

# *Vaccine Beliefs of Complementary and Alternative Medical Providers in Oregon—Preliminary Findings*

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# Overview

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- **Vaccines** save millions of lives a year
- Oregon parental **exemptions** ↑
- **Vaccine-opposing populations** → outbreaks of vaccine-preventable diseases (VPDs)
- Health care providers (HCPs) seen as **trustworthy**

(e.g., Baker et al., 2007; Gangarosa et al., 1998; Kennedy et al., Omer et al., 2008, Atwater et al., 2013—in press)

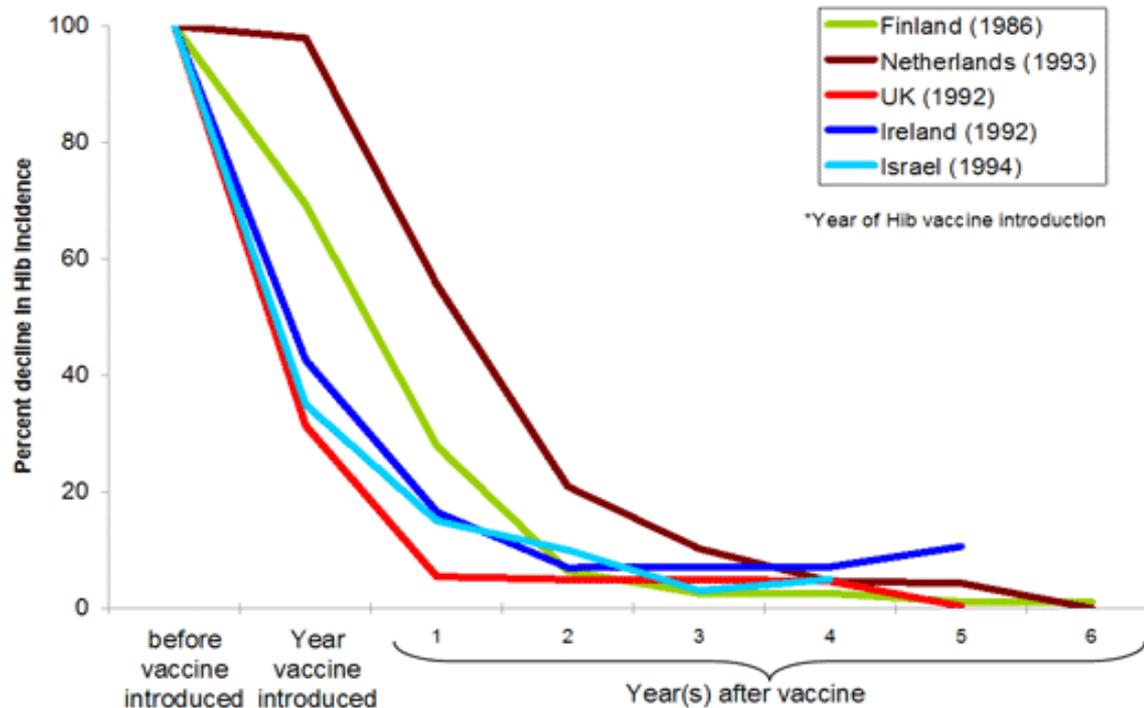
# Vaccines Save Lives

- **Smallpox**—30% mortality rate
- ***H.influenza B***—before vaccine, 386,000 deaths worldwide
- **Polio**—U.S. 1952, 21,000 infected; 2012, **0 persons** infected—disease eradication achieved, nearly extinct
- **Malaria** vaccine possible, but still challenging. kills 1M each year. Every minute, a child dies from malaria.



# Importance—Hib

386,000 deaths before the vaccine was introduced



(+)Hib is the leading cause of bacterial meningitis, a disease with very high mortality.

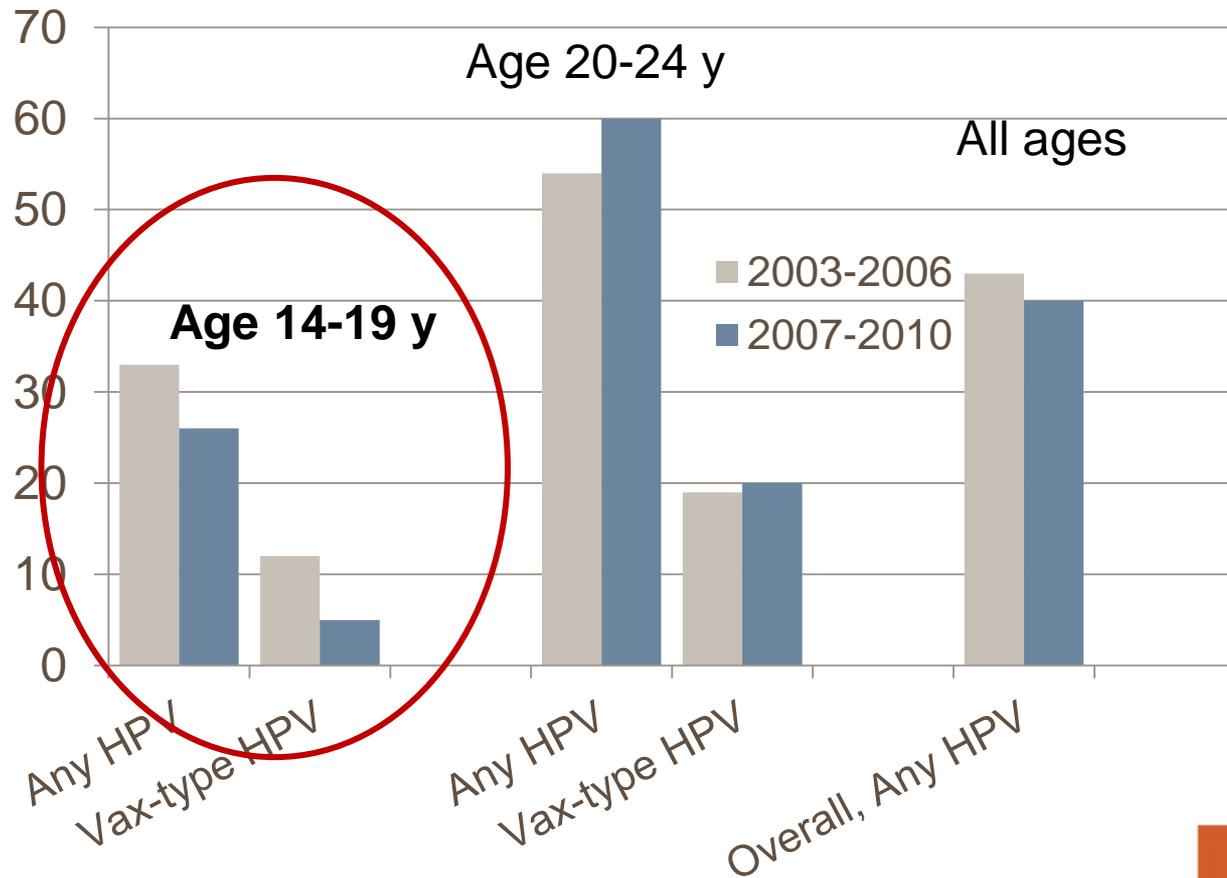
(\*) Year country introduced Hib vaccine

