

Development and Validation of the Emory Vaccine Confidence Index

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June 4, 2019



EMORY

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Disclosures

- Dr. Bednarczyk receives funding from the National Institutes of Health and the Bill & Melinda Gates Foundation.
- Dr. Bednarczyk has no conflicts of interest to declare.

Project Background

- National Vaccine Program Office funded Cooperative Agreement *1VSRNV000003-01-00*
- **Project Period:** July 1, 2016 through March 31, 2019
- **PIs:** **Dr. Paula Frew** (July 1, 2016 through August 31, 2018) and **Dr. Robert Bednarczyk** (September 1, 2018 through March 31, 2019)
- **Overall goal:** Effectively measure, assess, and address parent and provider vaccine confidence
- **Objectives:**
 - Develop reliable and valid measures of vaccine confidence
 - Monitor vaccine confidence
 - Develop, assess, and evaluation communication/education interventions to improve vaccine confidence

Activities Conducted

- Development of Emory Vaccine Confidence Index (2 manuscripts published, validation study manuscript in progress; additional applications to a wider variety of populations underway)
- Analysis of vaccine delay/schedule adherence using National Immunization Survey data (under review)
- Identification of vaccine confidence typologies using latent class analysis (manuscript in process)
- Development of best practices toolkit for pediatric practices to include vaccine information on practice websites

Emory Vaccine Confidence Index

- In 2015, the National Vaccine Advisory Committee recommended to the Assistant Secretary for Health that an expanded and coordinated effort was needed to achieve high parent and health care provider acceptance of vaccines.
- One strategy identified was “Measuring and tracking vaccine confidence”

What is vaccine confidence?

con·fi·dence

/ˈkɒnfɪdəns/ 

noun

the feeling or belief that one can rely on someone or something; firm trust.

"we had every confidence in the staff"

synonyms: trust, belief, faith, credence, conviction

"I have little confidence in these figures"



- Vaccine confidence extends beyond just addressing vaccine refusal
- Some parents may question the necessity of vaccines
 - Vaccine delay is a major concern^{1,2}
 - Delays may be “intention and circumstantial”^{3,4}
 - “Selective and complete refusal”^{5,6}
 - Typology development identifying non-hesitant acceptors, delayers, and refusers⁷

1. Omer SB, Richards JL, Ward M, Bednarczyk RA. N Engl J Med. 2012

2. Gilkey MB, McRee AL, Brewer NT. Prev Med. 2013

3. Smith PJ, Humiston SG, Parnell T, et al. Public Health Reports, 2010

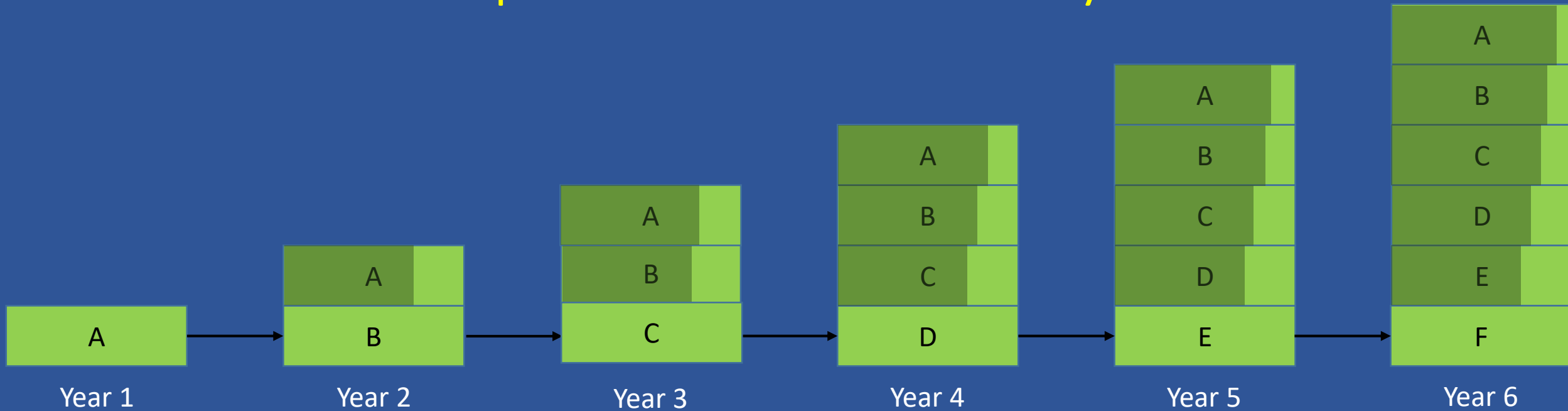
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5. Hill HA, Elam-Evans LD, Yankey D, et al., MMWR, 2015

6. Nadeau JA, Bednarczyk RA, Masawi MR, et al. J Pediatr. 2015

7. Chung Y, Weiner J, Schamel J, et al. Matern Child Health J. 2017

Cumulative impact of vaccine delays



- Year 1:
 - Children in cohort A will be born, but will not receive MMR until first birthday and will be unvaccinated this whole year
- Year 2:
 - Children in cohort B will be born, but will not receive MMR until first birthday and will be unvaccinated this whole year
 - Children in cohort A will be vaccinated, but not completely (incomplete shading)
- Year 3:
 - Children in cohort C will be born, but will not receive MMR until first birthday and will be unvaccinated this whole year
 - Children in cohort B will be vaccinated, but not completely (incomplete shading)
 - Some initial delayers in cohort A will be vaccinated (slightly increased shading)

And on and on and on...

EVCI Development and Validation

- Three rounds of data collection
 - October-November 2016, national parental survey using Qualtrics panel survey
 - N = 893
 - Initial EVCI development
 - Preliminary validation against self-report vaccine status for children
 - July 2017, national parental survey using YouGov panel survey
 - N = 700
 - Matched to 2013 American Community Survey demographics
 - June-October 2018, in-clinic parent recruitment in three CO pediatric offices
 - N = 303
 - Validation of EVCI using provider-verified immunization records

Scale Development

- Initial 30 question set addressing domains of “Information Environment”, “Trust”, “Healthcare Provider”, “Attitudes and Beliefs”, and “Social Norms”.
- Factor analysis grouped survey items into broader categories and correlation analysis used to reduce the number of variables
- Summary scoring rubric created for consistent format of responses

Scale Contents

- Final EVCI = 8 items ($\alpha = 0.857$)

Indicate your level of confidence in each item below about childhood vaccines (6-point “complete-no confidence” response)

1. Vaccines recommended for young children are safe
2. My doctor or nurse is a trustworthy source for vaccine information
3. My doctor or nurse has my child(ren)’s best interest in mind when making vaccine recommendations

Rate your level of trust in the following (7-point “complete-no trust” response):

