

[OBK-16-0033] Exploring the Continuum of Vaccine Hesitancy between African American and White Adults: Results of a Qualitative Study

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Abstract

Vaccine delay and refusal present very real threats to public health. Since even a slight reduction in vaccination rates could produce major consequences as herd immunity is eroded, it is imperative to understand the factors that contribute to decision-making about vaccines. Recent scholarship on the concept of “vaccine hesitancy” emphasizes that vaccine behaviors and beliefs tend fall along a continuum from refusal to acceptance. Most research on hesitancy has focused on parental decision-making about childhood vaccines, but could be extended to explore decision-making related to adult immunization against seasonal influenza. In particular, vaccine hesitancy could be a useful approach to understand the persistence of racial/ethnic disparities between African American and White adults. This study relied on a thematic content analysis of qualitative data, including 12 semi-structured interviews, 9 focus groups (N=90), and 16 in-depth interviews, for a total sample of 118 (N=118) African American and White adults. All data were transcribed and analyzed with Atlas.ti. A coding scheme combining both inductive and deductive codes was utilized to identify themes related to vaccine hesitancy. The study found a continuum of vaccine behavior from never-takers, sometimes-takers, and always-takers, with significant

differences between African Americans and Whites. We compared our findings to the Three Cs: Complacency, Convenience, and Confidence framework. Complacency contributed to low vaccine acceptance with both races. Among sometimes-takers and always-takers, convenience was often cited as a reason for their behavior, while never-takers of both races were more likely to describe other reasons for non-vaccination, with convenience only a secondary explanation. However, for African Americans, cost was a barrier. There were racial differences in trust and confidence that impacted the decision-making process. The framework, though not a natural fit for the data, does provide some insight into the differential sources of hesitancy between these two populations. Complacency and confidence clearly impact vaccine behavior, often more profoundly than convenience, which can contribute either negatively or positively to vaccine acceptance. The Three Cs framework is a useful, but limited tool to understanding racial disparities. Understanding the distinctions in those cultural factors that drive lower vaccine confidence and greater hesitancy among African Americans could lead to more effective communication strategies as well as changes in the delivery of vaccines to increase convenience and passive acceptance.

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Background

In public health, few developments have been as successful as the widespread adoption of vaccines to combat infectious diseases.¹ Continued success depends on sufficient numbers of individuals receiving vaccines to create and maintain herd immunity. Recently, the challenges posed by vaccine refusal have spurred research interest to understand public attitudes. Vaccine hesitancy has emerged as new concept in immunization scholarship to “de-polarize” the prevailing representation of pro-vaccine and anti-vaccine positions, by portraying the wide range of vaccine attitudes along a continuum from refusal to acceptance.² This new scholarship contributes to the global effort to examine vaccine concerns in different contexts.³

In the United States, African American adults are significantly less likely to be immunized for seasonal influenza than White adults.⁴ During the 2015-16 flu season, the Centers for Disease Control and Prevention estimated that 37% of Black adults were vaccinated compared to 45% of white adults.⁴ This disparity has persisted even as influenza immunization rates increased overall with the gap between Black and White remaining nearly constant.⁵ Despite significant research, the specific factors driving this disparity continue to elude scholars. The concept of vaccine hesitancy offers a new lens to explore, and perhaps better elucidate, these persistent racial disparities.

What is Vaccine Hesitancy?

The World Health Organization(WHO) defines vaccine hesitancy as;

*Delay in acceptance or refusal of vaccines despite availability of vaccination services. Vaccine hesitancy is complex and context specific varying across time, place and vaccines. It includes factors such as complacency, convenience and confidence.*⁶

The Strategic Advisory Group of Experts in Immunization (SAGE), a working group of scholars selected by the WHO that is routinely assembled to assess emerging issues related to vaccination, developed the concept.⁷

The WHO definition emphasizes three factors central to vaccine hesitancy, the Three Cs, of complacency, convenience, and confidence.² Complacency refers to how individuals perceive the risk and value of vaccines. Convenience refers to factors associated with access to the vaccine, including availability, affordability, and accessibility. Confidence refers to “trust in the effectiveness and safety of vaccines, the system that delivers them,

including the reliability and competence of the health services and health professionals and the motivations of policy-makers who decide on the needed vaccines”.⁸

Additionally, the WHO definition emphasizes the context-specific nature of vaccine hesitancy. For instance, vaccine hesitancy can be specific to a particular vaccine, with individuals or groups delaying or refusing some vaccines but not others.² The SAGE working group outlined a “matrix” of determinants that influence vaccine hesitancy, including contextual influences such as historic, cultural, environmental, and political factors; individual and group influences including personal experiences; and vaccine specific issues.² There are calls for future research to understand dynamics of hesitancy within sub-groups, and to explore the broader social, historical and cultural context from which hesitancy arises.^{9,10}

Peretti-Watel et al. 2015 noted some conceptual ambiguity in vaccine hesitancy.¹¹ While many argue that vaccine hesitancy exhibits itself as behaviors along a continuum from complete acceptance of vaccines to total refusal, including delay or refusal, Peretti-Watel et al. argue that vaccine hesitancy is a decision-making process, affected by the context in which it is located, and ultimately, affecting behavior itself.¹¹ Similarly, Salmon et al. highlight the role of underlying beliefs and attitudes in shaping vaccine hesitancy, warning that observed vaccination behaviors are often influenced by external factors and therefore, may not reflect true levels of hesitancy.¹² As an emerging concept, a majority of published literature on vaccine hesitancy has been largely theoretical. Two recent qualitative studies were among the first to apply these theoretical concepts to an actual dataset. Both studies took a broad view that focused on measurable behaviors but also explored the attitudes that motivated those behaviors.^{13,14} For our study, we utilize the broader conceptualization of vaccine hesitancy, by measuring vaccine behavior and exploring attitudes related to complacency, convenience, and confidence.