(Source: European Union-IBIS)

Source: World Health Organization, [http://www.euro.who.int/vaccine/20081217\\_11](http://www.euro.who.int/vaccine/20081217_11)

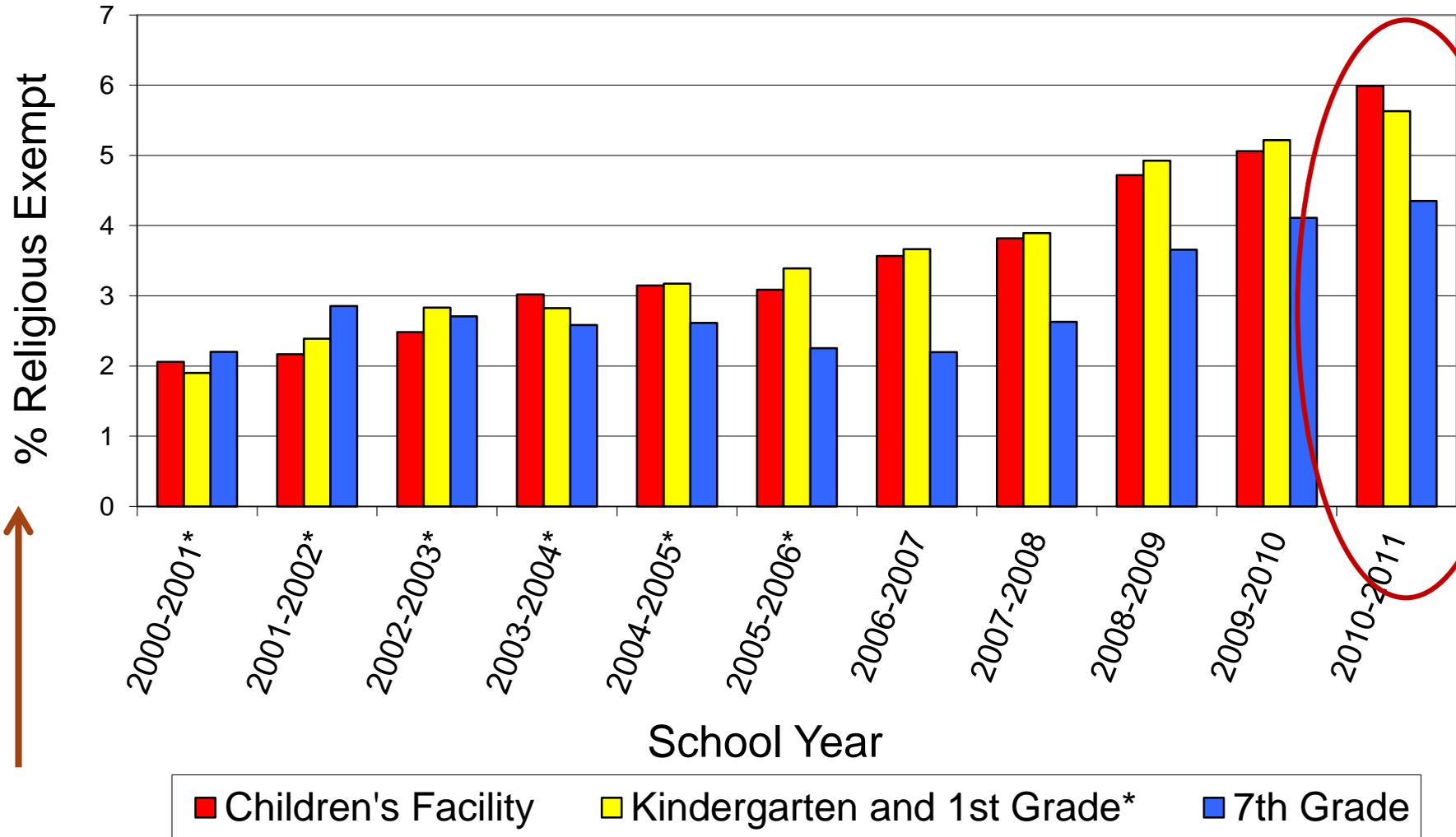
# Importance—HPV in females

## % prevalence HPV change pre-vax to post-vax



(Markowitz, et al., 2013)

# Oregon Religious Exemption Rates 2000 - 2011



# Role of HCPs

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- **Parents trust** HCPs, who **influence** health decisions.
- **HCPs** → whether a parent will agree to vaccinate her children
- **The public** is increasingly turning to complementary and alternative medical (CAM) providers, who are **less likely** to recommend vaccination

(Downey et al., 2010; Gust et al., 2009, Kennedy et al., 2011; Lee et al., 2005; Moseley et al., 2001; Tindle et al., 2005)

# CAM Providers

- CAM providers influence vaccine decisions
- CAM modalities are popular in Oregon—**14% higher** than U.S. average
- E.g., in Oregon, **midwife-attended births** 
  - 9% in 1990 to **16% in 2009**, up 89%
  - Top 10 percent of states w/midwife-attended vaginal births.

# Background

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- **CAM providers are more likely** than allopathic practitioners to oppose vaccination (e.g., Downey et al., 2010)
- They are likely to **doubt** vaccine benefit or efficacy (e.g., Abhyankar et al., 2008)
- Many believe **vaccines cause illness** (e.g., Busse et al., 2005)
- Prefer **infection-driven** immunity—“natural is best” (e.g., Russell et al., 2004)
- Many **distrust** government agencies and scientific research (e.g. Salmon et al., 2005)

# CAM Provider Beliefs

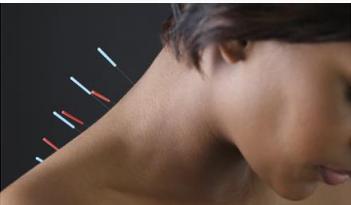
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- Questions :
  - Do CAM **personal and professional beliefs** affect their vaccination views and recommendations?
  - Do CAM **views about the immune system** affect their vaccination views and recommendations?



