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Addressing heterogeneous parental concerns about vaccination with a multiple-source model

A parent and educator perspective

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Abbreviations: VRj, vaccine-rejecting; VR, vaccine-resisting; VH, vaccine-hesitant; HCP, health care provider

Previous models of vaccine education have not addressed differences in levels and motives of vaccine concerns in parents. These differences may require changes in education approaches based on type of parental concern. Addressing vaccine concerns will require a multi-modal approach involving more than just a pediatrician or primary health care provider, as well as more than one educational approach.

Addressing Concerns about Vaccination: A Parent and Educator/Advocate Perspective

Although anti-vaccine propaganda and advocacy has existed since Edward Jenner's first experiments with inoculation,[1,2] the modern anti-vaccine movement benefits from technology that allows its adherents to pass false information at unprecedented rates.[3,4] The increased exposure to false information regarding vaccines then combines with natural parental concerns regarding the health of their children, and leads parents to fall victim to well-known psychological biases. Those processes include the confirmation bias (tendency to notice or recall information that confirms pre-existing beliefs), illusory correlation (belief that two variables are related when no such relationship exists) and the power of vivid cases (emotional and dramatic cases are remembered better and given more weight than statistics). The interaction of anti-vaccine misinformation with parental concerns and psychological bias has resulted in an increase of generalized parental anxiety regarding vaccination.[5]

Pediatricians encounter more and more resistance to vaccines as a result of this anxiety[6] and are often under appointment constraints that do not allow sufficient time to adequately alleviate these varied parental concerns.[7] In addition, pediatricians and other heathcare providers (HCPs) may mistakenly share their patient's concerns or have concerns of their own that they have not had time to address adequately. These issues perpetuate the cycle of misinformation and anxiety regarding the science of vaccinations. HCPs may seem to invalidate parents' concerns due to time constraints and thus alienate parents, or they may seem to validate those concerns inappropriately based on provider misinformation. Based on our experiences as vaccine advocates working from a parental and a professional educator perspective, effective strategies to address parental concerns about vaccinations will require a multi-pronged approach that must involve a wider range of educational opportunities than currently used.

Providing appropriate education regarding vaccines must be the work not only of pediatricians but also of nurses and other HCPs, pre-natal educators, public health advocates, media representatives and other societal stakeholders. Due to the nature and structure of the American healthcare system, patients of all kinds are likely to interact far more often with healthcare workers who are not their primary care physicians. Therefore, every healthcare worker should be prepared to serve as a vaccine educator and advocate. A phone call to a nurse practitioner or a consultation with a lactation specialist can all become opportunities for alleviating parents' fears and misconceptions regarding vaccines. In our experiences, some parents have responded better to another parent's experiences and reassurance, while others have appreciated a more academic or scientific explanation of why it is easy to develop fears regarding vaccines when misinformation is presented without statistical context. Receiving consistent and accurate vaccination information from multiple sources would drive home the accurate message that vaccines are safe and save lives. It would also allow HCPs to address different types of vaccine hesitancy using different interventions.

Previous intervention strategies have identified parents as either vaccine accepting or vaccine resistant. However, our experience as vaccine advocates indicates that the vaccine resistance is a heterogeneous category that necessitates a nuanced approach to vaccine education. Instead of "vaccine resistant," we suggest three different categories of parents, each requiring a different educational and/or policy approach.

Types of Vaccine Hesitancy

The first type, which we will call vaccine rejectors (VRj), has been included in previous discussions of vaccine resistance and

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vaccine refusers.[8] However, in our opinion, this type of parent is unyieldingly entrenched in their refusal to consider vaccine information, and including vaccine rejectors in with other categories of vaccine hesitancy does not recognize the unique characteristics of this group, thus decreasing the efficacy of public health education regarding vaccination. VRj parents are adamant in their refusal to consider vaccination for their children, and such rejection may not be based upon previous history of a vaccine-related adverse event, or actual medical contraindication to vaccination, either for themselves or for their children. VRj parents may express beliefs that vaccines cause more harm than good,[9-13] or that vaccines are a plot of a conspiracy involving governments, health organizations and pharmaceutical companies.[14-20] They commonly express beliefs in other conspiracy theories as well.[21] These belief systems indicate a lack of truth in public institutions and "allopathic" medicine. Therefore, VRj parents are more likely to utilize so-called "complementary" or "alternative" medical practices, and are least likely to receive regular care in a pediatrician's office.[22,23] Thus, they are least likely to be open to education on the issue due to their irrational belief systems.