Traditionally, vaccine research has utilized a number of theoretical models including the Health Belief Model, the Theory of Reasoned Action, and the Theory of Planned Behavior (for recent examples, see ^{15,16,17}). These theories have centered on individual attitudes, beliefs and internal thought processes. We see the Three Cs framework as providing broader sensitizing constructs that attempt to incorporate social and contextual factors and potentially capture the wider scope of vaccine hesitancy. While there is some similarity and overlap between constructs from existing theories, most notably the Health Belief Model, these constructs can take on new meanings within the Three Cs framework. Indeed, one of the major critiques of the use of these expectancy-value theories in vaccine research is the limited findings that they produce.²

To date, the majority of research on vaccine hesitancy has focused on the role of vaccine hesitancy in parental decision-making related to childhood vaccination.¹⁸ In the US, a smaller body of work focuses on understanding the role of vaccine hesitancy in adult vaccination.¹⁹ Several factors may explain this focus, including that the specified timeframe for childhood immunization makes it easier to assess hesitancy and delay, the growing political debate over mandatory vaccination policies, and high-profile outbreaks of vaccine preventable illnesses.^{21,20} However, because the flu vaccine is recommended annually, hesitancy is an issue that can have yearly impact on vaccine acceptance and delay, and since flu vaccine is recommended for all people over 6 months of age, hesitancy can contribute to greater disease burden across the population. This paper is one of the first to qualitatively explore the role of vaccine hesitancy in adult influenza immunization.

Given the consistent disparities in flu vaccination between African Americans and Whites, exploring vaccine hesitancy for its relevance to understanding these disparities is potentially useful. Additionally, little is known about how socio-economic status, race and racism may impact these concepts. This study explores whether vaccine hesitancy and the Three Cs framework is an applicable concept with adults and explicitly explores the differences between African American/Black and White Adults. Our research questions are:

1. What is the difference in the degree of vaccine hesitancy between African American and White adults related to seasonal influenza immunization?
2. What impact do cultural, attitudinal and social differences have on vaccine hesitancy?

3. Are the vaccine narratives of both African American and White adults accurately reflected in the Three Cs framework?

Methods

Data Collection

Utilizing an iterative process of data collection and analysis, we collected our qualitative data as part of a larger mixed-methods investigation of racial disparities in influenza immunization in African American and White adults. Our sample included native-born, English-speaking, adults over the age of eighteen, who identified either as White or African American. About two-thirds were African American and one-third was White. Data collection began with semi-structured exploratory interviews (N=12) to identify factors that influence vaccination decisions for African Americans and Whites. Based on that data, literature review and previous research, we then conducted nine focus groups (N=90), separating groups by race (6 African American, 3 White), vaccination behavior (3 Vaccine Takers, 3 Non-takers, 3 Mixed), and geographic location (6 Urban/suburban, 3 Rural). To facilitate research on racial identity and vaccination beliefs, we intentionally over-sampled for African Americans with purposive sampling to ensure diversity within racial groups for variables such as gender, age, and income. The focus groups followed the “funnel approach” in which moderators followed an open-ended interview protocol and directed the conversation while allowing discussion to flow freely.²⁷ In an iterative process, we adapted the protocol based on our results. Based on the focus groups, we identified specific areas for further elaboration in sixteen in-depth, individual interviews. Our total qualitative sample included 118 adults (N=118).

The Institutional Review Board at the University of Maryland approved all data collection activities (367080). The study sought to recruit African American/Black and White adults born in the US and of both genders. The rationale for inclusion of both racial groups was the noted disparity in adult vaccination between African Americans and Whites. Adult was defined as 18 years of age or older. During the screening process, all participants were asked to self-select their race and gender. Each participant received a paper copy of the informed consent request and discussed it with project staff prior to their signature.

Recruitment Strategies

Phase of data collection	Location	Type of Sample	Recruitment Strategies
Exploratory Interviews (1-1.5 hour)	Washington, DC metropolitan area; Athens, GA	Convenience sample with quotas to ensure appropriate representation by race, gender, age, and vaccine status	Email invitations and flyers sent to local contacts; Email flyers distributed through MD-Community Research Advisory Board; Flyers and visits to local barber and beauty shops associated with the Maryland Center for health Equity (M-CHE); Facebook page for the study; Announcement on the M-CHE webpage; Incentive \$30 giftcard
Focus Groups (1.5 hour)	Washington, DC metropolitan area; rural Eastern Shore, MD	Purposive sampling to ensure appropriate representation by race, gender, age, and vaccine status	Advertisements in the Washington Post Metro Express (free daily paper in DC region), The Diamondback (campus newspaper), and in the Star Democrat (a free daily paper in the Eastern Shore region); Email flyers for distribution through the MD-Community Research Advisory Board; Flyers and visits to local barber and beauty shops associated with the M-CHE; Facebook page for the study; Announcement on the M-CHE webpage; Incentive \$50 giftcard and refreshments
In-Depth Individual Interviews (1-1.5 hours)	Washington, DC metropolitan area	Purposive sampling	Email invitations and flyers sent to local contacts; email flyers for distribution through MD-Community Research Advisory Board; Facebook page for the study; Announcement on the M-CHE webpage; Incentive \$30 giftcard