# CAM populations studied (NCCAM domains/modalities)



- Alternative medical system: **Homeopathy**
- AMS, natural-product based: **Naturopathy**
- Manipulative, body based: **Chiropractic**
- AMS, energy-based: **Acupuncture**
- Evolutionary biologically adaptive, ancient practice: **Midwifery**



# *The Rise of Vaccine Opposition*

- Vaccine resistance in **Oregon**
- **Factors** in opposition
- Mainstream medical (MM) providers
- CAM providers

# Vaccine Avoidance

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- **Outbreaks** of pertussis and measles are linked to low vaccination rates, decline in efficacy over time, vaccine avoidance
- **Pertussis** is a scary disease for parents; it lasts for months, can be fatal, and is **preventable!** It is also underdiagnosed
- Here's what whooping cough **sounds like**—

<http://www.youtube.com/watch?v=TIV460AQUWk>



# Herd Immunity

Importance of the 6%

## Estimated Herd Immunity Thresholds for Seven Vaccine-preventable Diseases

Disease	Transmission	$R_0$	Herd immunity threshold
<u>Diphtheria</u>	Saliva	6-7	85%
<u>Measles</u>	Airborne	12-18	83 - 94%
<u>Mumps</u>	Airborne droplet	4-7	75 - 86%
<u>Pertussis</u>	Airborne droplet	12-17	92 - 94%
<u>Polio</u>	Fecal-oral route	5-7	80 - 86%
<u>Rubella</u>	Airborne droplet	5-7	80 - 85%
<u>Smallpox</u>	Social contact	6-7	83 - 85%

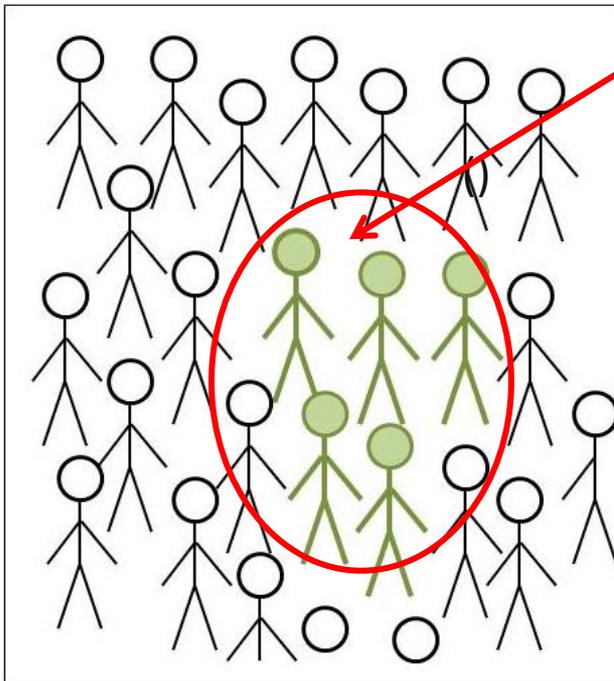
$R_0$  is the basic reproduction number, or the average number of secondary infectious cases produced by a single index case in completely susceptible population.

[Table modified from *Epid Rev* 1993;15: 265-302, *Am J Prev Med* 2001; 20 (4S): 88-153, *MMWR* 2000; 49 (SS-9); 27-38.]

# Herd Immunity Erosion

- An **un-immune cluster** can dramatically increase the probability of disease outbreak

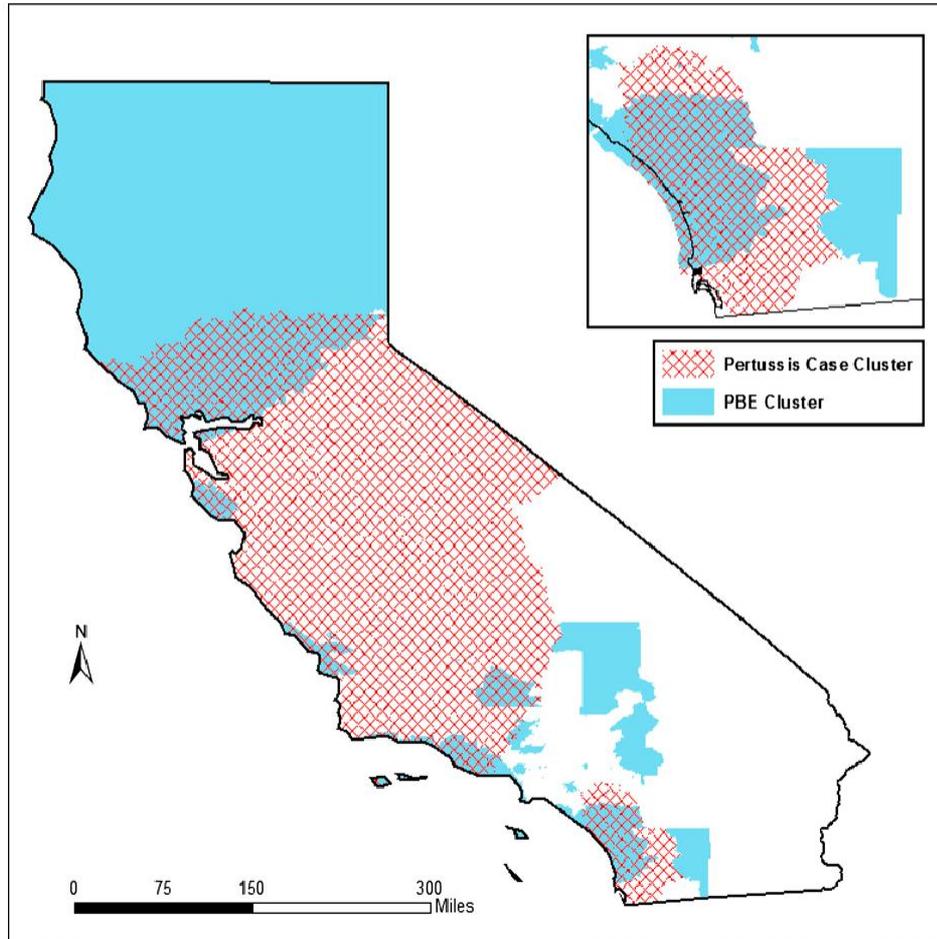
c. Un-immune cluster



In fact, **opinion or belief clusters** can result in clusters of unvaccinated persons

(See May and Silverman, 2003; Salathé and Bonhoeffer, 2008, also Atwater et al. , 2013)

# Herd Immunity Erosion



**FIGURE 1**

Relative locations of pertussis space-time clusters and personal beliefs exemption (PBE) clusters from 2005–2006 to 2009–2010. The inset in the top right corner shows the relative locations of pertussis space-time clusters and PBE spatial clusters in San Diego County.