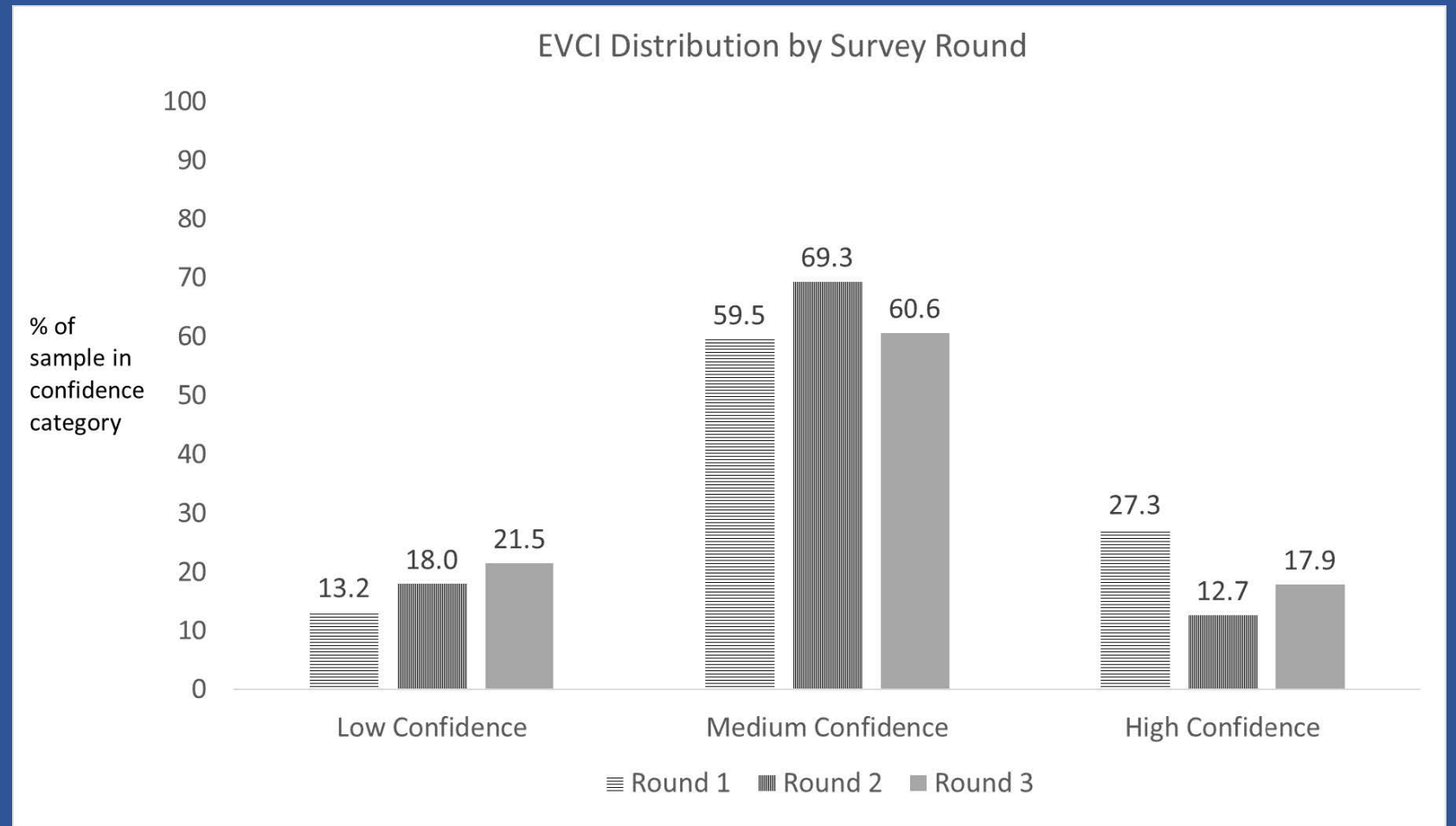
4. Scientists involved in developing and testing new vaccines
5. Centers for Disease Control and Prevention (CDC), the federal government agency that makes recommendations about who should get licensed vaccines
6. Federal government agencies responsible for monitoring the safety of recommended childhood vaccines
7. Food & Drug Administration (FDA), the federal government agency that licenses vaccines

Indicate how strongly you agree with the following (5-point Likert response):

8. It is important for everyone to get the recommended vaccines for their child(ren)

Results

- EVCI scored 0 – 24
 - 0 – 12 (low confidence); 13 – 20 (medium confidence); 21 – 24 (high confidence)



Initial validation

- Questions asked if child received all doses of a given vaccine they were supposed to
- No provider verification

Round 1	0 to 12	13 to 20	21 to 24	Chi-square p-value	Cochran-Armitage Trend Test p-value
DTaP	81.8	94.3	96.6	<0.0001	<0.0001
Polio	79.0	92.8	94.4	<0.0001	<0.0001
Hepatitis A	74.3	87.3	87.1	0.0027	0.0047
Hepatitis B	80.4	91.0	91.5	0.0037	0.0038
<i>Haemophilus influenzae</i> type b	71.3	86.9	91.3	<0.0001	<0.0001
Rotavirus	73.1	90.6	91.4	<0.0001	<0.0001
MMR	78.4	90.3	93.6	<0.0001	0.0003
Pneumococcal	61.7	77.2	83.0	0.0002	<0.0001
Varicella	64.0	83.1	87.6	<0.0001	<0.0001

Round 2	0 to 12	13 to 20	21 to 24	Chi-square p-value	Cochran-Armitage Trend Test p-value
DTaP	74.1	96.4	97.7	<0.0001	<0.0001
Polio	68.3	94.2	92.7	<0.0001	<0.0001
Hepatitis A	65.7	90.2	88.9	<0.0001	<0.0001
Hepatitis B	66.0	90.3	88.5	<0.0001	<0.0001
<i>Haemophilus influenzae</i> type b	60.6	87.3	88.2	<0.0001	<0.0001
Rotavirus	59.1	93.3	87.5	<0.0001	<0.0001
MMR	72.2	95.0	92.0	<0.0001	<0.0001
Pneumococcal	49.5	78.6	79.0	<0.0001	<0.0001
Varicella	57.7	90.4	85.9	<0.0001	<0.0001

Round 3 validation

- Vaccination status based on age-appropriate up-to-date status
 - For a 3 month old child, we only considered the hepatitis B birth dose and 2-month routinely recommended vaccines
 - For a 2 year old child, we considered all vaccines recommended up to 18 months of age.

Child age		N	%
	Less than 1 year	139	45.9
	1 to less than 2 years	66	21.7
	2 to less than 3 years	30	9.9
	3 to less than 4 years	34	11.2
	4 to less than 5 years	16	5.3
	5 to less than 6 years	11	3.6
	6 years	7	2.3

		Age-specific UTD	
		N	%
Vaccine confidence	Low	26	44.1
	Medium	128	77.1
	High	43	87.8
Chi-square p-value	<0.0001		
Cochran-Armitage trend p-value	<0.0001		

Discussion and Conclusions

- The EVCI performed well in all three rounds when used to compare vaccine uptake (both self-reported and provider-verified)
- EVCI is an easily administered and scored 8 question tool that can quickly assess vaccine confidence
- EVCI scores are strongly associated with vaccine uptake.

Thank you!

Any questions?