Since VRj parents are least likely to receive care in a pediatrician's office, an educational strategy relying on pediatrician-supplied vaccine information will not be effective for this population. Indeed, because VRj parents are so firmly rooted in their opposition to vaccination, it is probable that any provision of information to this group of parents will be ineffective at reducing their vaccine rejection.[24,25] This is not to say that such information should not be provided at all, but health care providers should recognize the severe limitations of any educational strategy with this particular group. We do not recommend that advocates completely abandon attempts to educate VRj parents, merely that education providers (be they pediatricians, other HCPs or other types of vaccine educators) be aware of this group of parents who likely will not respond to education efforts. While it is possible that vaccine rejectors' concerns could be addressed adequately so that they become accepting of vaccines, their tendency toward maintaining their original rejection beliefs may require intensive intervention that health care providers could better allocate elsewhere.[26] Luckily, studies have shown that the percentage of parents in this group remains extremely low,[27,28] so this group will not be the majority of parents that educators encounter.

Because of health concerns regarding unvaccinated children and their exposure to other children in waiting rooms and healthcare provider offices, many pediatricians have taken to "firing" VRj patients, insisting that those patients find other HCPs.[29-31] Such a policy decision may protect those HCPs' other patients from possible exposure to a vaccine-preventable disease from an unvaccinated child or the unvaccinated child from disease exposure,[32,33] but this may leave children of VRj parents without adequate medical care.[34,35] This intervention deserves more consideration before becoming widespread policy.

The second type of parent that HCPs and vaccine educators will encounter is the vaccine resistant (VR) parent. VR parents are those that, while they are currently rejecting vaccination, are willing to consider information regarding the safety and efficacy of vaccines.[22,26] VR and VRj parents have traditionally been combined in discussions of parental education, but interacting with VR parents has an increased likelihood of a positive outcome, as their distrust of medical science is less likely to be tied up with beliefs in other conspiracy theories than that of VRj parents. VR parents have some beliefs in common with vaccine-hesitant parents (discussed below)—they may be concerned that there are too many vaccines in the current schedule, or that vaccinations are given too soon in a child's life, or that vaccines are commonly associated with adverse events such as autism. The difference between VR and vaccine-hesitant parents is that VR parents may also hold a belief that vaccines are causing widespread damage or vaccine injuries. These beliefs are often based on the information VR parents gain from other VR parents, since parents most likely not to vaccinate rely on information from other such parents, creating an echo chamber of misinformation.[36]

The third category we propose, vaccine-hesitant (VH) parents, are not as committed to misinformation about vaccinations and tend to come to the health care provider's office with more of a generalized anxiety about vaccines.[37] When questioned further, these parents may be at first unable to articulate specific concerns with any detail. They may express themselves with vague statements that they have "heard things" about vaccines safety, or that "someone told" them something about vaccine safety. If they have specific concerns, such as the number of vaccines on the current schedule, or whether or not there are too many vaccines given too soon, those concerns may not be as detailed and specific as those of VR parents. Such parents may vaccinate as recommended by the health care provider, but reluctantly. Failing to adequately address VH parents' concerns may result in their becoming more resistant for future vaccinations.[37,38]

Types of Intervention and Education Strategies

Vaccine education efforts may not differ greatly for the latter two categories propose (VR and VH parents), since there is the possibility of successfully addressing their concerns, although less so in the VR case. There are multiple models of education currently being recommended and tested.[39-41] Combining some of these fact-based models currently used with other, less studied and more emotion-based techniques could result in a more effective approach. For example, the techniques of motivational interviewing, previously developed by substance abuse therapists, would give HCPs and other vaccine educators a model of interaction that includes recognizing and incorporating resistance into the education process.[42] Rolling with resistance, the third principle of motivational interviewing, allows the vaccine educator to reflect back the parent's resistance as a starting point for exploration. Such a technique accepts the resistance without validating or rejecting it, creating the beginnings of a rapport with resistant or hesitant parents.

Another possible adjunct to fact-based education strategies is the C.A.S.E. method,[43] a four-step method involving corroborating parents' fears, offering information about the educator and their experience, providing information about the science regarding vaccinations and explaining recommendations, all within a context of empathy and a pre-established relationship. An HCP

who is able to find some point of agreement with the parent (the Corroborate step) can use that point of agreement to build rapport with the parent, reducing the likelihood that the parent feels invalidated.

Due to the rigidity of the VR parents' resistance to vaccine information, starting with an emotion-based or empathy-based approach may be most effective for this particular category. This parent may be more likely to come into an encounter with an HCP or a vaccine educator with specific anti-vaccine "facts" or misinformation and be more prepared to fight against fact-based education efforts. Taking the time to identify the resistance or further develop the relationship between the parent and the educator may reduce this tendency and open the parent up for receiving factual information later in the encounter. On the other hand, helping the VH parent identify specific concerns first and then providing fact-based education may be the best approach for this category of parent. This approach allows the VH parent to put a name to their diffuse vaccine concerns, and gives the educator a direction for the provision of information.