Researchers reporting in the journal *Pediatrics* looked at non-medical exemptions (NMEs) for children entering kindergarten in California 2005 – 2010 and pertussis cases with onset in 2010. Census tracts within an **exemption cluster were 2.5 times more likely to be in a pertussis cluster** (OR = 2.47, 95% CE: 2.22-2.75)

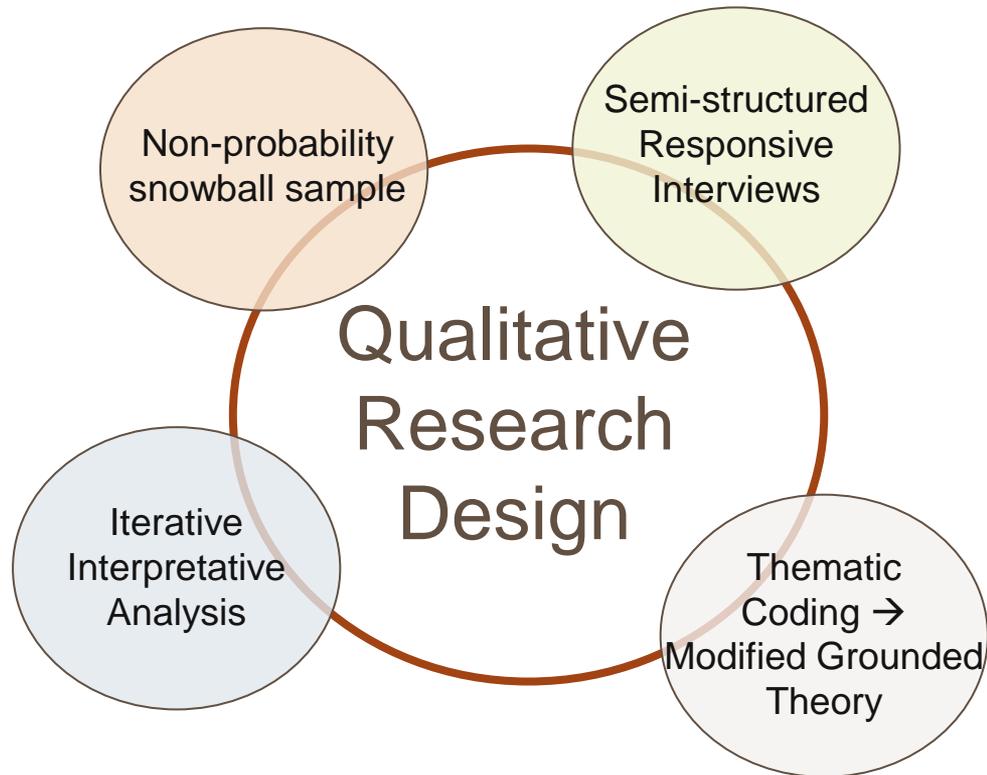
# *Dissertation Research Significance*

- Innovation
- CAM modalities for this study



Photo courtesy © U.S Baha'i Media Bank

# Qualitative Research Design



# Study Innovation

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- No similar study of **5 CAM provider** populations
- **Provides new insights** into the influences on CAM career choices, vaccine beliefs, norms, and decision-making.

# CAM Participants

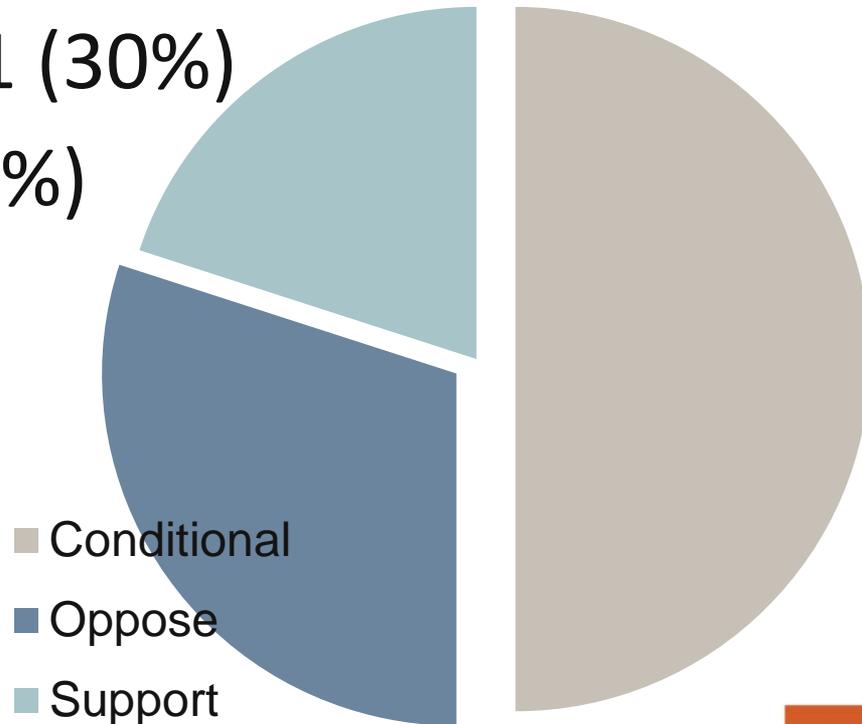
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- 36 participants—some dual modalities
  - 11 naturopaths
  - 10 acupuncturists
  - 8 chiropractors
  - 6 homeopaths
  - 7 midwives

# CAM Participants

- Vaccine position
  - Conditional support: 18 (50%)
  - Opposition: 11 (30%)
  - Support: 7 (20%)





# Research Questions

- **Why** are CAM providers likely to **doubt** vaccine benefit or efficacy?
- **Why** do CAM providers believe **vaccines cause illness?**
- **Why** do these providers prefer **infection-driven** immunity, when it can be so risky?
- **Why** do so many CAM providers **distrust** government agencies and scientific research ?

# Themes

- Immunology beliefs
- Personal experience
- Professional group norms
- Belief that profit motive drives vaccine promotion, collusion between gov't agencies and Big Pharma



# Group Norms: Naturopathy

- Official position is that “Safer, more effective vaccinations should be developed”<sup>1</sup>
- Emphasizes parental informed consent (i.e., consent to accept supposed vaccine risks and dangers)

<sup>1</sup>American Association of Naturopathic Physicians, 1991



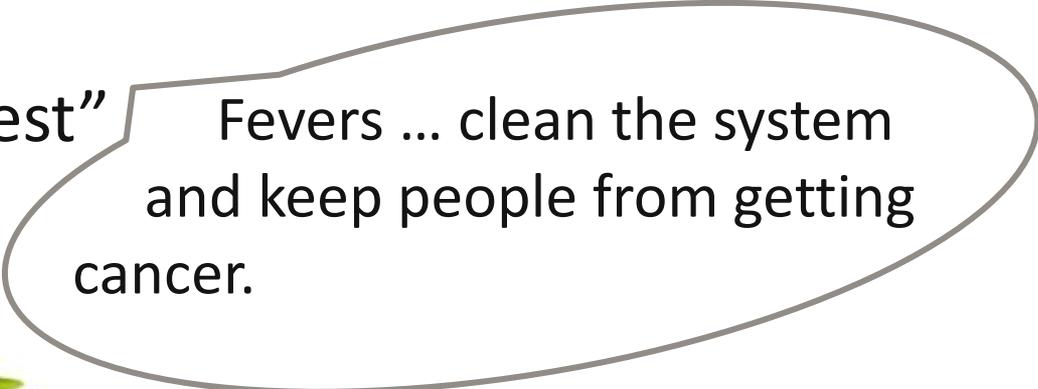


# Group Norms: Naturopathy

- Naturopathic Doctors (NDs) consider themselves **more humane** than mainstream medical (MM) doctors
- “Natural is best”



# Immunology Beliefs: Naturopathy

- Naturopathic Doctors (NDs) consider themselves **more humane** than mainstream medical (MM) doctors
- “Natural is best”  Fevers ... clean the system and keep people from getting cancer.