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Measuring Vaccination Confidence and Hesitancy – The Challenges and Value of Two Popular Concepts

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Presentation at
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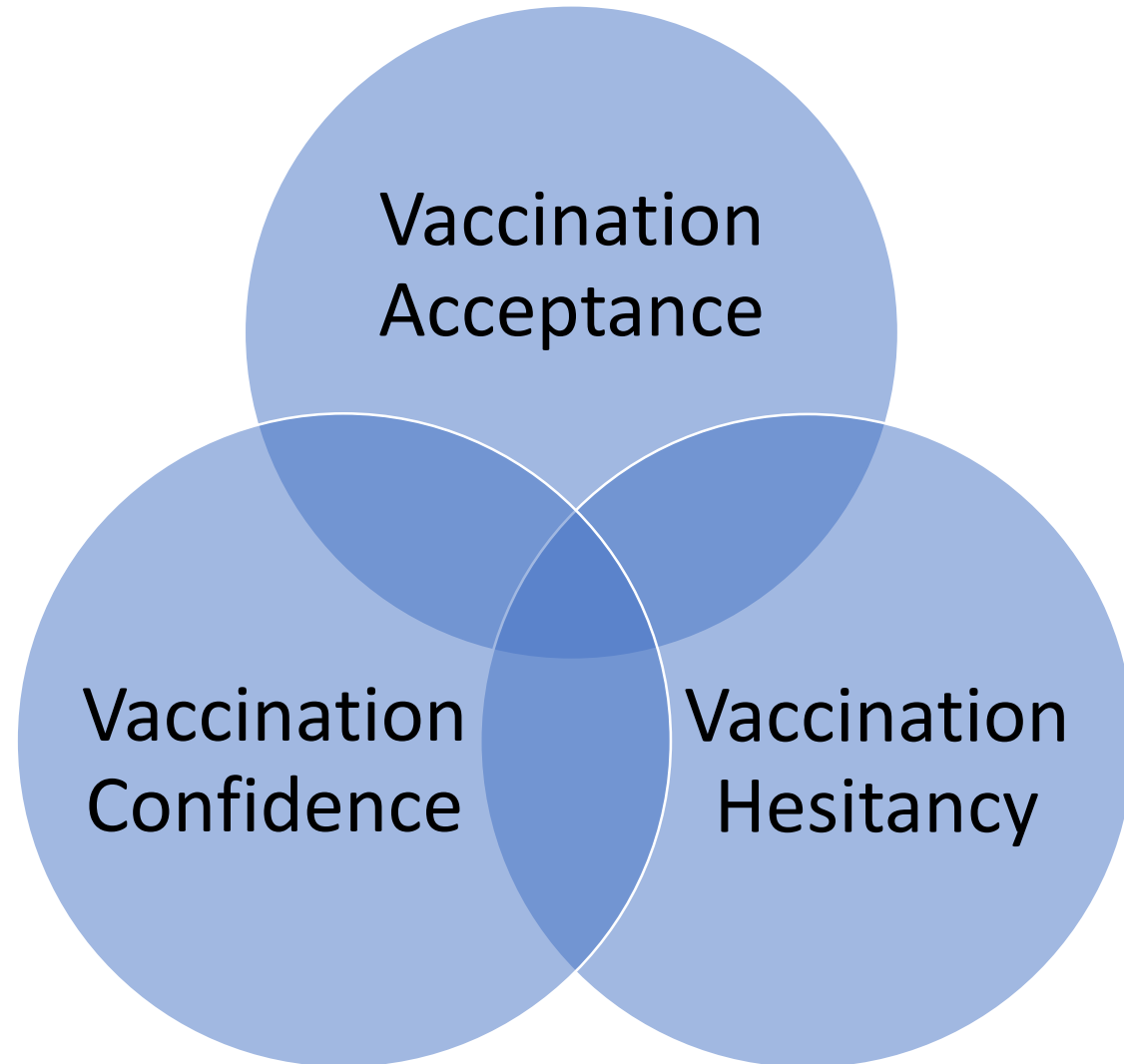


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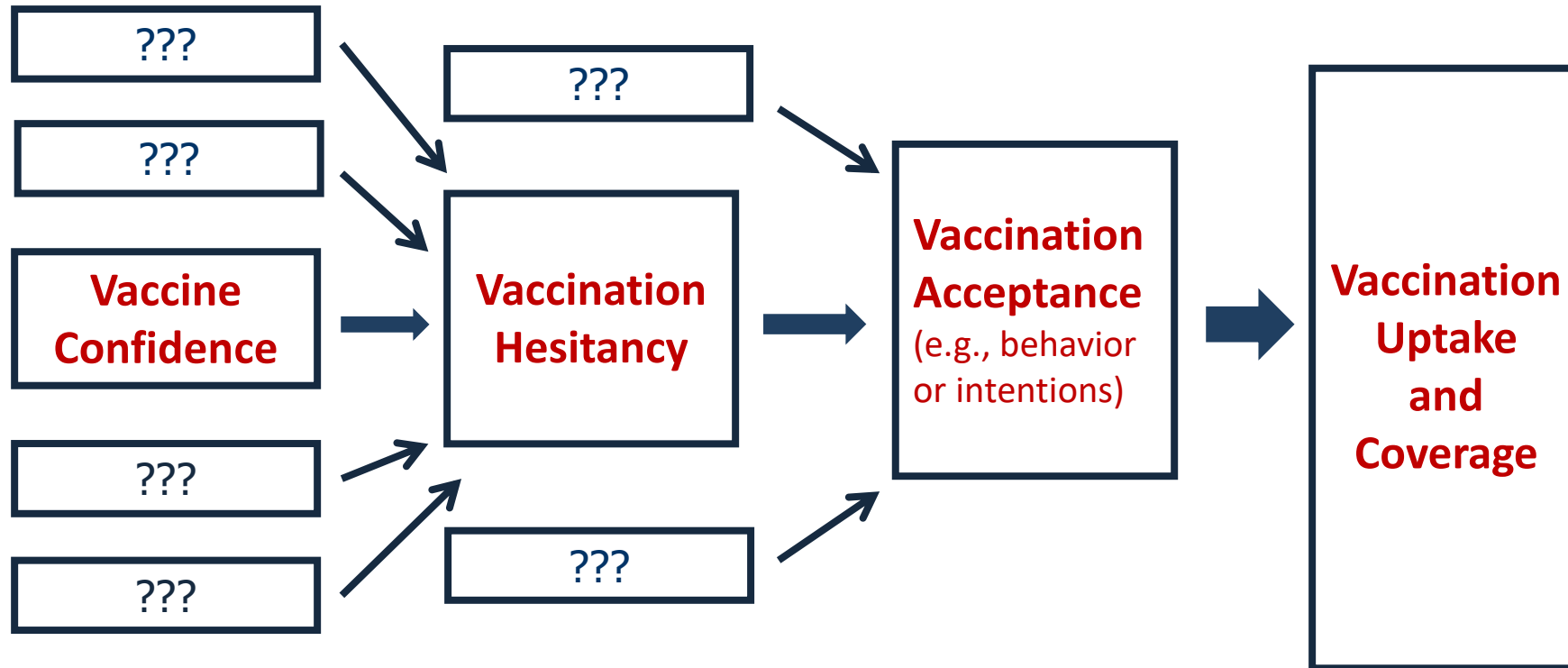
Overview

- A brief look at confidence and hesitancy
- Two examples of applying and using confidence measures
 - 2014-2015 U.S. measles outbreak
 - A 2016 survey of adults regarding recommended adult vaccines, including influenza vaccination receipt

Three related, yet distinct, concepts



Often seen as linked along these lines. . .



