Understanding stakeholder perspectives about a fentanyl vaccine and the need for precision vaccine promotion

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Background

Fatal overdoses have soared during the COVID-19 pandemic, with more than 100,000 overdose deaths (OD) from 2020-2021,1 and fentanyl overdose has become the leading cause of death for US adults ages 18-45 years.² Efforts to address the overdose crisis have been complicated by the pandemic's effect on public health and healthcare systems. Rising OD mortality indicates new efforts to reduce overdose are needed, to complement existing controls.

Objectives

A vaccine that blocks fentanyl from reaching the brain to prevent overdose death is under development³ and insight is needed into its implementation.

Methods

Using a semi-structured interview guide, participants were asked about their attitudes toward use of a fentanyl vaccine to prevent overdose mortality.

Participant Selection: Participants (≥15 years) were recruited from the community ("controls") and an adolescent substance use clinic ("cases"). Participants included individuals with OUD, parents of people with OUD, community stakeholders, and the general public.

Data Collection: 60–90-minute interviews were conducted in English by trained researchers. With participant consent, interviews were recorded and transcribed using a HIPAA-compliant service. The interview involved open-ended questions, non-judgmental probes, and brief, standardized explanations about vaccines, the opioid epidemic, and a potential vaccine to prevent fentanyl overdose.

Data Analysis: Members of the study team (ERW, LB, SP, RC) created a coding framework, coded interview data using NVivo software, and identified major themes. Working within and across transcripts, textual responses were grouped into themes and subthemes. All coding was done by two analysts working independently and compared, differences resolved by discussion. Identifiers were removed from study data, quoted data are annotated with gender and age in years.

Results

Table 1. Sample characteristics

	Total	(%)	Casea	(%)	Communityb	(%)
N	65		12	(18.4)	53	(81.5)
Biological Sex						
Male	19	(29.2)	9	(75.0)	10	(18.9)
Female ^c	46	(70.8)	3	(25.0)	43	(81.1)
Gender						
Male	20	(30.8)	9	(75.0)	11	(20.8)
Female	43	(66.2)	2	(16.7)	41	(77.4)
Non-Binary	2	(3.1)	1	(8.3)	1	(1.9)
Age in Years						
Mean (SD)	32.7	(14.8)	20.3	(3.7)	33.3	(15.3)
15-24	30	(46.2)	11	(91.7)	19	(35.8)
25-34	15	(23.1)	1	(8.3)	14	(26.4)
35-44	6	(9.2)	0	(0)	6	(11.3)
45+	14	(21.5)	0	(O)	14	(26.4)
Recruitment Source						
Substance use and addiction program	20	(30.8)	12	(100)	8 ^d	(15.1)
Professional contact	11	(16.9)	0	(O)	10	(20.8)
Flyer	9	(13.8)	0	(O)	9	(17.0)
Facebook	13	(20.0)	0	(O)	13	(24.5)
Direct email to organization	2	(3.1)	0	(0)	2	(3.8)
Other BCH studies	10	(15.4)	0	(0)	10	(18.9)
Medical Exposure to Opioids	14	(21.5)	3	(25.0)	11	(20.8)
Friend/Family with OUD or OD	34	(52.3)	8	(66.7)	26	(49.1)

^aDiagnosed with an Opioid Use Disorder (OUD).

dParent, grandparent, or sibling of person with OUD.

Figure 1. Opioid vaccine misconceptions

Some participants expressed concerns about the vaccine that reflected either confusion or low science literacy about immunology and how vaccines work (see exemplary quotes). Other concerns stemmed from perceived tensions between participants' understanding of addiction and treatment and how an overdose-preventing vaccine might fit into that model

Low Science Literacy

Understanding of immunization and disease

The vaccine will prevent addiction

"I think that an opioid vaccine

would be great because it

really kind of targets the

problem at its source...whereas

[harm reduction services] help

individuals who have already

gotten addicted...Whereas an

opioid vaccine would sort of

prevent overdoses from even

happening."

(Male, 21, Control)

The vaccine will cure or treat OUD

"Well, it seems how everyone's

been hearing about the opioid

epidemic, I'd be selling [the

fentanyl vaccine] as the cure,

you know?"

(Female, 25, Case)

"I feel like it would pretty much be the same thing [as Narcan], like they just feel like they're protected, they could get away with using, that there's this medicine that'll keep them from overdosing."

The vaccine is an

emergency rescue

medication

(Male, 22, Case)

"I'm not very familiar with the biological basis of it all. So, when you say that [the fentanyl] gets too large to enter the brain... does [fentanyl] then just leave the system or does it continue to build up in the body? It sounds like damage to the brain."

The vaccine may cause

severe adverse effects

Understanding of vaccine mechanism

(Female, 22, Control)

Disease model

Social determinants model

Concern that resources spent on

vaccines are not available for

societal or structural change that

would more effectively combat OUD

Concern that vaccination is incompatible with medical treatment for OUD

"You should think before you give [the fentanyl vaccine] to [individual with OUD] if he's on any meds or if anything in his body right now could be affected with a mix of the fentanyl vaccine...You should find out to see if the fentanyl vaccine could impact them because of the other meds in their body or

(Female, 17, Case)

whatever else in their body."

"I feel like [the fentanyl vaccine] would make it easier for me to go back to using again. If I didn't have to worry about dying from an accidental overdose from something being laced. In a way it kind of gets rid of that barrier... because I don't want to do something that's laced."

(Male, 18, Case)

"Addiction is a societal problem... we just need to support people to be healthier if we want to stop addiction, like, we need better support for housing and education and social supports and just a healthier society in general, more support."

(Female, 32, Control)

Figure 2. Need to integrate a vaccine into a comprehensive strategy to address addiction and overdose

Participants emphasized the importance of a layered interdisciplinary approach that engages diverse stakeholders and employs tailored and targeted promotion.



Discussion

Attending to the complexity of attitudes and beliefs is central to the success of introducing a novel strategy, i.e., vaccine, to address behavioral health disorders. The models of addiction and treatment are not value-neutral, and the ultimate acceptability of a vaccine will hinge, in part, on responding and being sensitive to diverse points of view and assumptions about addiction treatment and people who use drugs.

Advancing a fentanyl vaccine will require speaking to existing beliefs about immunology, vaccinology, and addiction. Indications of important gaps in knowledge are going to impact the ultimate rollout, and a health education strategy will need to be developed that effectively addresses misconceptions, gaps, and responds to concerns.

Implications and Limitations

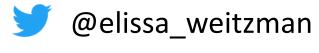
Advancing a fentanyl vaccine to prevent OD will require attention to a broad range of assumptions, beliefs, and implementation factors. A successful vaccine strategy will build from understanding these factors and taking a "precision" health promotion approach.

This exploratory study was undertaken on an opt-in sample, with limited geographic diversity.

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Potential Barriers to Vaccine Uptake Based on Models of Addiction and Treatment

Moral or choice-based model

Concern that vaccination encourages further substance use

^bStakeholder community cohort

^c1 person missing biological sex indicated that their gender was female. Their biological sex has been classified as female.