# Immunology Beliefs: Naturopathy

- Naturopathic Doctors (NDs) consider themselves **more humane** than mainstream medical (MM) doctors

- “Natural is best”

The body has an inherent ability to heal, so the physicians' role is to try understand obstacles to healing and ... remove what's stopping the body from doing what it's wanting to do.





# Naturopathy

- **No naturopath supported vaccination.** Most recommended a delayed schedule, and several mistakenly believed that vaccines compromise the infant's immune system.





# Naturopathy

- **No naturopath supported vaccination.** Most recommended a delayed schedule, and several mistakenly believed that vaccines **compromise the infant's immune system.** (Hold that thought)





# Group Norms: Chiropractic

- Strong influence from peers who oppose vaccines and from CE course content that questions vaccines or emphasizes risks over benefits

In the company I keep... there are plenty of individuals that are extremely active in fighting the concept of vaccination.





# Group Norms: Chiropractic

- Strong influence from peers who oppose vaccines and from CE course content that questions vaccines or emphasizes risks over benefits

[We were] taught that the vaccines are completely legitimate and helpful. It was *afterwards* that I started reading about... the relationship between **vaccines and autism.**





# Group Norms: Midwifery

- Foundational trust that a mother can give birth without technology, and often at home (i.e., Certified Professional MWs and Direct-entry MWs)
- “Natural is best”





# Personal Experience: Midwifery

- Vaccine beliefs vary from support to opposition

Everybody else that I know of has followed ... an alternate vaccine schedule – I think **I'm kind of out there by myself on [opposing vaccines]**. Most all [midwives I know] have vaccinated their kids and I look at them and go – have you noticed that your child's health hasn't been as good since you've been doing that?



# Personal Experience: Midwifery

- Vaccine beliefs vary from support to opposition

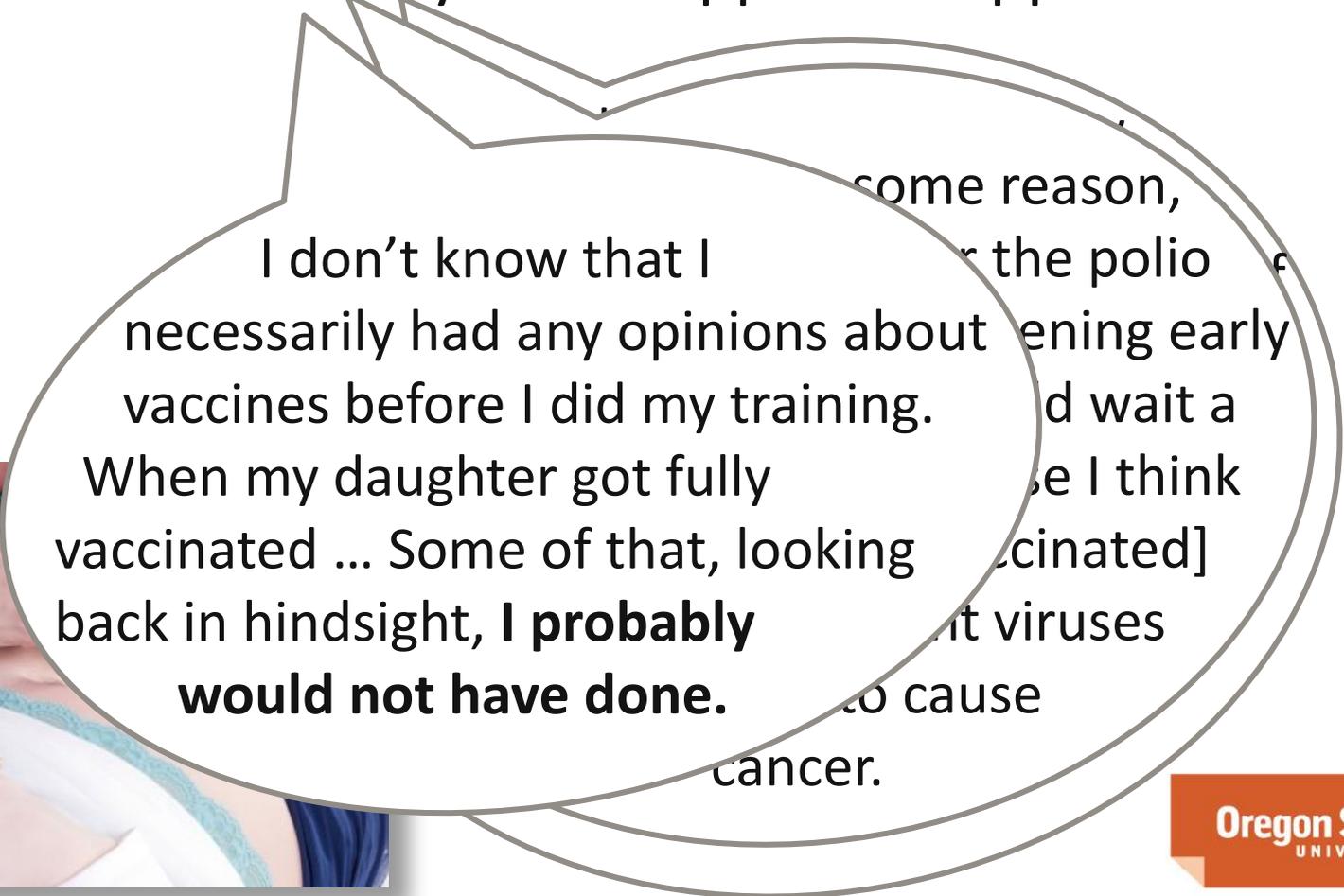
My mother, for some reason, didn't sign me up for the polio experiment that was happening early on. She thought that it could wait a while. And I'm glad, because I think those folks [who were vaccinated] got some **contaminant viruses that are shown to cause cancer.**





# Group Norms: Midwifery

- Vaccine beliefs vary from support to opposition



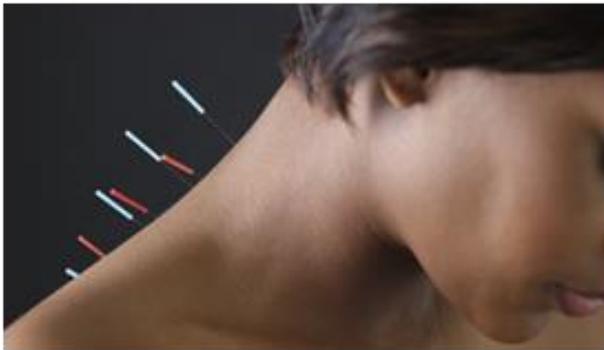
... some reason,  
I don't know that I ... for the polio ...  
necessarily had any opinions about ... ening early  
vaccines before I did my training. ... d wait a  
When my daughter got fully ... se I think  
vaccinated ... Some of that, looking ... cinated]  
back in hindsight, **I probably** ... it viruses  
**would not have done.** ... to cause  
cancer.