Sample Descriptions

Exploratory Interviews			
	White (N=5)	Black (N=7)	Total (N=12)
Gender (%)			
Female	100%	29%	58%
Male	0%	71%	42%
Age Range (yrs)	27-71	26-65	25-71
Mean Age (yrs)	46.2	41.9	43.8
Flu Vaccine Status (%)			
Yes	83%	43%	54%
No	17%	57%	46%
Education Level (%)			
Less than High School	0%	14%	8%
High School/GED	17%	29%	23%
Some College/Associate Degree	33%	29%	31%
Bachelor's Degree or Higher	50%	29%	38%

Sample Descriptions

Focus Groups			
	White (N=26)	Black (N=64)	Total (N=90)
Gender (%)			
Female	62%	34%	63%
Male	38%	64%	36%
Other	0%	2%	1%
Age (%)			
18-29	15%	9%	11%
30-44	19%	25%	23%
45-59	12%	42%	33%
60+	54%	23%	32%
Flu Vaccine Status (%0			
Annually	44%	37%	39%
Most Years	15%	25%	17%
Once or Twice	25%	42%	20%
Never	26%	23%	24%
Education			
Less than High School	0%	3%	2%
High School/GED	0%	28%	19%
Some College/Associates Degree	22%	39%	34%
Bachelor's Degree or higher	78%	30%	44%

Sample Descriptions

In-depth Interviews			
	White (N=8)	Black (N=8)	Total (N=16)
Gender (%)			
Female	50%	50%	50%
Male	50%	50%	50%
Age Range (yrs)	24-67	35-72	24-72
Mean Age (yrs)	44.8	55	49.3
Flu Vaccine Status (%)			
Annually	38%	13%	25%
Most Years	0%	13%	6%
Once or Twice	13%	13%	23%
Never	50%	63%	56%
Education Level (%)			
Less than High School	0%	0%	0%
High School/GED	0%	0%	0%
Some College/ Associate Degree	13%	13%	13%
Bachelor's Degree or Higher	87%	87%	87%

Data Analysis

For this manuscript, we conducted a thematic analysis to specifically explore the role of vaccine hesitancy and the Three Cs framework across our sample. Thematic analysis evolved as a method of textual analysis that builds off of a traditional content analysis, but emphasizes the qualitative meaning attached to a text rather than simply documenting the frequency of codes.²¹ All interviews and focus groups were professionally transcribed and imported into Atlas.ti. Two team members coded all transcripts and discursively resolved all coding discrepancies, reaching consensus on each code. The coding process included an initial, line-by-line, coding and later-stage focused coding of broad concepts. In our initial coding process, we began with a codebook of fifty deductive codes as a guide. Examples of deductive codes included “perceived risk of disease” and “barriers to access”. Following a careful line-by-line technique, we either used existing codes or created new codes to fit each idea we observed. Examples of emergent codes included “prefers natural remedies” and “not necessary”. The final codebook included 121 codes. At this point, we recognized similarities between our codebook and the Three Cs framework presented in the vaccine hesitancy literature. To conduct the thematic analysis, we developed a set of deductive codes derived from the Three Cs Framework including codes of “complacency – not taker” and “convenience – sometimes taker” and recoded our data with these new codes.

Significant themes around each of the Three Cs were fully developed into written memos combining theoretical definitions with illustrative quotes. A major part of thematic analysis is identifying and recognizing patterns in the data.²² We utilized a visualization feature on Atlas.TI to understand the interconnections and overlap between major codes. Our thematic approach is perhaps best characterized as a “hybrid approach” as it combines both inductive codes and deductive codes derived from an a priori framework. This is similar to the work done by Fereday & Muir-Cochrane (2006), who argue that the hybrid approach that balances inductive and deductive coding can actually demonstrate greater rigor in qualitative research.²³

Results

Our data revealed a continuum of vaccine behavior from never-takers, sometimes-takers, and always-takers with great variability within these groups, especially in motivations and the ways their attitudes have changed over time.

By focusing on behavioral outcomes alone, this variability was lost, so we broadened our analysis to focus on the major motivations that drive different vaccination behavior. We made a decision to see how well our findings “fit” into the Three Cs framework. While the WHO definition broadly describes the Cs, no one had yet applied these conceptual definitions to an actual data set of American adults. Since each C had an influence in both directions, with some elements contributing to greater vaccine hesitancy and some attitudes contributing to greater vaccine acceptance, this approach was much “messier” than the literature would suggest. We explore the role of vaccine hesitancy in influenza vaccine disparities by examining articulations between the narratives of our participants and the Three Cs of complacency, convenience and confidence.

To identify quotations, the following four part coding system is used: First, race either W=White or AA=African American, followed by gender F=Female and M=Male, then vaccine status (if known) T=vaccine taker or NT=non-taker. The final code reflects the stage of data collection: EI = Exploratory Interviews, FG=Focus Groups and II= In-depth Interviews.