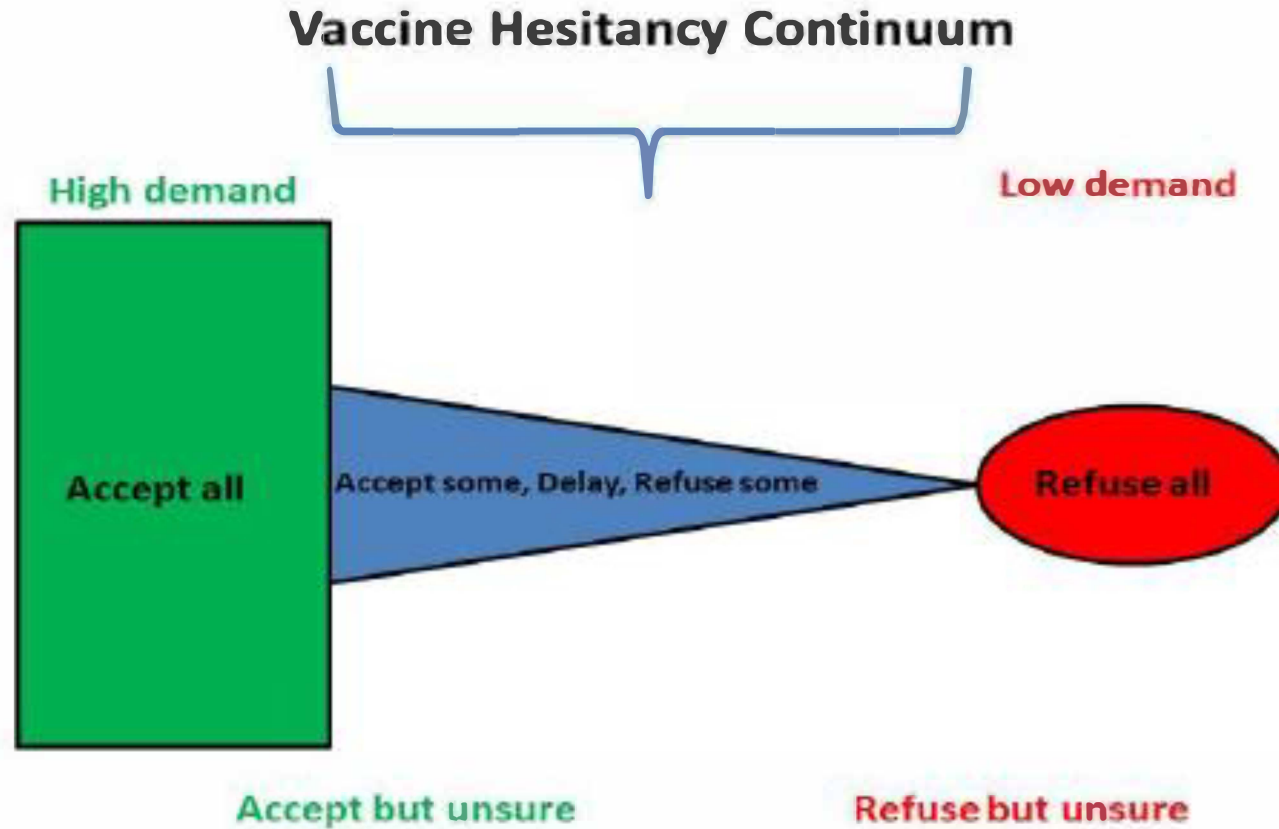
Note – There is not consensus on the relationship between confidence and hesitancy. It has also been suggested that vaccine hesitancy is a component of vaccine confidence.

WHO SAGE Working Group Report – Vaccine Hesitancy

November 2014

- **Definition:** Vaccine hesitancy refers to delay in acceptance or refusal of vaccines despite availability of vaccine services. Vaccine hesitancy is complex and context specific, varying across time, place and vaccines.
 - Vaccine hesitant individuals are a heterogeneous group who hold varying degrees of indecision about specific vaccines or vaccination in general.
 - Vaccine hesitant individuals may accept all vaccines but remain concerned about vaccines, some may refuse or delay some vaccines, but accept others; some individuals may refuse all vaccines.
 - Vaccine hesitancy is influenced by factors such as *complacency*, *convenience*, and *confidence*.

The Continuum of Vaccine Hesitancy between Full Acceptance and Outright Refusal of all Vaccines



Other Definitions of Vaccination Hesitancy Exist

Larson (2013): “Vaccine hesitancy is a state of indecision and reluctance”

Demochowski and Suryadevara (2013): “an active desire to defer or omit any of the vaccines routinely recommended by the ACIP”

Yaqub et al. (2014): “an expression of concern or doubt about the value, need for, or safety of vaccines or vaccination.”

Belan (2016): “A broad spectrum phenomena, ranging from a genuine call for help to complete defiance of authorities. . . Mid-spectrum hesitancy is an act of personal exploration and deliberation whether to get vaccinated or not.”

In general, hesitancy is seen as: “caution,” “worry,” “doubt,” “distrust,” “reluctance,” and/or “anxiety” when it comes to vaccines and/or vaccination and/or immunization recommendations

Vaccine/vaccination hesitancy: Important considerations

- Many see vaccination or vaccine hesitancy as a “proactive,” “active,” or “considered” process.
- It’s often not explicitly recognized, but there is a difference between “addressing hesitancy” and “overcoming hesitancy.”
 - Addressing hesitancy: establish or build understanding, trust, confidence, including through education and provider-parent communication
 - Overcoming hesitancy: mandates, incentives, removing barriers related to access and affordability, foster convenience
- There are no standardized measures of vaccine or vaccination hesitancy – nor is there consensus on whether it is an outcome, an indicator of a larger outcome, or a segmentation approach.

Assessing the State of Vaccine Confidence in the United States: Recommendations from the National Vaccine Advisory Committee,

Approved by the National Vaccine Advisory Committee on June 10, 2015

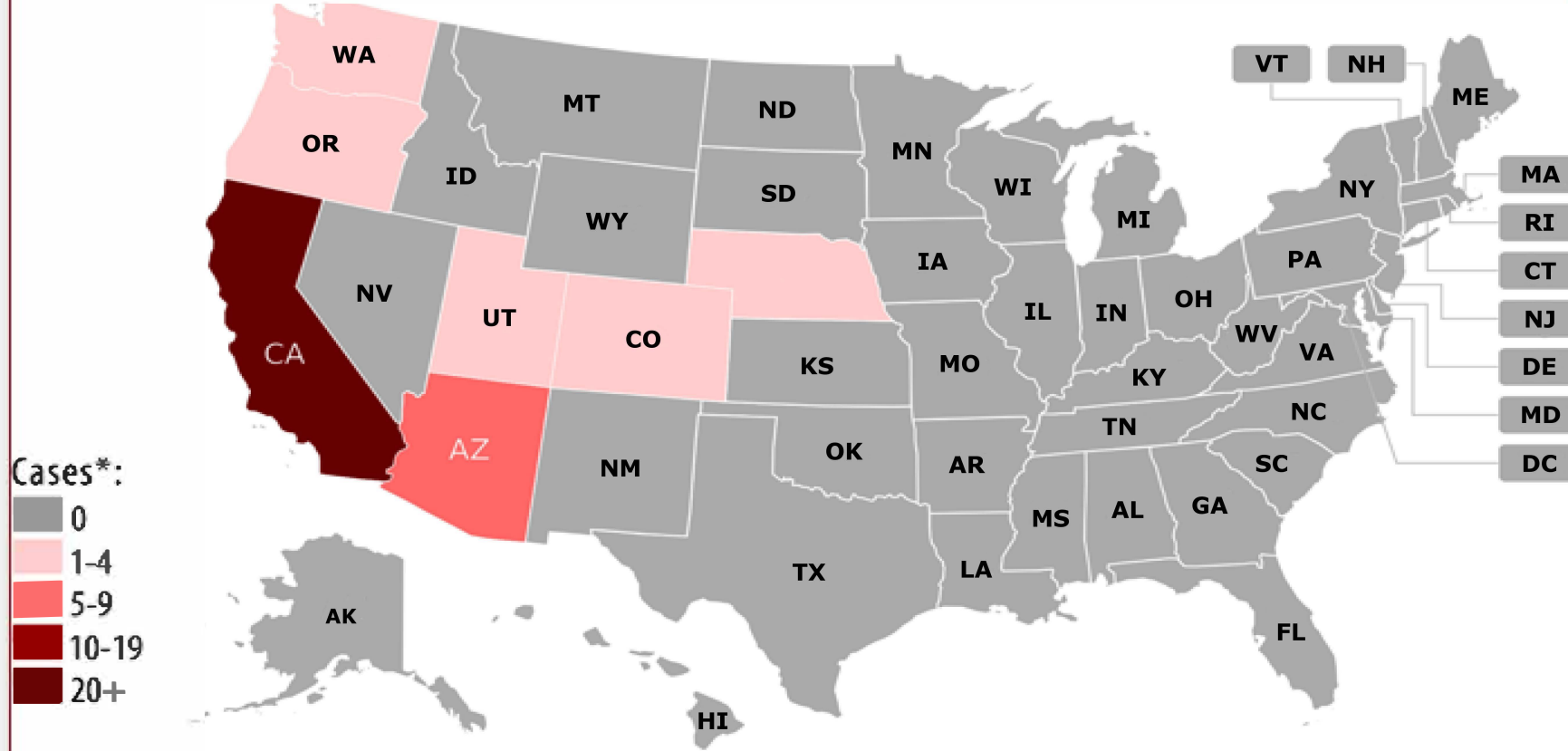
Public Health Reports / November–December 2015 / Volume 130