# Immunology Beliefs: Acupuncture

- “If it’s old, it must be better” —Chinese medicine vs. modern, mainstream medicine
- Vaccines act like a **pathogen in the body**, diminish the body’s natural energy (zero-sum, only so much energy; it can be depleted)





# Group Norms: Acupuncture

- “If it’s old, it must be better”

I heard [an acupuncturist] say, “In Western medicine they poison people with their drugs and they cut them with their surgeries, and they burn them with chemotherapy.” And I remember thinking, “Well, we stick needles in them, give them herbs, and ... burn them with moxa.”



# Immunology Beliefs: Acupuncture

- Vaccines deplete the body's core energy, or *wei qi*.

... the majority of people that I trained with were against vaccination, because they feel that it can have a negative effect on the [body], that it's unnecessary, and it's actually good for our body to fight pathogens that we're exposed to.





# Immunology Beliefs: Homeopathy

- All **disease is innate**, we need to express disease, not “fight” it
- Tailor treatment to the person





# Profit Motive: Homeopathy

- Profit drives U.S. health care; homeopathic remedies are inexpensive

Come fall, get your flu vaccine...  
25 bucks right here. ... That amount  
[of influenza pathogen] that's in one shot  
... could serve all of those people if it  
were prepared homeopathically.





# Profit Motive: Homeopathy

- Profit drives U.S. health care; homeopathic remedies are inex

Pharmaceutical companies ... have one legal obligation. It's not to cure disease. It's not to heal patients. Their one legal obligation as a corporation is to make money.

We

7.





# Discussion

“Some people have wondered whether combination vaccines might overwhelm or weaken a child’s immune system, but the immune system contains billions of circulating B and T cells capable of responding to millions of different antigens at once. Because the body constantly replenishes these cells, a healthy immune system cannot be ‘used up’ or weakened by a vaccine. According to one published estimate, infants could easily handle 10,000 vaccines at once.”

National Institute of Allergy and Infectious Diseases (Ed.). (2008). *Understanding vaccines: What they are, how they work*. Washington, D.C.: National Institutes of Health, U.S. Department of Health and Human Services., p. 32



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# Discussion

- **Understanding CAM worldviews** opens the door to beginning a dialogue → possible CAM behavior change
- **The Homeopathy-Vaccine** analogy as a persuasive model
- How do we overcome both **false dichotomies** (us vs. them) and **false equivalence** (“both sides of the vaccine argument”)

**Thank you**

Thank you

Thank you



# *Questions or comments?*



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# Health Belief Model

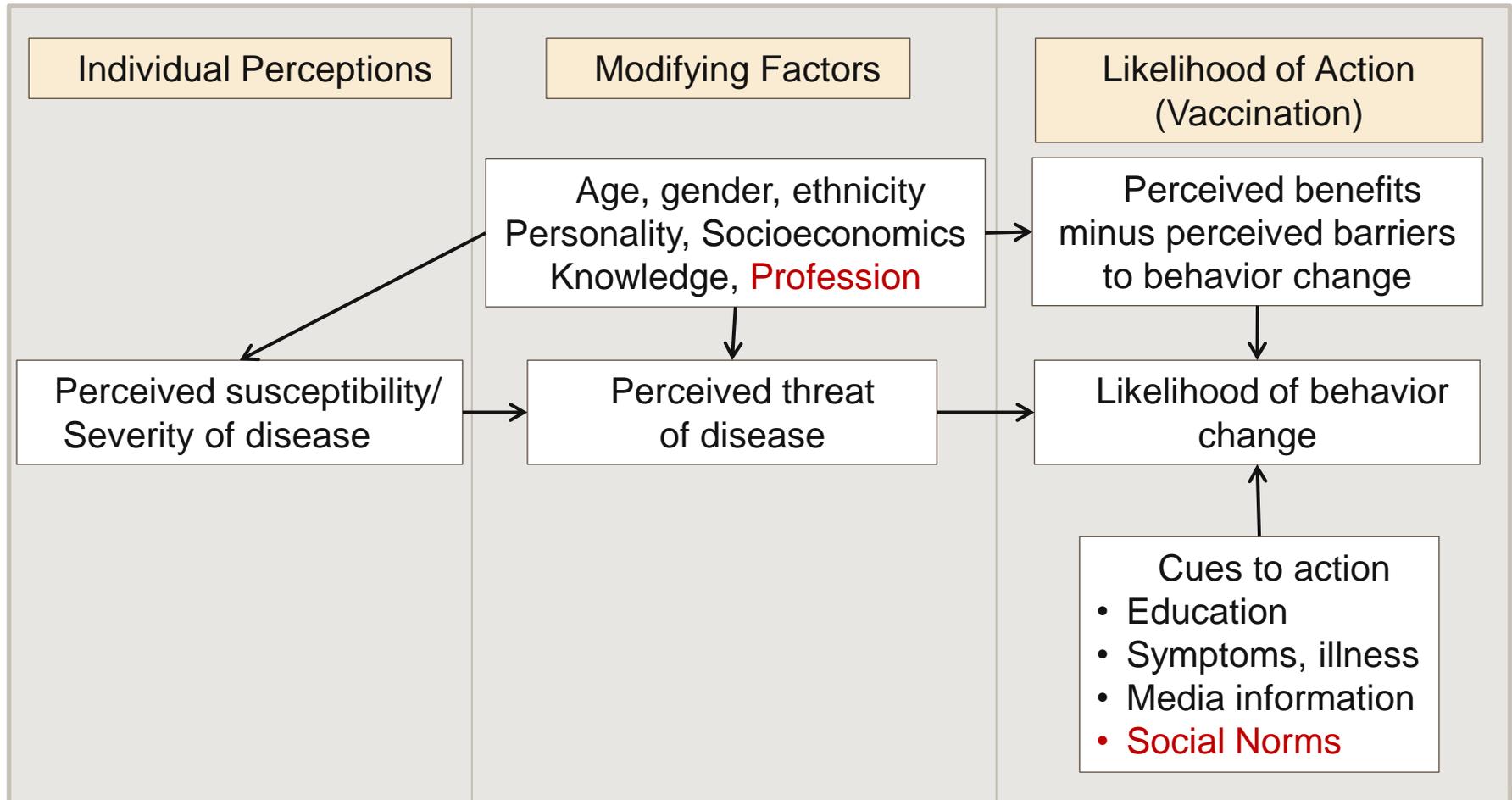
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- Three positional categories
  - Vaccine **support** (MM-trained providers)
  - **Conditional** vaccine support (support some vaccines, delay all vaccines)
  - Vaccine **opposition** (no vaccines; exceptions: sometimes *IPV vax*, almost always *tetanus vax*)
- Based on perceptions:
  - Vaccine **benefits** → reduces VPD severity
  - Vaccine **risks** (illness, disability, death)
  - Vaccine **efficacy** → reduces disease susceptibility