Both motivational interviewing and the C.A.SE method provide a step-by-step model for incorporating fact-based education into an empathy-based educational strategy. The benefit of the combination of the two is that all HCPs and healthcare workers, as well as non-healthcare-based vaccine educators, can be trained to utilize these models. The drawback of these approaches is that while they are worthwhile and most show efficacy, they are time-consuming. In addition, there are times when correcting inaccurate beliefs increases the strength of the belief.[25,44] Therefore, the amount of time necessary to reassure VR parents, and VH patients to a lesser extent, requires that vaccine education take place in multiple venues, using multiple strategies. Vaccine education strategies should be incorporated into all possible parental education venues, such as Lamaze classes, prenatal care and parenting classes and other pre-birth venues, as well as ongoing postnatal education opportunities. Increasing the number of venues in which vaccination education takes place creates more chances for addressing fears and correcting misinformation. This multimodal approach requires that all individuals interacting with parents must be educated on the scientific evidence regarding the well-established safety and efficacy of vaccines.

During educational opportunities, HCPs should address the specific concerns raised rather than attempt to counter all anti-vaccine messages that the parents might have heard. Research has shown that providing education regarding misinformation by presenting the misinformation first and the correction second increases the likelihood that the recipient of the information remembers only the misinformation and not the correction.[25,44,45] By encouraging parents to share specific concerns rather than guessing what parents might be worried about, vaccine educators can avoid this pifall. In addition, if parents bring up their own concerns based on anti-vaccine misinformation, they are more likely to be receptive to education.

Vaccine educators of all kinds will also need to be prepared to provide parents with some basic information regarding relative risk and epidemiology. To a parent, hearing the one-in-one-million chance of encephalitis with the MMR vaccine will not provide them with any reassurance unless they are also provided with the one-in-one-thousand chance of encephalitis with measles itself and the other attendant risks of the disease.[46,47] Unfortunately, the anti-vaccine movement paints such attempts at risk education as unnecessary fearmongering, so this risk education will need to occur over multiple visits and will be best accomplished by ensuring that appropriate risk education takes place in multiple arenas.

One "compromise" that HCPs may encounter during their education attempts with VR and VH parents is a request for an alternative schedule of vaccinations, rather than agreeing to adhere to the CDC recommendations for childhood vaccinations. While HCPs may want to allow parents this option, the science behind such alternative schedules is non-existent,[48] and there are concerns regarding the safety of proposed alternative schedules.[49] Parents should be adequately informed of those risks and the lack of scientific support for alternative schedules that are not based on actual medical need. HCPs may see the alternative schedules as better than no vaccines at all, but providers should still continue to educate parents on the risks of the schedule and address ongoing parental concerns in order to convince parents to follow the recommended schedules if possible. Alternative schedules for individual medical needs, such as a history of vaccine reaction or a current illness, should be developed on a case-by-case basis.

A successful education campaign will involve more than just the primary health care contact, whether that is a pediatrician, primary care physician, physician's assistant, nurse practitioner or registered nurse. All healthcare workers should receive education regarding vaccine safety and efficacy, so that any contact with an employee and a provider becomes an opportunity for correct education and reassurance. The more that parents hear vaccine-supportive arguments from multiple sources, the more likely that parents will recognize that anti-vaccine beliefs are not grounded in scientific fact.[50-54] Given that most parental contact with HCPs involves interacting with more than just a primary provider such as the pediatrician, having a pro-vaccine message available from all possible contacts increases the likelihood that factual vaccine information will become normalized in the minds of VR and VH parents. Provider knowledge and beliefs regarding vaccine efficacy are critical to this multi-pronged approach, as all providers and vaccine educators should be conversant on the current state of vaccine research.

All vaccine educators and advocates need to hold the media more responsible for reporting the science of vaccination accurately. Recent research indicates that the media's continued portrayal of vaccination as "controversial" and providing a false balance by including anti-vaccine advocates in the discussion has increased parental concerns regarding vaccinations.[55-57] HCPs, public health advocates and vaccine advocates all need to become more pro-active at addressing the media's continuing efforts to paint vaccination as problematic or controversial. This involvement must take the form of letters to editors, opinion pieces submitted to popular media, comments on public forums regarding scientific information, and other forms of social and mass media participation.