- Vaccine confidence refers to the trust that parents or health-care providers have (1) in the recommended immunizations, (2) in the provider(s) who administers vaccines, and (3) in the process that leads to vaccine licensure and the recommended vaccination schedule.
- **Confidence was seen to encompass hesitancy.** For example, if parents have high confidence in recommended vaccines and vaccinations, there should be little or no hesitation about having their children receive immunizations at the recommended ages. Conversely, if confidence is low or lacking, parents will likely hesitate when it comes to a recommended vaccination.
- **Trust is one of the most important factors associated with vaccine confidence.** Trust is the willingness to rely on someone else's expertise and advice (e.g., their vaccine recommendation).
- On the science side, the **initial efforts toward** developing a multinational research network to **advance the science** to understand vaccine confidence and hesitancy **need to be sustained and extended.**

Other Definitions of Vaccination Confidence

- Layperson definitions of “confidence” often encompass the notion of “no reservations” when it comes to compliance or adopting a health-related recommendation, e.g.,
 - “I have no reservations about whether or not it is a good idea and desirable for my child (or me) to be vaccinated” or “I am completely convinced of the (value, safety, need) of this vaccine.”
- Other characterizations or definitions include:
 - Faith – e.g., faith that one will benefit and/or experience no harm
 - Strength of belief regarding expected outcome – e.g., that vaccine will provide protection and/or that there will not be an adverse reaction.
 - Absence of worry or concern(s) – e.g., not perceiving a significant likelihood of a bad or adverse outcome
 - Satisfaction with one’s decision – e.g., “I’m confident my decision to [get / not get] my child vaccinated was the right one.”

U.S. Multi-state Measles Outbreak December 28, 2014 - April 24, 2015



From December 28 to April 24, 2015, 147 people from 7 states [AZ (7), CA (131), CO (1), NE (2), OR (1), UT (3), WA (2)] were reported to have measles and are considered to be part of a large outbreak linked to an amusement park in California*.

*Provisional data reported to CDC's National Center for Immunization and Respiratory Diseases



A “Natural” Experiment surrounding the 2014-2015 outbreak

Core questions:

- What effects, if any, did a measles outbreak that generated visible, sustained media coverage have on parents’ awareness and level of interest in the outbreak?
- Was level of awareness/interest associated with vaccine-related concerns, confidence, and beliefs, and future vaccination intentions?

Survey Overview:

- Pair of independent, nationally representative, YouGov surveys; parents with at least one child age 5 or younger (N=1,000 in each survey)
- Survey 1: Nov. 3 – Dec. 1, 2014 Survey 2: May 19 – June 19, 2015
- Response rates of 36.3% and 32.7%

Measures and analyses included:

- Vaccine-related concerns, confidence, beliefs regarding state immunization, mandates, future vaccination intentions
- Comparisons involved “no,” “low,” and “high” awareness parents to those in Survey 1

By Michael A. Cacciatore, Glen Nowak, and Nathaniel J. Evans

Exploring The Impact Of The US Measles Outbreak On Parental Awareness Of And Support For Vaccination

DOI: 10.1377/hlthaff.2015.1093
HEALTH AFFAIRS 35,
NO. 2 (2016): 334–340
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The People-to-People Health
Foundation, Inc.

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ABSTRACT Despite consensus among health officials that childhood immunizations are a safe and effective means of protecting people from disease, some parents remain hesitant about vaccinating their children. This hesitancy has been linked to a lack of confidence in recommended vaccinations as well as a desire to delay or further space out scheduled vaccinations but also outright refusal of vaccines. Using two national surveys of parents of children ages five and younger, collected immediately prior to and in the weeks following the 2014–15 US measles outbreak, this study examined the awareness of this vaccine-preventable disease outbreak among parents and whether awareness of the outbreak affected their beliefs about childhood vaccination, confidence, and intentions. The study found that while most parents were aware of the outbreak, many were not, and the level of familiarity mattered, particularly on measures of confidence in vaccines and support for mandates requiring childhood vaccination. Increases in vaccine-related concerns were found as well, indicating that disease outbreaks foster not just awareness of vaccines and their potential to prevent disease but a range of parental responses.

It's Complicated: The 2014–2015 U.S. Measles Outbreak and Parents' Vaccination Beliefs, Confidence, and Intentions

Michael A. Cacciatore,* Glen J. Nowak, and Nathaniel J. Evans

While it seems intuitive that highly visible vaccine-preventable disease outbreaks should impact perceptions of disease risk and facilitate vaccination, few empirical studies exist to confirm or dispel these beliefs. This study investigates the impact of the 2014–2015 Disneyland measles outbreak on parents' vaccination attitudes and future vaccination intentions. The analysis relies on a pair of public opinion surveys of American parents with at least one child under the age of six ($N = 1,000$ across each survey). Controlling for basic demographics, we found higher levels of reported confidence in the safety and efficacy of childhood vaccinations in our follow-up data collection. However, this confidence was also accompanied by elevated levels of concern toward childhood vaccines among American parents. We then examined how different subgroups in the population scored on these measures before and after the outbreak. We found that parents with high levels of interest in the topic of vaccines and a child who is not fully up to date with the recommended vaccination schedule reported more supportive attitudes toward vaccines. However, future intentions to follow the recommended vaccination schedule were not positively impacted by the outbreak. Possible explanations for these results and implications for vaccination outreach are discussed.

KEY WORDS: Measles; outbreak events; public opinion; risk communication; vaccines

Awareness and Attention Paid to the Outbreak

There was moderate levels of awareness and interest:

- 52.6% of parents in the post-outbreak survey stated they were aware of any cases of measles in the United States in the prior four months, but 33.2% reported no knowledge of the outbreak and 13.7% were unsure.
- 25% of parents indicated they had paid much attention to news stories regarding the outbreak.
- Parents who were aware of the outbreak were more likely to be white, slightly older, and somewhat more educated than those who were unaware.