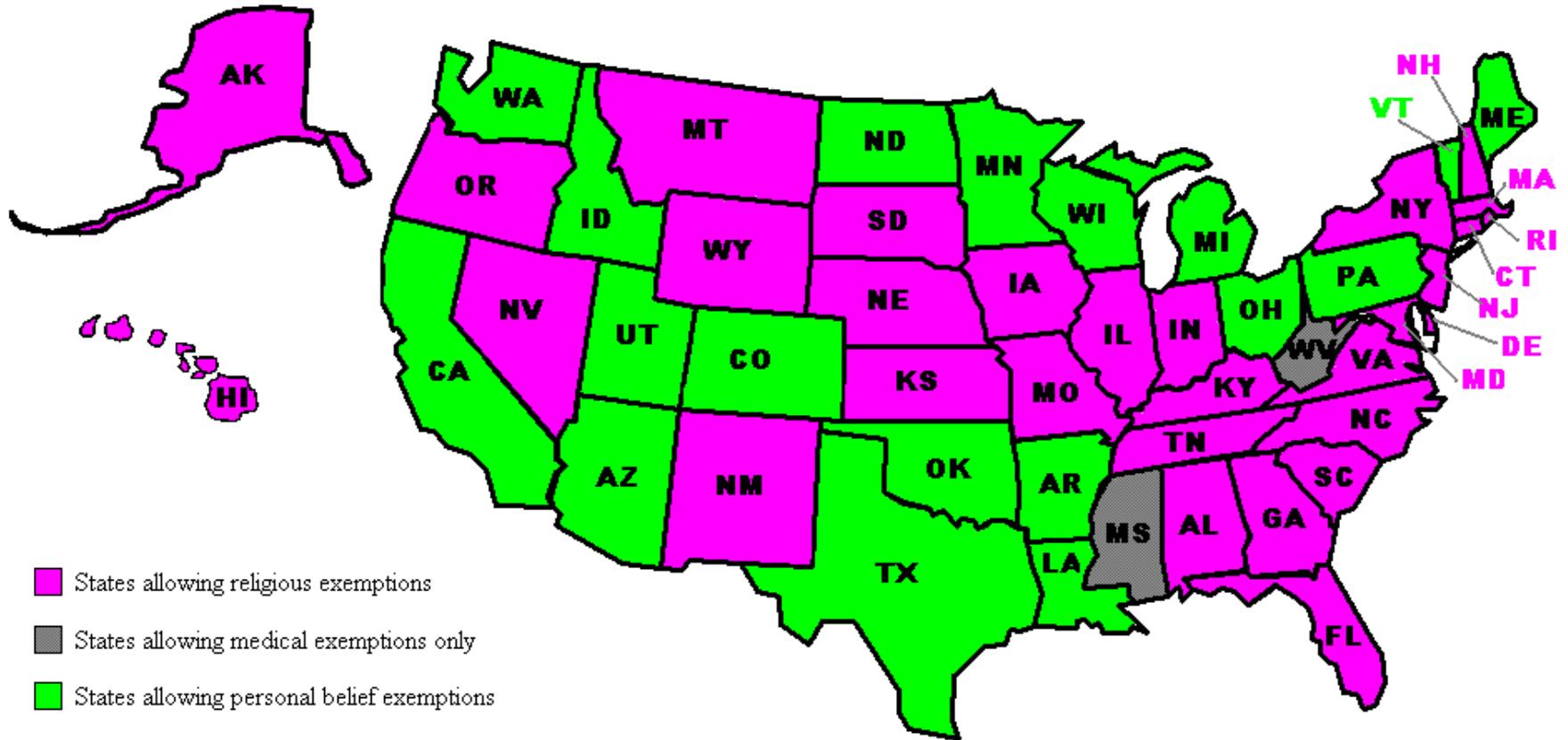
# Health Belief Model

## Components and Linkages



Model adapted from Strecher & Rosenstock (1997), The health belief model, in Glanz, Lewis, Rimer, *Health Behavior and Health Education*, 2 ed, p. 48

# U.S. Religious Exemptions



- States allowing religious exemptions
- States allowing medical exemptions only
- States allowing personal belief exemptions

# U.S. Vaccine Exemptions 2009–2010

Morbidity and Mortality Weekly Report

TABLE 3. Number and percentage of children enrolled in kindergarten who had a reported exemption\* to vaccination, by type of exemption and state/area — United States, 2009–10 school year

State/Area	Medical exemptions		Nonmedical exemptions				Total exemptions	
	No.	(%)	Religious	Philosophical	Total	(%)	No.	(%)
Alabama	91	(0.1)	282	—†	282	(0.4)	373	(0.5)
Alaska	161	(1.7)	369	—†	369	(3.8)	530	(5.5)
Arizona	185	(0.2)	—§	2,479	2,479	(2.8)	2,665	(3.0)
Arkansas	28	(0.1)	33	132	165	(0.5)	193	(0.6)
California	998	(0.2)	—§	10,280	10,280	(2.0)	11,278	(2.2)
Colorado	NA	NA	NA	NA	NA	NA	NA	NA
Connecticut	108	(0.2)	387	—†	387	(0.8)	495	(1.1)
Delaware	22	(0.2)	65	—†	65	(0.6)	87	(0.8)
District of Columbia	46	(0.8)	20	—†	20	(0.3)	66	(1.1)
Florida	697	(0.3)	2,100	—†	2,100	(1.0)	2,797	(1.3)
Georgia	87	(0.1)	1,478	—†	1,478	(1.0)	1,565	(1.1)
Hawaii	16	(0.1)	645	—†	645	(3.5)	660	(3.6)
Idaho	66	(0.3)	68	726	794	(3.5)	860	(3.8)
Illinois	1,526	(0.9)	5,629	—†	5,629	(3.4)	7,155	(4.3)
Indiana	236	(0.3)	674	—†	674	(0.8)	909	(1.1)
Iowa	218	(0.5)	359	—†	359	(0.8)	577	(1.4)
Kansas	89	(0.2)	304	—†	304	(0.8)	393	(1.0)
Kentucky	170	(0.3)	193	—†	193	(0.3)	363	(0.6)
Louisiana	151	(0.3)	32	228	260	(0.5)	411	(0.8)
Maine	48	(0.3)	11	412	423	(3.0)	470	(3.3)
Maryland	236	(0.3)	393	—†	393	(0.5)	629	(0.8)
Massachusetts	298	(0.4)	538	—†	538	(0.7)	836	(1.1)
Michigan	858	(0.7)	751	4,121	4,872	(3.8)	5,730	(4.4)
Minnesota	NA	NA	NA	NA	NA	NA	NA	NA
Mississippi	12	(0.0)	—§	—†	—	(0.0)	12	(0.0)
Missouri	198	(0.3)	626	—†	626	(0.8)	823	(1.1)
Montana	118	(1.0)	262	—†	262	(2.2)	380	(3.1)
Nebraska	274	(1.0)	802	—†	802	(2.8)	1,076	(3.8)
Nevada	357	(1.0)	357	—†	357	(1.0)	714	(2.0)
New Hampshire	NA	NA	NA	NA	NA	NA	NA	NA
New Jersey	167	(0.1)	905	—†	905	(0.8)	1,072	(1.0)
New Mexico	—¶	—¶	183	—†	183	(0.7)	183	(0.7)
New York State	309	(0.1)	1,117	—†	1,117	(0.5)	1,426	(0.6)
North Carolina	158	(0.1)	756	—†	756	(0.7)	914	(0.8)
North Dakota	—¶	—¶	17	50	67	(0.8)	67	(0.8)
Ohio	284	(0.2)	—**	1,515	1,515	(1.2)	1,799	(1.4)
Oklahoma	119	(0.2)	137	319	456	(0.9)	575	(1.1)
Oregon	86	(0.2)	2,330	—†	2,330	(5.2)	2,416	(5.4)
Pennsylvania	1,777	(1.2)	—**	2,924	2,924	(2.0)	4,701	(3.1)
Rhode Island	34	(0.3)	26	—†	26	(0.2)	60	(0.5)
South Carolina	147	(0.3)	303	—†	303	(0.6)	450	(0.8)
South Dakota	38	(0.3)	83	—†	83	(0.7)	121	(1.1)
Tennessee	—¶	—¶	421	—†	421	(0.5)	421	(0.5)
Texas	2,330	(0.6)	—**	2,904	2,904	(0.8)	5,234	(1.4)
Utah	89	(0.2)	22	1,793	1,815	(3.6)	1,904	(3.8)
Vermont	35	(0.5)	13	341	354	(5.3)	389	(5.8)
Virginia	159	(0.2)	751	—†	751	(0.7)	911	(0.9)
Washington	331	(0.4)	168	4,515	4,684	(5.7)	5,015	(6.2)
West Virginia	303	(1.3)	—§	—†	—	(0.0)	303	(1.3)
Wisconsin	391	(0.6)	87	1,782	1,868	(3.1)	2,260	(3.7)
Wyoming	NA	NA	NA	NA	NA	NA	NA	NA