While a multi-faceted vaccine communication strategy may be able to effectively address many of the concerns underlying vaccine hesitancy and resistance, such strategies may be ineffective against the most strongly-held anti-vaccine beliefs, such as those of the VRj Parents. Education initiatives in various parts of the country have not been as successful as hoped in addressing anti-vaccine propaganda.[58-60] Policy approaches in addition to education strategies may also be needed to ensure protective immunization rates. For example, states may need to address loopholes in public health policies such as religious or philosophical exemptions to vaccination for public school attendance.[61-64] Given that no mainstream religious theology mandates against vaccination, the vast majority of "religious" exemptions are actually personal philosophical exemptions in disguise, and courts have already rules that parents' personal philosophies are restricted when it comes to placing their children's lives at risk.[65-68] Mississippi and West Virginia do not allow for philosophical or religious exemptions, and West Virginia showed a vaccination rate of 99.85% for 7th and 12th graders in the first year after it eliminated religious and personal exemptions and only allowed for medical exemptions.[69] A lawsuit against this statewide rule has been dismissed.[70] To increase and/or sustain vaccination rates nationwide, it might be necessary for more states to follow West Virginia's example.

No single strategy will be effective to begin to undo the damage inflicted by the anti-vaccine movement. A successful maintenance of effective vaccination rates will require a more organized and more widespread pushback against anti-vaccine misinformation than is currently seen. Vaccine advocates must recognize the wide variety of parental concerns regarding vaccination and be prepared to meet those concerns with multiple education strategies. Our experience has taught us that the anti-vaccine movement is well-organized and extremely vocal in spreading its misinformation, and vaccine advocates must meet that energy with equal organization and fervor.

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No potential conflicts of interest were disclosed.