Childhood Vaccination-related Confidence

	Pre-outbreak ^a	Post-outbreak ^b		p value	
	Overall, mean (N = 1,000)	No awareness, mean (n = 332)	Low awareness, mean (n = 279)		High awareness, mean (n = 244)
VACCINE CONFIDENCE (1–10 SCALE)					
That the recommended childhood vaccination schedule is safe	7.05	7.25	7.39	8.15	****
That the recommended childhood vaccination schedule will protect my child from the diseases	7.03	7.14	7.32	7.99	****
That my child's overall health will benefit from getting all the recommended vaccines	7.23	7.36	7.56	8.23	****
That my child will not have a bad or serious adverse reaction to any of the recommended vaccines	6.61	6.74	6.84	7.37	****
That the recommended vaccines are effective in protecting my child from disease	7.10	7.17	7.46	8.23	****
That my child's overall health benefits from each of the vaccines in the recommended vaccine schedule	7.01	7.20	7.34	8.10	****
Combined confidence index	7.01	7.14	7.32	8.01	****

Notably, vaccination confidence levels among parents whose children were vaccinated as recommended were at the same high levels before and after the outbreak. Confidence increased among parents who had an delayed or declined some vaccinations – though still not on par with level of complying parents.

But having confidence did not equate to lower vaccination-related concern levels

Variable	Pre-outbreak ^a	Post-outbreak ^b			p value
	Overall, mean (N = 1,000)	No awareness, mean (n = 332)	Low awareness, mean (n = 279)	High awareness, mean (n = 244)	
VACCINE CONCERNS (1–10 SCALE)					
That any of the recommended childhood vaccines might not be safe	5.60	6.29	4.96	5.99	<0.001
That children receive too many vaccines	5.35	6.08	4.59	5.68	<0.001
That a vaccine might not prevent the disease	5.21	6.10	4.66	5.95	<0.001
That vaccines attempt to protect children from too many diseases	5.01	6.00	4.16	5.46	<0.001
Combined concern index	5.29	6.12	4.60	5.77	<0.001

Notably, parents who reported a high level of awareness regarding the outbreak and who had delayed or declined a recommended childhood vaccination reported much higher vaccine efficacy concern following the outbreak as compared to before it.

Fall 2016 National Survey – Adults and Adult Vaccinations

- 18-minute long survey involving adult vaccination, including flu vaccine
- National Opinion Research Center's (NORC) AmeriSpeaks panel
 - Probability-based panel designed to be representative of U.S. household population
 - 3 million households in the sample frame
 - General population sample of U.S. adults 19 years old and older
- Survey field in October 2016 in English, using Internet and phone
- 1,005 respondents completed (received cash equivalent of \$3)
 - Response rate 35.6%
 - Margin of error +/- 3.9%

Flu vaccination Receipt in past 12 months

During past 12 months, have you received a flu vaccination:

Overall: 42.3%

Highest among: 65+ (66.7%)

Awareness of recommendation:

58.7% of those aware of recommendation received vs. 41.3% of those unaware of recommendation

90.8% of those unaware did not receive one

Received a provider recommendation:

63.9% of those who received recommendation were vaccinated vs. 36.1% of those who did not receive.

84% of those who did not get a provider recommendation did not receive a flu vaccination in past 12 months

Operationalized the 2015 NVAC Definition + one more

Vaccine Confidence refers to the trust that parents or healthcare providers have in:

- (a) the recommended vaccinations, including recommended immunization schedules;
- (b) the provider(s) who administer(s) vaccines;
- (c) the researchers and federal government entities and processes involved in vaccine development and licensure;
- (d) the researchers, organizations, and federal government entities and processes involved in vaccination recommendations, including vaccine safety;
- (e) vaccine manufacturers

Please rate your level of trust in. . . ('1' = 'no trust' / '5' = 'complete trust')

Note: NVAC definition has much significance when it comes to the number of trust-related items needed

- Influenza vaccine
- Tetanus vaccine
- A Zika vaccine if it was available
- Vaccine information and recommendations from my doctor or healthcare provider
- The scientists involved in developing and testing vaccines
- The experts who make vaccination recommendations
- The Centers for Disease Control and Prevention
- The Food and Drug Administration
- Federal government agencies responsible for monitoring the safety of recommended adult vaccines
- The companies that make or produce the vaccines recommended for adults

Modest overall trust – and some trusted more than others. . .

Item – <i>Level of trust in the. . .</i>	No Trust 1	2	3	4	Complete Trust 5	Average Rating
Vaccine information and recommendations from my doctor or healthcare provider	6.3%	7.4%	25.2%	33.5%	27.6%	3.7
	4.2%	7.2%	25.2%	38.2%	25.2%	3.7
Centers for Disease Control & Prevention – or CDC	10.0%	12.9%	31.5%	30.4%	15.1%	3.3
	5.5%	12.9%	29.0%	35.5%	17.1%	3.5
Scientists involved in developing and testing vaccines	10.1%	13.4%	37.8%	29.0%	9.8%	3.1
	6.8%	14.4%	35.2%	31.9%	11.8%	3.3
The experts who make vaccination recommendations	11.7%	16.9%	34.2%	28.3%	8.4%	3.0
	7.8%	12.5%	37.5%	31.5%	10.7%	3.2
The Food & Drug Administration – or FDA	13.7%	18.1%	30.2%	26.8%	11.2%	3.0
	8.4%	12.9%	34.1%	33.7%	10.8%	3.3
Federal government agencies responsible for monitoring the safety of recommended adult vaccines	14.9%	18.8%	35.1%	21.5%	9.8%	2.9
	10.1%	17.4%	34.6%	27.2%	10.7%	3.1
The companies that make or produce the vaccines recommended for adults	20.8%	26.9%	32.6%	15.3%	4.3%	2.6
	17.3%	25.8%	36.0%	16.6%	4.3%	2.6

Level of trust is associated with key outcome measures

Measure	Little or no Trust in CDC (20.3%)	Moderate Trust in CDC (37.5%)	High/Complete Trust in CDC (42.1%)
Received an influenza vaccination in past 12 months	21.9%	50.8%	63.1%
Level of hesitancy about getting recommended adult vaccines	3.67 (60.6%)	2.51 (16.2%)	1.78 (9.0%)
Confidence that all of the vaccines recommended for adults are safe	1.91 (10.8%)	2.78 (18.4%)	3.71 (62.7%)
Confidence that all of the vaccines recommended for adults are effective	1.95 (8.3%)	2.83 (20.5%)	3.53 (56.1%)
Confidence that getting a recommended vaccine is best thing to do	2.33 (18.7%)	3.39 (44.8%)	4.20 (82.2%)

Percentages in parentheses are those responding 4 or 5 on the measures of hesitancy and confidence; with 4 and 5 representing higher levels of hesitancy and higher levels of confidence

Measure	Little or no Trust in Experts who make recommendations (18.3%)	Moderate Trust in Experts who make recommendations (29.0%)	High/Complete Trust in Experts who make recommendations (52.6%)
Received an influenza vaccination in past 12 months	26.5%	43.3%	62.4%
Level of hesitancy about getting recommended adult vaccines	3.47 (51.1%)	2.64 (22.5%)	1.95 (11.3%)
Confidence that all of the vaccines recommended for adults are safe	1.95 (8.7%)	2.72 (19.1%)	3.50 (54.1%)
Confidence that all of the vaccines recommended for adults are effective	2.08 (11.4%)	2.74 (17.9%)	3.38 (49.2%)
Confidence that getting a recommended vaccine is best thing to do	2.47 (23.9%)	3.23 (37.2%)	4.05 (76.4%)

Percentages in parentheses are those responding 4 or 5 on the measures of hesitancy and confidence; with 4 and 5 representing higher levels of hesitancy and higher levels of confidence

Key Insights Regarding Vaccination Confidence and Hesitancy Measures and Tracking include. . .