Complacency Contributing to Vaccine Hesitancy

In the SAGE framework, complacency is used to characterize the combination of low perceived risk and low motivation to vaccinate.⁸ Interpreting this definition, we recognized a distinct subset, generally young and majority white, of our sample could be described as complacent. For some participants, complacency was characterized by true apathy. One young white non-taker described it:

I mean there is not really anything that wouldn't make me want to get it every year, so I feel like I'm kind of in this ambiguous space where I probably should, like there is no reason why I shouldn't, but it's just not something I think about. If I thought about it, I would probably do it, but it just has never been a part of my life. So I think I am just conditioned to not even think about it.

— (WNTM – II)

The majority of complacent non-takers perceived a low susceptibility and low severity of seasonal influenza as justifications to forego vaccination. Non-takers often described the flu as “*just a bad cold*” or “*not that big of a deal*”, especially when compared to more “*serious*” diseases like polio or measles. Some believed that the flu could be serious, but only to individuals who are “*high-risk*” and not people like themselves. One man used his perceived low risk as a deciding factor against a vaccine:

Since I've never had the flu and I think of myself as a very healthy person, it just doesn't matter to me. So when the doctor asked me, “Are you going to get a flu shot?” I said, “No, I don't plan on it.”

— (WNTM- FG)

The most common manifestation of complacency was that the belief that the flu vaccine is simply “*unnecessary*.” For non-takers, there were two positions: those who believed that their immune system was fully capable of fighting off infection without a vaccine and those who practiced other behaviors they believed to be more effective in preventing infection. Within the first group, crediting a strong constitution was common – as an African American man explained, “*Over the years, I decided not to take the flu shot, because I feel like I was healthy enough and my immune system was strong enough to avoid the germs or bacteria, whatever that causes the flu*” (AANTM– FG). Members of this second group attributed their health to “*common sense*” prevention techniques: “*I've never had the flu before, even without getting the shot, so apparently I'm doing something right or whatever the other ways,*

washing my hands. Whatever it is, I've never felt the need to get the shot" (AANTF –FG). Within both groups, there was a sense that healthy individuals can rely on alternatives to the flu vaccine.

We noted an interaction between complacency and an incomplete understanding of how vaccines work among a small proportion of mostly African Americans respondents. For example, some participants did not understand why they needed a vaccine if they are not sick. One man described, *"I just can't get around the fact of injecting myself with flu so that I can become protected by the flu"* (AANTM- II). These misconceptions reflect both fear and doubt, but also contribute to the belief that the vaccine is not necessary.

Complacency Contributing to Vaccine Acceptance

Interestingly, what appeared to be complacency did not always lead to non-vaccination; in fact, we saw several instances where it contributed to passive acceptance of the vaccine. One young man described how he got his first flu shot at his physician's urging, *"I got it because my doctor strongly, strongly encouraged me to. And it was right there and I was right in the doctor's chair. But I think if I had to make the effort to go out and do it myself, I wouldn't have gotten it"* (AATM- II). Another person couldn't remember the reason for being vaccinated this year, *"I took it last year, but the last few years before that I didn't... I couldn't be bothered, figured nothing was going to happen. I'm not sure why I got it this last year"* (WT- FG). More passive vaccine takers didn't have a strong opinion on the vaccine, but when external circumstances made vaccination an option, they accepted it.

Among our respondents, many did not object to the vaccine; they simply felt that it was not necessary. Under certain circumstances, this translated into vaccine acceptance, but more frequently, it contributed to greater hesitancy. Younger participants displayed higher levels of complacency and apathy. There were no marked differences by gender or race.

Convenience Contributing to Vaccine Hesitancy

In the SAGE Framework, convenience refers to availability, affordability, and accessibility of vaccines.⁸ More traditionally, these concepts may be thought of as barriers, but convenience captures both the presence and absence of barriers. However, this is one area where our qualitative data did not match the Cs framework and for many of our participants, convenience and barriers were substantially different concepts. We found that participants tend to consider convenience in conjunction to other factors, and that there were significant differences between takers and non-takers.

Major barriers to vaccination related to affordability included vaccine costs, transportation, and health insurance. Most participants knew how much flu vaccines cost and where they could go to receive them. Several focus groups engaged in heated discussions of the best locations to get low-cost vaccines. Although many recognized the relatively low prices of flu vaccines, some participants felt they were still out of reach for the poorest of the poor. One man explained, *"So it's like 10, 15 dollars. I do think that if you have children, let's say you have five kids, \$15 a person, that's excessive"* (AATM-EI). While both racial groups discussed poverty as a barrier to vaccination, African Americans were more likely to describe personal or community experiences of poverty. This was the reality for one African American woman:

I mean for me, it's challenging— most people probably don't have six children. But, the size of my family, and working, and trying to schedule it in, and get all the appointments and all that, you know, I tend to stagger them. And so, if that flu shot is not done in one fell swoop, that requires additional visits to the doctor, which can be really hard to do, especially a single parent.

— (AANTF-EI).

Transportation costs were another barrier for elderly or low-income participants. Another woman explained her transportation difficulties, *“The money to pay for it, transportation for some people, especially like in areas like this, that I’m more rural, a way to get to the doctor, or if somebody is having a free clinic of flu shots, and how are you going to get there?”* (AANTF-EI). College students also shared this view, explaining that with their very limited budgets (and relatively good health), the vaccine was an unnecessary cost, especially if it meant a trip to the doctor’s office, or a trip *“home”*.

