pre-dating COVID-19 in the United States: A Rapid Review

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PREFACE

The VA Evidence Synthesis Program (ESP) was established in 2007 to provide timely and accurate syntheses of targeted healthcare topics of importance to clinicians, managers, and policymakers as they work to improve the health and healthcare of Veterans. These reports help:

- Develop clinical policies informed by evidence;
- Implement effective services to improve patient outcomes and to support VA clinical practice guidelines and performance measures; and
- Set the direction for future research to address gaps in clinical knowledge.

The program comprises three ESP Centers across the US and a Coordinating Center located in Portland, Oregon. Center Directors are VA clinicians and recognized leaders in the field of evidence synthesis with close ties to the AHRQ Evidence-based Practice Center Program and Cochrane. The Coordinating Center was created to manage program operations, ensure methodological consistency and quality of products, and interface with stakeholders. To ensure responsiveness to the needs of decision-makers, the program is governed by a Steering Committee composed of health system leadership and researchers. The program solicits nominations for review topics several times a year via the [program website](#).

Comments on this report are welcome and can be sent to Nicole Floyd, Deputy Director, ESP Coordinating Center at Nicole.Floyd@va.gov.

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EXECUTIVE SUMMARY

AIMS

We conducted a systematic review of infectious disease epidemics predating COVID-19 to better understand the potentially modifiable factors that may have contributed to differential infection rates and health outcomes, as well as the interventions and programs implemented to mitigate them.

METHODS

We searched electronic databases and reference lists from database inception through May 20, 2020 for studies of adult populations examining health inequalities by race/ethnicity, SES, disability, or geographic location related to infectious disease epidemics predating COVID-19 or disasters (KQ2 only) in the United States. We abstracted data on study design, factors, interventions, and outcomes. Dual assessment of studies' full text, quality, and strength of evidence (where applicable) was agreed upon by consensus using published criteria.

RESULTS

We identified 50 articles relevant to health inequalities in infectious disease epidemics in the United States predating COVID-19. We found 14 studies (16 articles) that examined potential mediating factors associated with health inequities, and 12 studies (3 articles) and 5 CDC expert panel reports that provide examples of interventions and lessons learned from previous epidemics and disasters to guide us forward in mitigating health inequalities during the COVID-19 pandemic and beyond. We also identified 20 studies that examined inequalities in H1N1 vaccine uptake and mediating factors, and 1 vaccine-related intervention study.

To our knowledge, this is the first review of studies aimed at identifying both the factors that mediate health disparities in infectious disease epidemics and also potential avenues for mitigating them. Our conceptual framework was guided by the work of Quinn and Kumar, who considered the potential causes of epidemic influenza based on measures of exposure, susceptibility, and access to care as they applied to data collected in 2009-2010 during the H1N1 pandemic. The framework points to proximal and distal determinants of disease burden with the ultimate goal of identifying potential points of policy and programmatic intervention.

Across Key Questions, studies were heterogeneous in their operationalization of potentially mediating factors, populations, programs and interventions. Studies of potentially mediating factors generally, and those related specifically to H1N1 vaccine uptake specifically, were largely cross-sectional. Several included studies did not control for confounding variables or their methods were unclear; however, many were well conducted and adequately reported. A few of the qualitative studies clearly reported their methodology and/or findings. However, more did not. We identified very few interventions or program evaluation studies specific to infectious disease epidemics; most were focused on post-disaster needs or disaster preparedness.

KEY QUESTION 1. What factors contribute to disparate infection rates and health-related outcomes among different segments of the

population during infectious disease epidemics or pandemics in the United States?

Our findings related to mediators associated with differential exposure or the transmission of infectious disease were unsurprising. Despite looking across racial/ethnic groups and socioeconomic status independently, the findings that disparities were related to societal-based structural and work-related factors, rather than individual factors such as hygiene and cleaning, were consistent across studies. We identified few significant differences in social distancing attitudes and intentions between groups. Instead, it was clear that the meaningful differences lay in the ability or inability to social distance. Only 1 study examining variables related to exposure to illness disaggregated the Latino population by language proficiency, and 1 additional study provided qualitative input in the form of stakeholder interviews. In contrast with other populations we examined, compared to either English-proficient Latinos or Whites, limited English-proficient Latinos (and/or migrant and seasonal farm workers) were at higher risk across both structural and work-related variables measured (see Table 9).

Susceptibility to illness played a major role in H1N1 severity and mortality; however, access to care (*ie*, having a primary care provider or health insurance) did not. Significantly greater proportions of every racial and ethnic minority group reported having experienced discrimination while seeking healthcare, and many reported being less informed or were less prepared. Much of the literature guiding communication is dated due to advances in technology, and findings of proportionally high rates of trust in the federal government, particularly in AA/Black and Latino adults, may be out of date.

KEY QUESTION 2. What interventions or intervention components have been used to reduce health inequalities (or identified in preliminary studies) in infectious disease transmission or health outcomes in disasters, or infectious disease epidemics or pandemics in the United States?

Of the 12 studies that described interventions or intervention components, only 1 study examined effectiveness outcomes, while the majority described acceptability and feasibility of the studied interventions. We identified only 1 randomized controlled trial and 1 longitudinal cohort study.

While many focus on disaster preparedness and response, the interventions in this review often represent real world applications of CDC and expert panel recommendations. For instance, the positive effect that interpersonal, culturally appropriate education delivered by a community health worker can have on disaster preparedness in vulnerable communities validates the recommendation for using lay *promotoras* in delivery of health services, goods, and messaging in the case of a pandemic. These results could be translated into an intervention to reach vulnerable populations during the current COVID-19 pandemic.