- Confidence and hesitancy are related but also distinct
 - “Confidence” – often more associated with one’s beliefs regarding benefits attained from vaccination and/or likelihood of vaccination reactions
 - “Hesitancy” – often more associated with reluctance to take a recommended action
 - Common assumption is that greater confidence will equate to less hesitancy
- Definitions of confidence and hesitancy matter – and there is no current consensus regarding how to define and measure either
- Most parents and adults have relatively high confidence levels – but high confidence levels may not equate to reduced concern levels or fewer questions regarding recommended.
- The value of assessing vaccination confidence and hesitancy needs to be linked to an end outcome or goal – and many possibilities exist.

Vaccination hesitancy and confidence research and efforts: What could or should they be about?

- **Active demand** (e.g., more people or parents valuing or seeking vaccines?)
- **Greater acceptance** (e.g., of vaccines? specific vaccines? immunization schedules? – and by who?)
- **Faster and/or higher uptake of new vaccines or new recommendations?** (by who?)
- **Less hesitancy (in terms of reduced worry, anxiety, doubt)** (e.g., about vaccines in general? Specific vaccines? about an immunization schedule?)
- **Greater confidence** (e.g., in vaccines? in immunization schedules? New vaccines? in those who provide vaccines? in the system that licenses and recommends vaccines?)
- **More or stronger trust** (e.g., in vaccination recommendations? in manufacturers? In public health and those who recommend?)
- **Different utility calculations** (e.g., a changed decision making process? more likely to favor vaccination?)
- **More than one of the above**

Thanks

INSIGHTS INTO FLU-HESITANT AFRICAN-AMERICAN AND HISPANIC ADULTS

**National Vaccine Advisory Committee (NVAC) Meeting
US Department of Health and Human Services (HHS)**

Washington, DC

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PRESENTATION OVERVIEW

- **Study Design**
 - Purpose
 - Study questions
 - Methods
- **Demographics**
- **Summary of Findings**
- **Conclusions/Recommendations**



PURPOSE

- Compare the vaccination knowledge, attitudes, and beliefs of Black and Hispanic adults to those of White adults, to identify potential differences that might inform targeted messaging in adult vaccination communication campaigns.
- Inform the development of targeted health communication messages and activities that leverage motivators, overcome barriers, influence personal health beliefs, and effectively address social context.

STUDY QUESTIONS

1. What are the differences between Blacks, Hispanics, and Whites in adult vaccination knowledge, attitudes, beliefs, and behavior?
2. What are the differences among Blacks, Hispanics, and Whites who do not get vaccinated in regard to their adult vaccination knowledge, attitudes, and beliefs?
3. What are the most reported factors associated with not getting vaccinated for key demographic groupings (e.g., race, gender, age, and education)?

METHODS

Data collection (Fall 2017)

- National probability-based panel survey of adults fielded by NORC at the University of Chicago on behalf of Community Science
- Offered in English and Spanish, administered on the phone and web
- Interviews completed: 1,295
- Completion rate: 13.4%

Sampling

- General population sample of U.S. adults aged 18 and over from NORC's AmeriSpeak panel, [oversample of non-Hispanic African American and Hispanic adults](#)
- Sampling strata were based on age, race/Hispanic ethnicity, education, and gender (48 sampling strata in total).
- A sample-derived weight was used to correct for nonresponse and avoid inflation of scores inherent in subgroup comparisons with the chi-square test, resulting in more conservative results.

METHODS (cont.)

Measures addressed by the questionnaire

- Knowledge about diseases and vaccines, including sufficient knowledge for vaccine decision making (flu, tetanus, whooping cough, other generally recommended adult vaccines)
- Adult Vaccine Confidence Index (acceptance/willingness, hesitancy, confidence)
- Perception of vaccine risk, personal health beliefs, social influences
- Vaccination uptake intentions and barriers to receiving all recommended vaccines

Analyses

- Chi-square, confidence interval comparisons, and T Tests to determine differences within categories by race (Whites as referent) and by current season flu shot uptake
- Confidence intervals for the AVCI comparisons to determine differences overall and for race groups by current season flu shot uptake
- Significance levels of $\geq .05$

RESPONDENT DEMOGRAPHICS

Demographic Characteristic	Percentage (n)	Demographic Characteristic	Percentage (n)
Gender:		Race/Ethnicity:	
Female	51.6% (668)	White	40.8% (528)
Male	48.4% (627)	Black	25.6% (331)
Age:		Hispanic	28.6% (370)
Aged 18–29 years	21.2% (274)	2+ Races, non-Hispanic	2.3% (30)
Aged 30–44 years	24.3% (315)	Asian, non-Hispanic	1.9% (24)
Aged 45–59 years	26.6% (345)	Other	0.9% (12)
Aged 60 years and older	27.9% (361)		
n=1,295 (based on weighted data)		n=1,295 (based on weighted data)	

RESPONDENT DEMOGRAPHICS (cont.)

Demographic Characteristic	Percentage (n)
Education:	
No high school diploma	11.0% (143)
High school graduate	28.9% (374)
Some college	28.6% (371)
Bachelor's degree or higher	31.5% (407)
Annual household income:	
Less than \$50,000	49.0% (635)
\$50,000 or more	51.0% (660)
n=1,295 (based on weighted data)	

WHAT ARE THE DIFFERENCES BETWEEN BLACKS, HISPANICS, AND WHITES IN ADULT VACCINATION KNOWLEDGE, ATTITUDES, BELIEFS, AND BEHAVIORS?

Knowledge of Disease for Decision-Making

Significantly fewer Blacks and Hispanics than Whites reported they knew enough about the flu vaccine to make an informed decision about getting the flu shot. Whites were 1.11 times more likely than Blacks and 1.15 times more likely than Hispanics.

- Whites: 92.7%; Blacks: 83.5%; Hispanics: 80.8%

VACCINE RISK PERCEPTION (Not Vaccinated)

Blacks' past negative experiences make them more reluctant to get vaccinated

Blacks who did not receive a flu vaccination in the 2017–2018 vaccination season were significantly more likely than Whites to report the risks as more of a barrier and the benefits as less of a motivator.

- *Blacks (34.9%) were 2.12 times more likely than Whites (16.5%) to report that past experiences with **pain from getting a vaccination** made them reluctant to get vaccinated.*

VACCINE RISK PERCEPTION (Not Vaccinated)

Hispanics' past negative experiences make them more reluctant to get vaccinated

Hispanics who did not receive a flu vaccination in the 2017–2018 vaccination season were significantly more likely than Whites to report the risks as more of a barrier but reported the benefits as more of a motivator.

- *Hispanics (33.6%) were 2.04 times more likely than Whites (16.5%) to report that **past experiences with pain** from getting a vaccination made them reluctant to get vaccinated.*

PERSONAL HEALTH BELIEFS

Blacks were significantly more likely than Whites to report beliefs that may act as barriers to getting vaccinated.

- Blacks (52.0%) were 1.57 times more likely than Whites (33.2%) to report that **vaccines can overload the immune system.**
- Black respondents (38.7%) were 1.41 times more likely than Whites (27.5%) to report they **disagree that healthy adults should get all recommended adult vaccinations.**

Blacks and Hispanics were significantly more likely than Whites to report that vaccinations were inconsistent with their religious and/or cultural beliefs.

- Hispanics (21.1%) were 1.84 times more likely and Blacks (20.3%) were 1.77 times more likely than Whites (11.4%) to report that it is **not consistent with their religious beliefs to get vaccinated.**
- Hispanics (26.4%) were 2.26 times more likely and Blacks (23.5%) were 2.03 times more likely than Whites (11.6%) to report that it is **not consistent with their cultural beliefs to get vaccinated.**

PERSONAL HEALTH BELIEFS (cont.)