For some, it was a struggle to justify the cost of the vaccine, especially without medical insurance. One older woman who had recently lost her job and insurance described, *“If public healthcare covered it, I would be much more likely to do it, but if I have to budget it in when I’ve been getting it free for several years, it’s different”* (WTF-FG). Another man explained, *“Another deciding factor for me not getting the flu shot is lack of insurance. There were times where I didn’t have insurance”* (AANTM-FG).

Convenience Contributing to Vaccine Acceptance

We observed a division between takers and non-takers related to convenience. Overall, vaccine takers were more likely to cite convenience as a reason they got the vaccine, while implicitly implying the true reason they got the vaccine was obvious – *“it works”*. Non-takers were more likely to cite other reasons, such as personal beliefs or philosophical reasons first, and then describe barriers as a secondary justification. Several non-takers actually described how easy it would be for them to get a vaccine if they wished, but that they had made a decision not to do so.

Takers described accessible location, low cost, and encouragement through workplace policies as the most common convenience-related reasons for vaccination. Widespread availability in pharmacies, grocery stores, and pop-up clinics made the vaccine very accessible, as one woman described:

You know you’re in Costco on a Saturday and they’re there, and you’re like, “Oh I should get my flu shot.” Not that you had planned on it, but like you said, it’s a pain organizing a trip to the doctor. Having it be very convenient makes it easy.

— (WTF- FG)

A woman described her preference for the clinics over her doctor’s office, because she could avoid paying additional co-pays and visitation fees, *“I find that’s cheaper than going to my doctor. I go to my doctor, I got the office visit, plus I have the cost of the flu shot. If I just go to the local clinic, then I just get the cost of the flu shot”* (AATF-FG).

Workplace policies also have a positive impact on vaccine acceptance. Participants described policies ranging from passive to proactive that made the vaccine more convenient. Most involved small incentives that helped them decide to get a flu shot; one federal intern said she could easily get it in her office building; another office worker described receiving regular e-mail reminders from her boss; and still another said her entire office would all go together to the clinic for support. Other employers relied on more persuasive methods. A university student explained how his supervisor offered to cover the cost. Some employees were required to get their flu vaccines as a condition of employment; this included a hospital nurse, a student health volunteer, and several current or former military personnel.

Conceptually, we found a great deal of overlap between complacency and convenience. For some individuals (especially those with high levels of complacency), convenience may make the difference between vaccinating and non-vaccinating, *“I’ve always been willing to take it. I’ve never had any resistance to taking it. The shift has just been convenience and that the awareness is right there in front of me”* (AAM T-II). Another woman explained:

I'm not opposed to it in anyway, certainly. For example, if my place of work said, "Hey, we're doing flu vaccines today. Would you like that?" I probably would get one. I don't have any reason not to. I'm not afraid of it in any way. I just don't go down to CVS and get it or whatever.

— (WNTM- II)

Confidence Contributing to Vaccine Hesitancy

The final, and most complex, C is confidence, which the WHO defines as trust in vaccines and the broader system that produces, distributes, and provides them, along with the policy makers responsible for vaccination.⁸ Indeed, as a concept, there is a great deal of overlap between confidence and trust. We found that participants were more likely to use the language of trust to describe their own views— specifically, trust in the vaccine's effectiveness and safety, as well as trust in the health care system that provides the vaccine and the policy makers who set the vaccine regulations and policy. We observed three major areas related to confidence: trust/distrust of the vaccine, trust/distrust of the agencies that produce the vaccine, and a more generalized sense of trust/distrust that stems from traditions. While many factors were shared across our participants, Whites and African Americans expressed differing perspectives on trust, with Whites demonstrating greater trust, while African Americans were generally more skeptical.

Vaccine Distrust

We frequently heard statements like "*There's something about the flu vaccine I don't trust...*" (AANTF-EI). For these individuals, low vaccine confidence was linked to high levels of distrust in the vaccine itself. While many participants could not articulate exactly why they were hesitant to get the vaccine, some justifications included the fear of side effects or "*bad reactions*", distrust of the vaccine due to low perceived efficacy, belief that the flu vaccine would actually cause influenza, and fear of needles.

A major challenge to vaccine confidence is the fear of side effects, which was widespread across participants. One man described how his fears arose after hearing a list of potential risks:

There was a disclaimer on the flu shot stuff that says you're subject to, in very rare instances that there is a type of paralysis that can happen and that is basically debilitating... And I thought, 'Well, you know, I'm not going to take a flu shot.'

— (WNTM-II)

Another woman described that knowing about potential side effects "*is very important*" in her vaccine decision. When she heard about side effects, she wondered, "*What is the side effect? What else would be triggered in me?*" (AANTF- II).

These participants may have based their fears on personal experiences or anecdotes of "bad reactions" that they had heard from friends and family members. Some were based on specific instances, such as this young woman's description of her sister's experience:

"My sister had a very, very bad experience with a vaccine, so that kind of scares me off a little bit... She had a very bad reaction. I mean she lost a ton of weight. She was down to like 80 pounds. She couldn't get out of bed for like three months. It was just very, very bad

— (WNTF-II)

Others were fueled by rumors of extreme side effects. Respondents were quick to repeat some of the stories they had heard, *“I hear people, I hear tall tales, someone will say, ‘It will paralyze you. They’re injecting a live virus in you and it’s going to kill you. No, no, no, I’m not doing it”* (AATM-II). One viral internet story about a Washington Redskins cheerleader resonated with African American participants:

There was something a couple years ago. It was like on the news. It was like a Redskins cheerleader where she got the flu shot and she had the same issue where it was like she couldn’t even talk or something was going on with her. And so I never felt like, because I don’t get sick, so it’s like why should I take the chance of getting it and then having something like that happen?