Abbreviation: NA = not available.

\* Exemption status might not be mutually exclusive of vaccination status. Children with an exemption who did not receive any vaccinations are indistinguishable from those with an exemption and also up-to-date for a given vaccination.

† Exemptions for philosophical reasons are not allowed.

§ Exemptions for religious reasons are not allowed.

¶ Exemptions for medical reasons are allowed but were not reported.

\*\* Exemptions for religious reasons are allowed but are not reported separately from exemptions for philosophical reasons.

# U.S. Vaccine Exemptions 2009-2010

State	2009 No.	2009 (%)	2010 No.	2010 (%)	2009 No.	2009 (%)	2010 No.	2010 (%)
Iowa	218	(0.3)	355	—†	355	(0.8)	377	(1.1)
Kansas	89	(0.2)	304	—†	304	(0.8)	393	(1.0)
Kentucky	170	(0.3)	193	—†	193	(0.3)	363	(0.6)
Louisiana	151	(0.3)	32	228	260	(0.5)	411	(0.8)
Maine	48	(0.3)	11	412	22	(3.0)	470	(3.3)
Maryland	235	(0.3)	393	—†	93	(0.5)	629	(0.8)
Massachusetts	298	(0.4)	538	—†	538	(0.7)	836	(1.1)
Michigan	858	(0.7)	751	4,121	4,872	(3.8)	5,730	(4.4)
Minnesota	NA							
Mississippi	12	(0.0)	—§	—†	—	(0.0)	12	(0.0)
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Montana	118	(1.0)	262	—†	262	(2.2)	380	(3.1)
Nebraska	274	(1.0)	802	—†	802	(2.8)	1,076	(3.8)
Nevada	357	(1.0)	357	—†	357	(1.0)	714	(2.0)
New Hampshire	NA							
New Jersey	167	(0.1)	905	—†	905	(0.8)	1,072	(1.0)
New Mexico	—¶	—¶	183	—†	183	(0.7)	183	(0.7)
New York State	906	(0.1)	1,117	—†	1,117	(0.5)	1,426	(0.6)
North Carolina	188	(0.1)	156	—†	756	(0.8)	814	(0.8)
North Dakota	—¶	—¶	17	50	67	(0.8)	67	(0.8)
Ohio	284	(0.2)	—**	1,515	1,515	(1.2)	1,799	(1.4)
Oklahoma	119	(0.2)	137	319	456	(0.9)	575	(1.1)
Oregon	86	(0.2)	2,330	—†	2,330	(5.2)	2,416	(5.4)
Pennsylvania	1,777	(1.2)	—**	2,924	2,924	(2.0)	4,701	(3.1)
Rhode Island	34	(0.3)	26	—†	26	(0.2)	60	(0.5)
South Carolina	147	(0.3)	303	—†	303	(0.6)	450	(0.8)
South Dakota	38	(0.3)	83	—†	83	(0.7)	121	(1.1)
Tennessee	—¶	—¶	421	—†	421	(0.5)	421	(0.5)
Texas	2,330	(0.6)	—**	2,904	2,904	(0.8)	5,234	(1.4)
Utah	89	(0.2)	22	1,793	1,815	(3.6)	1,904	(3.8)
Vermont	35	(0.5)	13	341	354	(5.3)	389	(5.8)
Virginia	159	(0.2)	751	—†	751	(0.7)	911	(0.9)
Washington	331	(0.4)	168	4,515	4,684	(5.7)	5,015	(6.2)
West Virginia	303	(1.3)	—§	—†	—	(0.0)	303	(1.3)
Wisconsin	391	(0.6)	87	1,782	1,868	(3.1)	2,260	(3.7)
Wyoming	NA							

	Medical exemptions		Nonmedical exemptions			Total exemption	
	No.	(%)	Religious	Philosophical	Total	(%)	No.

**Abbreviation:** NA = not available.  
 \* Exemption status might not be mutually exclusive of vaccination status. Children with an exemption who did not receive any vaccinations are indistinguishable from those with an exemption and also up-to-date for a given vaccination.  
 † Exemptions for philosophical reasons are not allowed.  
 § Exemptions for religious reasons are not allowed.  
 ¶ Exemptions for medical reasons are allowed but were not reported.  
 \*\* Exemptions for religious reasons are allowed but are not reported separately from exemptions for philosophical reasons.

# Direct-Entry Midwives Illegal





“**Combination vaccines** reduce visits to the doctor, saving time and money and sparing children extra needlesticks. Without combination vaccines, parents would have to bring their children in for each vaccination and all its boosters, and the chances would be greater that kids would miss their shots. Missed shots put children, as well as their communities, at risk.

“Some people have wondered whether combination vaccines might overwhelm or weaken a child’s immune system, but the immune system contains billions of circulating B and T cells capable of responding to millions of different antigens at once. Because the body constantly replenishes these cells, a healthy immune system cannot be “used up” or weakened by a vaccine. According to one published estimate, infants could easily handle 10,000 vaccines at once.”

National Institute of Allergy and Infectious Diseases (Ed.). (2008). *Understanding vaccines: What they are, how they work*. Washington, D.C.: National Institutes of Health, U.S. Department of Health and Human Services., p. 32