The importance of community engagement and partnership with community leaders was repeated often in expert-based recommendations, and was empirically grounded in some studies we examined. For example, 1 study found that African American clergy could be integral as community liaisons in facilitating the delivery of mental health services after Hurricane Katrina, and that churches could serve as sites for delivery of community-based services. These findings

mirror the recommendations of partnering with faith-based organizations and community leaders in order to “allay distrust and ensure successful implementation of mitigation interventions in minority communities” in the setting of an influenza pandemic. These recommendations support the use of such partnerships to lessen the disproportionate burden of COVID-19 in racial and ethnic minorities. While it is too early in the pandemic to expect a rigorous evaluation of the effect of faith-based partnerships on COVID-19 disparities, the popular media has already chronicled that such interventions are underway.

The interventions described here emphasize that preparedness efforts must be prioritized and that marginalized communities must be included *before* disaster hits. Nevertheless, some of the lessons learned may be relevant to the current pandemic phase: months into the trajectory of pandemic response but prior to a safe and widely available vaccine or treatment. Proven preparedness interventions could also be considered for implementation now given the potential for future waves of COVID-19 or new epidemics to emerge.

What remains missing from the studies in this review are examples of successful systems-level interventions that target the distal determinants of worse outcomes of influenza illness in vulnerable populations. This is despite evidence from the H1N1 pandemic that variables of exposure that occur at higher rates among these vulnerable groups, such as inability to take sick leave, can drastically affect disease rates. In key stakeholder reports, we find multiple systems-level recommendations, such as liberal workplace leave and teleworking policies, wage freezes and childcare vouchers, and creating an ethical and equitable system for ensuring access to treatment and vaccination, particularly among the uninsured. These interventions may already be underway, and researchers and policymakers should actively test their impact on health disparities so that lessons learned may be applied to our current and possible future disease epidemics.

INEQUITIES IN H1N1 VACCINE UPTAKE, CONTRIBUTING FACTORS, AND INTERVENTIONS

We identified 10 studies examining disparities in H1N1 vaccine uptake in the US during the 2009-2010 flu season. We found moderate-strength evidence that vaccine uptake was lower in AA/Black than White populations from 4 of 6 studies presenting unadjusted data. We also found low-strength evidence of lower vaccine uptake for Latino populations, although there was some inconsistency in results. The evidence for Asian, AI/AN, and Pacific Islander populations compared to Whites was insufficient.

Three studies looked at disparities by socioeconomic status (SES) and provide low-strength evidence that lower-SES individuals were less likely to have been vaccinated. Lastly, a very small study of rural versus urban participants provided insufficient evidence for H1N1 vaccine uptake between those populations. There was no evidence by disability status (see Table i).

Table i. Strength of the Evidence for Studies of H1N1 Vaccine Uptake

Population of interest	Comparator population	# of studies	Vaccine uptake likelihood	Strength	SOE justification
AA/Black		6	Less likely	Moderate	
Latino		7	Less likely	Low	Inconsistency
Asian		2	Unclear	Insufficient	Inconsistency, imprecision, indirectness
AI/AN	White	2	Unclear	Insufficient	Indirectness, imprecision
Pacific Islander		1	Unclear	Insufficient	Indirectness
Asian/Pacific Islander		1	Unclear	Insufficient	Indirectness, imprecision
Lower SES (education and/or income)	Higher SES	3	Less likely	Low	Inconsistency
Rural	Urban	1	Unclear	Insufficient	Single, small study with multiple limitations
With Disabilities	Without Disabilities	0	No evidence	---	---

Abbreviations: AA = African American, AI = American Indian, AN = Alaska Native, SES = socioeconomic status

Studies examining H1N1 vaccines explored a wide range of factors that were either proximal or distal to H1N1 vaccine uptake. Health insurance coverage and availability of/access to vaccines were both important factors. Also important were receipt of the seasonal influenza vaccine, vaccine-related safety and effectiveness beliefs, and perceived susceptibility to H1N1. Across all factors AA/Black adults, and often Latino and low SES adults as well, were at higher risk.

We did not identify any studies of interventions specifically targeting disparities in H1N1 vaccine uptake. However, the single vaccine intervention study we did find demonstrated greater Hepatitis A vaccine uptake in an ED setting after the implementation of an EHR alert system that informed providers of the patient’s homeless status and prompted them to recommend vaccination during a regional outbreak. This suggests that EHR notification systems may be useful in increasing vaccination, and potentially could be used in the COVID-19 vaccination campaign to prompt providers to recommend vaccination, especially for vulnerable groups.

CONCLUSION

The literature examining health disparities associated with previous infectious disease epidemics, and in some cases disasters, may provide some guidance for the current COVID-19 response. Evidence consistently pointed to disparities in structural and work-related exposure to infection as underlying disparities, with the impact of comorbid conditions on susceptibility for more severe infection and higher rates of mortality playing a less certain role. Discrimination was reported more frequently by all racial and ethnic minorities. However, its impact on disparities during infectious disease epidemics is uncertain. African American/Black and Latino adults generally were disproportionately affected. However, Latinos with limited English proficiency were at especially high risk. There is moderate-strength evidence that AA/Black adults were less

likely to receive a H1N1 vaccine, and low-strength evidence of lower vaccination rates for Latinos adults of lower SES. Advances in technology, and sociopolitical shifts over the past decade call into question the applicability of findings. Interventions and programs from the disaster literature bring to light recommendations for infectious disease response by the CDC and other experts. In order to better prevent widespread health disparities that emerge in the wake of the current and future disease epidemics, more research is needed on policy- and systems-level interventions and their effect on the distal determinants of poor health outcomes among vulnerable groups.