— (AANTF- FG)

Whether the fear of vaccine side effects stems from a personal experience, an account from friends and family, or from a rumor, these fears had a strong, negative impact on trust in the flu vaccine and vaccine confidence overall.

Individuals actively weigh the risk of disease against risk of side effects. For people who already perceive low vaccine benefit and low disease risk, the fear of side effects may be enough to deter them from the vaccine. For instance, a woman explained, *“Given that it’s not totally effective, why would I then want to make myself sick for two days only to be protected from something that probably won’t happen anyway?”* (WNTF-FG). News stories that discuss the actual efficacy of vaccines may have exacerbated these fears: *“You think of it as like 100% and it was, I don’t know, something closer to 50%. I didn’t find that compelling enough to go over to the doctor’s office”* (WNTF-FG).

Some individuals were also afraid that the vaccine would give them the flu. One man elaborated, *“I have heard too many horror stories from people that I know where they took the flu vaccine and they got real ill. I’m like, ‘Okay, that validates my thought right there”* (AANTM-FG). The indiscriminate use of the term “flu” to describe a variety of ailments makes it difficult to confirm if these people were actually contracting influenza, but the perception that the vaccine caused the illness it was intended to prevent, reduces trust in the vaccine and negatively impacted vaccine confidence. These fears led some individuals to forego vaccination, as this woman explained, *“A friend of mine just got the flu shot and it was like they had the flu. I’m like, ‘Oh my goodness, I am never going to get the flu shot.’ And I never have and I don’t think I ever will”* (AANTF-FG).

Distrust of vaccines and fear of needles arose among some African American participants. This African American man described both of these fears, *“A lot of things I don’t like about needles is contamination. I don’t really like taking needles for any reason and I don’t like the pain of needles”* (AANTM-FG)

Organizational and Governmental Distrust

Low trust for the organizations involved in vaccine approval, manufacture, and distribution negatively impacted vaccine confidence. We assessed trust in motives as well as trust in the competence of pharmaceutical companies, public health agencies, and *“the government”* more broadly.

Distrust in pharmaceutical companies was universal among many participants young and old, male and female, White and African American. Some concerns centered on their ‘for-profit’ nature, as this white woman explained *“I’m not sure the vaccine works. I think it might be a big hype by the pharmaceutical companies to get more money”*(WNTF-II). Another African American man explained, *“You’re not really concerned about me as much as you are about your financial bottom line”*(AANTF-EI). Individuals questioned not only the motives of pharmaceutical companies, but also their ability to produce safe, effective, and reliable products:

So, it’s like you’re asking me to trust a pharmaceutical company when anybody can do anything to that. I’m swallowing, I’m injected, I’m taking it because it’s a pharmaceutical

company and that's it? What kind of oversight are we talking about here?

— (AANTF-FG)

Some participants discussed their distrust of public health agencies, but these sentiments were more nuanced. One woman described her ambivalence, *"I honestly don't know how the FDA can test to make sure that the vaccine works, but I do trust that they are testing it to make sure that it is safe"* (WTF-II). White participants voiced concern about the competence of these agencies, but among some African Americans, concerns related to motives that drive these agencies. When asked to describe why he has *"zero trust"* in the people who produce the flu vaccine, this man explained, *"Because, I mean, why would they really care so much about us?"* (AAANTM-FG).

The clearest racial divide in vaccine confidence was between White and African American participants' different levels of trust in the government's role in vaccination. White participants expressed greater trust in government, while African American participants voiced lower trust, with particular concerns regarding the government's motives. A common refrain from black focus groups was, *"You don't trust a government vaccine"* or *"don't trust the government for nothing"* (AANTF-FG). This distrust extended into conspiracy theories including beliefs that the government was experimenting on minorities as *"guinea pigs"*, that the vaccines were being diluted and distributed in Black communities, or that vaccines were a form of population control. Additionally, the legacy of the Tuskegee Syphilis Study emerged in every focus group as a justification for distrust.

Our findings revealed a significant influence of family traditions on vaccine confidence. In the absence of a strong family tradition supporting vaccination, many individuals, especially from older generations, refused to consider a flu shot now. Another older woman explained:

Only because I grew up with my mother, grandmother, father, great-grandmother, everybody around me, "No, I'm not taking that. It ain't gonna give me the flu." I mean, that's always what I've heard, so when I became an adult, "Well no, not going to give me the flu either." So huh-uh, don't do it.

— (AA F-FG).

This is especially true among African American families, where distrust of the medical establishment was the norm, as this older man explained, *"I was raised old school, so a flu shot was not part of the regime to be taken care of, and then there was a time where the flu shot was killing people. There were counterfeits"* (AANTM-FG). In many instances, the confluence of distrust in the vaccine, distrust of the medical establishment, and a lifetime of socially reinforced fear of the vaccine, reinforced very low levels of vaccine confidence among African Americans.