- **Blacks and Hispanics who did not receive a flu vaccination in the 2017–2018 season were significantly more likely than Whites to report that vaccinations were *inconsistent with their cultural beliefs*.**
 - Hispanics (27.3%) and Blacks (27.3%) were both 2.15 times more likely than Whites (12.7%) to report that it is not consistent with their cultural beliefs to get vaccinated.

Social Context Attitudes

- **The sole significant difference is that Whites (88.5%) are 1.10 times more likely than Hispanic respondents (80.4%) to *report that their health care provider reminds them that they should be up to date on their vaccinations*.**
- **Across all groups, similar percentages were reported that they like being able to protect someone from contracting a contagious disease. *All groups share this desire to protect others but may have differing opinions on how to best do it.***

BARRIERS TO THE RECEIPT OF VACCINES

Almost all barriers to vaccination are similarly reported across racial subgroups, Barriers reported significantly more by Blacks and Hispanics that did not receive a flu vaccine in the 2017–2018 season

- Blacks (24.2%) were 1.95 times more likely than Whites (12.4%) to report that they **worried about pain** from getting an injection.
- Blacks (46.0%) were 1.65 times and Hispanics (53.1%) were 1.91 times more likely more likely than Whites (27.8%) to report that they **don't know why they should be vaccinated**.
- Hispanics (47.6%) were 1.57 times more likely than Whites (30.3%) to report that they **haven't been reminded by their health care provider** to get vaccinated.

VACCINE BEHAVIORS: MOTIVATORS

Hispanics and Blacks were both significantly more likely to report social media posts as a motivator to receive a flu vaccine.

- Hispanics (22.4%) were 2.33 times more likely and Blacks (19.9%) were 2.06 times more likely than Whites (9.5%) to report a social media post as a motivator.
- Recommendations from a health care provider remain the primary motivator for all groups.

Other motivators included recommendation by family member (Hispanics) and availability at work (Blacks)

- Hispanics (67.8%) were 1.15 times more likely than Whites (58.9%) to report **recommendation by a family member** as a motivator.
- Blacks (43.4%) were 1.30 times more likely than White respondents (33.5%) to report **availability at work** as a motivator to receive the flu vaccine.

EXPOSURE TO VACCINE INFORMATION

Blacks reported significantly more exposure to flu vaccine information in the prior month than Whites.

- Blacks (11.7%) were 4.33 times more likely than Whites (2.7%) to hear “a great deal” of flu vaccine information on social media.
- Blacks (18.5%) were 2.68 times more likely than Whites (6.9%) to report hearing “a great deal” of advertising on TV, internet, or radio.
- Blacks (24.7%) were 2.52 times more likely than Whites (9.8%) to report hearing “a great deal” of flu vaccine information from health care providers.

Hispanics reported significantly more exposure to flu vaccine information in the past month via social media than Whites.

- Hispanics (11%) were 2.08 times more likely than Whites (5.3%) to report “a good amount” of exposure to flu vaccine information on social media.

ADULT VACCINE BELIEFS

Blacks and Hispanics are significantly more likely than Whites to report that vaccinations were inconsistent with their religious and/or cultural beliefs.

Recommendation: This finding is worthy of more exploration/study, as understanding the strength and nature of these beliefs may be key to changing vaccine behavior.



SOCIAL MEDIA, INTERNET, AND OTHER MEDIA EXPOSURE

Conclusion: Hispanics and Blacks were both significantly more likely to report social media posts as a motivator to receive a flu vaccine and heard significantly more flu vaccine information on social media.

Recommendation: Use social media for targeted messages to Hispanics and Blacks, especially focusing on areas identified as challenges for these subgroups. *The amount of exposure is not the issue, but the content and source are what's important including addressing the perceived cultural conflict.*

ADULT VACCINE MOTIVATORS

Conclusion: Recommendations from a health care provider remain the primary motivator for getting a vaccination for all groups, followed by recommendation by a family member.

Recommendation: Interventions that involve healthcare providers and family members may contribute to flu vaccine uptake.



ADULT VACCINE BARRIERS

Blacks were more likely than Whites to report that:

- they worried about pain from getting an injection.
- they don't know why they should be vaccinated.

Hispanics were more likely than Whites to report that:

- they haven't been reminded by their health care provider to get vaccinated.
- they don't know why they should be vaccinated.

One Last Note

There was no significant differences reported in regards to access or availability of vaccines among Whites, Blacks, and Hispanics.



Thank you!

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Cluster Anxiety-Related Adverse Events Following Immunization (AEFI): Assessment of Reports Detected in Social Media and an Online Search Engine

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Background

- Immunization anxiety-related reaction: an adverse event following immunization (AEFI) that arises from anxiety about the immunization
- Since 1992: 8 published reports of anxiety-related AEFIs occurring in clusters or group settings
- Additional reports not found in peer-reviewed literature can help in understanding and characterizing these disruptive events

Background

- Social media and the web are increasingly popular ways of sharing personal health-related information
- Online networks may represent a novel resource for identifying potential clusters of anxiety-related AEFIs
- Reviewed Google and Facebook due to their size and popularity among users

Objectives

- Assess the detection of clusters of anxiety-related AEFIs, not otherwise reported in traditional peer-reviewed systems
- Characterize anxiety-related cluster reports found in social media and by an online search engine

Methods

- Two reviewers (in Atlanta and Geneva) independently searched Google and Facebook to identify reports of AEFI clusters*
- Search terms used
 - Mass hysteria after vaccine
 - Mystery illness after vaccine
 - Fainting in school children after vaccine
 - Mass fainting after vaccine

*(≥ 2 persons, following mass vaccination and concentrated in a geographic location or related to a mass immunization event)

Methods

- Reviewed reports and summarized:
 - Patient demographics
 - Vaccines given
 - Country of report
 - Public health response efforts
 - Any disruptions to vaccination programs
- Characterized sentiment and tone expressed in reports regarding vaccines and vaccinations as:
 - Positive
 - Negative
 - Neutral

Results

- 39 reports referring to 18 cluster events
- Most reports (19, 48.7%) involved human papillomavirus (HPV) vaccine
- Most reports (38, 94.9%) involved children; both sexes affected
- Size of clusters ranged from 2 – 360 individuals

Results

- All reports either occurred in a school setting or as part of a state or national vaccination campaign
- Clusters occurred in rural and urban settings, high- and low- income countries
- Most commonly reported AEFI was syncope (50.0%)
- 5 cluster events where vaccination campaigns were reportedly halted

Results

- Themes expressed in reports
 - Vaccines are safe, widely used and are well studied
 - Vaccines are harmful; distrust for public health investigators and pharmaceutical companies
 - Genuine uncertainty as to the cause of the cluster AEFIs

Limitations

- Some reports were only found based on the geographic location from where the search was performed
- Cannot examine entire social networks
- Limited to the information provided in the report
- Limited by search phrases, including English-only reports

Conclusions

- Social media and the web have proven to be a useful resource for identifying reports of cluster anxiety-related AEFIs not found in traditional peer-reviewed journals
- Solely relying upon reviewing the published literature may seriously underestimate the occurrence of such cluster events
- Data may be useful in developing guidance for immunization programs in preventing these events and mitigating their potential negative impact on vaccination campaigns, vaccine schedules and national vaccine strategies

Conclusions

- Public health agencies must be alert to the sentiment and tone of discussions in online forums
- Be prepared to respond effectively and rapidly to prevent or mitigate the spread of misinformation that might damage public trust and confidence in vaccines
- Google vs. Facebook



Cluster anxiety-related adverse events following immunization (AEFI): An assessment of reports detected in social media and those identified using an online search engine

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Thank You

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