Confidence Contributing to Vaccine Acceptance

Individuals who regularly get immunized for flu described having greater confidence in flu vaccine. This stemmed from higher levels of trust in the vaccine, as well as trust towards public health and government authorities responsible for producing vaccine, and health care providers administering it.

People who trusted the vaccine often described it in terms of vaccine effectiveness. Many takers got the vaccine because they believed it works. *"I believe in vaccinations"* is how one man succinctly described his support (WTF-FG). These participants also viewed vaccines as the primary method to prevent disease. When asked how she prevents flu, a woman answered, *"What comes to my mind is get the flu shot..."* (AATF-FG). An older man was declarative, *"I keep up on my shots, and I believe in the system... I mean I have not had the flu. I really don't get sick and I think it's because of the vaccine. And so I kind of believe it, I really do"*(WTF-FG).

Vaccine takers also weighed perceived risks and perceived benefits of the vaccine, but ultimately decided in favor of the vaccine. One difference was that African Americans considered rare and extreme risks from the vaccine

while Whites focused on more minor risks and inconveniences. A man who admitted that he only sometimes got a flu vaccine described this weighting of risks and benefits among people in his community:

So they're [his non-vaccinating friends] always thinking about okay, it [vaccine safety] might be 99%. They're thinking I could be that 1% that gets sick, dies. That's the only thing I could do. In other cases, another person might look at it, "Well, 99%, that's better than 50% chance you getting it if you don't take this vaccine."

— (AANTM-EI)

For some, ambivalence created an overlap between confidence and complacency. This was captured in a few “shrugging” type comments where people felt the vaccine might help and would probably not harm them. For some White takers, the comparison of risk was less extreme, as one woman explained, “*Well, it's the lesser of two evils, the way I look at it... I've had no side effects, knock on wood I've been healthy for all these years in spite of taking it or because of taking it*” (WTF-EI). Whites also perceived very few risks to the vaccine, so that a risk comparison was almost one-sided: “*But I just feel like if it's not hurting you, you might as well try it and maybe it will help you or maybe it will prevent something*” (WTF-EI).

For Whites, the power of family traditions and the intergenerational transfer of health practices emerged as significant source of vaccine confidence whereas for many African Americans, traditional family beliefs diminished reduced vaccine confidence.

Organizational Trust and Governmental Trust

For non-takers, a lack of trust in any one area (i.e. vaccine, pharmaceutical companies, federal regulatory agencies, the government) was often enough to reduce vaccine confidence. For takers, high confidence reflected trust in the overall process. These individuals describe trust very broadly. A young woman described her attitude as, “*I trust the product and trust the people*” (WTF-II). Similarly, an older man explained the many facets of trust:

Well, it means I trust that the vaccine is going to be effective, I trust that nothing dangerous is being given to me, and I trust the sources of the vaccine, meaning, I mean that's a lot of trust, but I'm trusting the makers of the vaccine, I'm trusting my doctor who recommends it, and I'm trusting the U.S. government who promotes it and subsidizes it to some extent. So it is a lot of trust. And I think if any of those factors were not in place, I would probably have some doubts about the vaccine and may or may not take it, so trust is key.

— (AATM-II)

We also observed differences between individuals who voiced an unquestioning and implicit trust in vaccines and others who had reached a high level of vaccine confidence after much consideration and debate. Both groups had high vaccine confidence but it stemmed from different origins, falling along racial lines. Whites were more likely to simply ‘trust’ a vaccine while African Americans were more likely to engage in thoughtful discussion. One woman was asked why she had listed “trust” as unimportant in relation to her vaccine decisions: “*I'm a trusting person. That's why it's so unimportant. Inherently, it's there*” (WTF-II). For the African American vaccine takers, they were aware of the concerns within their community and yet they made an active choice to trust. One woman described her new approach to healthcare; she saw how distrust had led to her mother's early death at age 38, so she made a choice to get involved and take a more active role in her own health, “*I don't distrust government or distrust medical professionals. I do ask questions. You ask questions of more than one person, but you don't come with the premise of distrust*” (AATF-II).

Summary of Themes Organized by Construct

Constructs	Non-Takers	Takers
Complacency	Vaccine is not necessary; Natural immune response is sufficient; Other behaviors prevent flu; Low perceived susceptibility to flu.	Doctor's recommendation overcomes ambivalence towards vaccine.
Convenience	Vaccine (and related costs) are too expensive; Difficult to obtain without insurance.	Convenient location made it easy; Low cost/free; Encouraged through workplace policies; Insurance coverage.
Confidence	Fear of vaccine side effects; Distrust vaccine; Distrust organizations that produce vaccine; Distrust in government; Family history of distrust; Fear of needles.	Trust vaccine; Trust government; Trust organizations that produce vaccine; Family history of trust.

Discussion

Our research revealed a continuum of vaccine attitudes and behaviors across both White and African American participants. In many ways, this continuum is reflected in the Vaccine Hesitancy Three Cs framework, but there are significant points of deviation.

To some extent, the degree of hesitancy differed by race just as the reasons for hesitancy about the flu vaccine varied by race. Among the non-takers, racial differences were observed based on trust and confidence, complacency, perceived risk of influenza and other factors. However, many white non-takers did not outright reject the flu vaccine, but did not believe they needed the vaccine due to low perceived susceptibility. For the sometimes-takers, external motivations included outside factors like a doctor's recommendation or a convenient opportunity, while their own passivity contributed to their vaccination decisions as well. The always-takers demonstrated high confidence in the vaccine. For both African Americans and Whites, complacency reduced likelihood of vaccination. For many, complacency was linked to low perceived risk for influenza. For others, complacency intersected with confidence when their low perceived disease risk, coupled with questions about vaccine efficacy, contributed to failure to get the vaccine.

For numerous takers of both races, convenience was cited as a major facilitator of vaccination whereas non-takers cited other reasons for lack of vaccination first, only raising convenience issues as a secondary reason. To overcome complacency, external motivators, including increased convenience, appeared to be important prompts to action for sometimes-takers. In many ways, this reflects what Nichter described as the difference between "passive acceptance" and "active demand" for a vaccine, a concept that is beginning to be integrated into the vaccine hesitancy literature.⁹²⁴ These findings suggest that increasing access to affordable vaccine through convenient locations can potentially increase passive acceptance of the vaccine for sometimes-takers.

It was in the context of confidence that racial differences emerged more starkly and cultural, social, historical and attitudinal factors had the most significant impact. Distrust of pharmaceutical companies cut across races, with even takers voicing doubts about pharmaceutical companies. However, in terms of trust in government, Whites typically expressed more trust, and when they voiced distrust, they raised questions about government's competence. For African Americans, distrust was stronger and specifically coupled with concerns about the government's motives with regard to racial and ethnic minorities. Increasing trust in the motives of agencies or industry is a longer-term and complex challenge. However, both public health professionals and health care providers can emphasize the primary motive driving promotion of the flu vaccine as the critical importance of protecting individual and public health, and potentially addressing the 'elephant in the room' by emphasizing that flu vaccination is not a high profit enterprise for pharmaceutical companies.

Among always-takers, there were fewer racial differences as both shared confidence in the vaccine's safety and its importance. Although they were similar in their reasons for vaccination, they differed in their decision-making process. White takers were passive in their decision making process, and when they did consider side effects in their risk-benefit comparison, they saw vaccine side effects as minimal. African Americans were more deliberate in their risk-benefit analysis, considering more serious potential risks of the vaccine and weighing the decision carefully. Therefore, those African Americans who did take the vaccine had decided to actively confront and overcome many of the more negative perceptions that are prevalent in the black community, including historical distrust. Although that suggests more possibility for hesitancy and delay, they ultimately accepted the vaccine.

This position reflects what Velan et al. have identified as the importance of reflexive processes in the ways individuals manage risk and interpret vaccine-related uncertainty.²⁵ They argue that individuals bear a strong "personal responsibility" for managing an overwhelming number of risks, and are forced to be selective about which risks require attention at any given time.²⁵ Consequently, by attending to the differences in decision making that we found between African Americans and Whites, public health professionals may more effectively communicate information that addresses not just their judgments about disease and vaccine risk, but may also influence some of the family networks that appear to be important in establishing vaccine attitudes and behaviors. This may be particularly critical among the sometimes takers that could be moved from significant hesitancy toward greater vaccine acceptance.

This article was one of the first attempts to use the Vaccine Hesitancy framework with data on adults. Our qualitative findings yielding a broad continuum of behaviors and beliefs that was unwieldy and not easily distilled into discreet categories based on either behavior or belief. In practice, the Three Cs can reflect some of the complexity but the wide range of variability between populations and the overlap between the Three Cs leaves room for debate and growth. Some would note the potential overlap with key concepts such as susceptibility, severity and barriers from the Health Belief Model. We found a number of factors that are associated with complacency, and in the HBM framework, would be described as low perceived susceptibility and low perceived severity. However, by considering the Three Cs, we also discover passive placement of vaccine opportunities in the path of some complacent individuals, results in vaccine uptake. More traditionally, a HBM approach would lead us to target changing individual susceptibility and severity, which is more difficult, and potentially failing to address vaccine opportunities and convenience.

The potential lack of clarity between the concepts of "confidence" and trust raises questions as well. However, our data helped us make that distinction more clearly. The Oxford English Dictionary defines confidence as "The feeling or belief that one can have faith in or rely on someone or something".²⁶ Clearly, the extent to which the public demonstrates trust in the vaccine process, the relevant organizations, and finally the vaccine itself can contribute to a broader confidence or belief in vaccination, and ultimately, decrease hesitancy. This is a area in which there is still significant work to be done, particularly with African Americans.

One of the intriguing opportunities presented by using the Three Cs framework is the recognition of the complexity of the individual, social, cultural and environmental factors that affect complacency, convenience and confidence. By considering some of that interaction, it gives more opportunity to craft more nuanced messages that move sometimes-takers along the continuum to more routine acceptance. Equally important is that the recognition of the complex interaction of these factors facilitates more comprehensive approaches to reducing vaccine disparities, including those that recognize the importance of families, environment, and policies.

Conclusion

To address vaccine hesitancy among African American and White adults, the Three Cs framework of complacency, convenience and confidence provides some guidance for more nuanced approaches to overcoming complacency, fostering convenience, and strengthening confidence in each group. Incorporating this knowledge into more

tailored communication messages and campaigns, as well as into actual delivery of vaccine, could reduce disparities in vaccine uptake and subsequently prevent morbidity and mortality.

Competing Interest Statement

The authors have declared that no competing interests exist.

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