References

1. Wolfe RM, Sharp LK. Anti-vaccinationists past and present. BMJ 2002; 325:430-2; PMID:12193361; http://dx.doi.org/10.1136/bmj.325.7361.430
2. Jones K. Rebelling against lawful authority? The vaccination controversy during the smallpox epidemic at Muncie, Indiana, 1893. Journal Of The Indiana Academy Of Social Sciences 2010; 14:74-87
3. Nielsen. State of the media: The social media report 2012. http://www.nielsen.com/content/dam/corporate/us/en/reports-downloads/2012-Reports/The-Social-Media-Report-2012.pdf.
4. Fox S, Jones S. The Social Life of Health Information. Pew Internet & American Life Project. June 11, 2009. Available at www.pewInternet.org/Reports/2009/8-The-Social-Life-of-Health-Information.aspx.
5. Tickner S, Leman PJ, Woodcock A. Factors underlying suboptimal childhood immunisation. Vaccine 2006; 24:7030-6; PMID:16890330; http://dx.doi.org/10.1016/j.vaccine.2006.06.060
6. Freed GL, Clark SJ, Hibbs BF, Santoli JM. Parental vaccine safety concerns. The experiences of pediatricians and family physicians. Am J Prev Med 2004; 26:11-4; PMID:14700706; http://dx.doi.org/10.1016/j.amepre.2003.09.004
7. Dugdale DC, Epstein R, Pantilat SZ. Time and the patient-physician relationship. J Gen Intern Med 1999; 14(Suppl 1):S34-40; PMID:9933493; http://dx.doi.org/10.1046/j.1525-1497.1999.00263.x
8. Smith PJ, Humiston SG, Marcuse EK, Zhao Z, Dorell CG, Howes C, et al. Parental delay or refusal of vaccine doses, childhood vaccination coverage at 24 months of age, and the Health Belief Model. Public Health Rep 2011; 126(Suppl 2):135-46; PMID:21812176
9. Payne FE. Can vaccines actually cause more harm than good? Medical Sentinel 2000; 5:53-4
10. Shapiro N. The anti-vaccine epidemic: Why Washington hosts the nation's fastest growing population of so-called "refusers." Seattle Weekly, Jun 15 2011.
11. Offit PA, Jew RK. Addressing parents' concerns: do vaccines contain harmful preservatives, adjuvants, additives, or residuals? Pediatrics 2003; 112:1394-7; PMID:14654615; http://dx.doi.org/10.1542/peds.112.6.1394
12. Alliance for Natural Health. Vaccinations: Position paper. http://www.anh-usa.org/main-menu/resources/position-papers/862/.
13. Gale R, Null G. Flu vaccines: are they effective and safe? http://www.garynullblog.com/home/gary-null-flu-vaccines-are-they-effective-and-safe.html.
14. West D. The Vaccination Conspiracy. http://www.conspiracy.itgo.com/custom.html
15. Pringle E. FDA Fraud: New Studies Prove Vaccines Cause Autism. http://conspiracyplanet.com/channel.cfm?channelid=47&contentid=2254
16. Plait P. Congress promotes dangerous anti-vaccine quackery. Slate Magazine, Dec. 4, 2012.
17. England C. Freedom of information request reveals major government vaccine conspiracy. http://vactruth.com/2012/01/03/foi-request-reveals-major-vaccine-conspiracy/
18. Adams M. Big Pharma criminality no longer a conspiracy theory: Bribery, fraud, price fixing now a matter of public record. http://www.naturalnews.com/036417_Glaxo_Merck_fraud.html#ixzz2K5YnvECH
19. Sanghavi D. The flu vaccine controversy: Are drug companies really more dangerous than the flu virus? Slate Magazine, Dec. 18, 2012. http://www.slate.com/articles/health_and_science/pandemics/2012/12/flu_vaccine_safety_tamiflu_and_vaccines_save_lives_and_show_public_health.html
20. Caplan A. Did the vaccine industry manipulate the WHO to sell H1N1 shots? Science Progress 2011; 20; http://scienceprogress.org/2011/01/did-the-vaccine-industry-manipulate-the-who-to-sell-h1n1-shots/.
21. Wood MJ, Douglas KM, Sutton RM. Dead and Alive: Beliefs in Contradictory Conspiracy Theories. Social Psychological and Personality Science 2012; 3:767-73; http://dx.doi.org/10.1177/1948550611434786.
22. Wei F, Mullooly JP, Goodman M, McCarty MC, Hanson AM, Crane B, et al. Identification and characteristics of vaccine refusers. BMC Pediatr 2009; 9:18; PMID:19261196; http://dx.doi.org/10.1186/1471-2431-9-18
23. Risser N, Murphy M. Parental refusal of childhood vaccinations. Nurse Pract 2005; 30:66; http://dx.doi.org/10.1097/00006205-200510000-00016
24. Anderson CA, Lindsay JJ. The development, perseverance, and change of naive theories. Soc Cogn 1998; 16:8-30; http://dx.doi.org/10.1521/soco.1998.16.1.8
25. Lewandowsky S, Ecker UH, Seifert CM, Schwarz N, Cook J. Misinformation and its correction: Continued influence and successful debiasing. Psychological Science In The Public Interest (Sage Publications Inc.), 13(3): 106-131.
26. Healy CM, Pickering LK. How to communicate with vaccine-hesitant parents. Pediatrics 2011; 127(Suppl 1):S127-33; PMID:21502238; http://dx.doi.org/10.1542/peds.2010-1722S
27. Smith PJ, Humiston SG, Marcuse EK, Zhao Z, Dorell CG, Howes C, et al. Parental delay or refusal of vaccine doses, childhood vaccination coverage at 24 months of age, and the Health Belief Model. Public Health Rep 2011; 126(Suppl 2):135-46; PMID:21812176
28. Omer SB, Salmon DA, Orenstein WA, deHart MP, Halsey N. Vaccine refusal, mandatory immunization, and the risks of vaccine-preventable diseases. N Engl J Med 2009; 360:1981-8; PMID:19420367; http://dx.doi.org/10.1056/NEJMsa0806477
29. Flanagan-Klygis EA, Sharp L, Frader JE. Dismissing the family who refuses vaccines: a study of pediatrician attitudes. Arch Pediatr Adolesc Med 2005; 159:929-34; PMID:16203937; http://dx.doi.org/10.1001/archpedi.159.10.929
30. Leib S, Liberatos P, Edwards K. Pediatricians' experience with and response to parental vaccine safety concerns and vaccine refusals: a survey of Connecticut pediatricians. Public Health Rep 2011; 126(Suppl 2):13-23; PMID:21812165
31. Halperin B, Melnychuk R, Downie J, Macdonald N. When is it permissible to dismiss a family who refuses vaccines? Legal, ethical and public health perspectives. Paediatr Child Health 2007; 12:843-5; PMID:19043497
32. Centers for Disease Control and Prevention (CDC). Outbreak of measles--San Diego, California, January-February 2008. MMWR Morb Mortal Wkly Rep 2008; 57:203-6; PMID:18305451
33. Buttenheim A, Jones M, Baras Y. Exposure of California kindergartners to students with personal belief exemptions from mandated school entry vaccinations. Am J Public Health 2012; 102:E59-67; PMID:22698009; http://dx.doi.org/10.2105/AJPH.2012.300821
34. Kemper KJ. Dismissing families: a slippery slope. Arch Pediatr Adolesc Med 2006; 160:452, author reply 452-3; PMID:16585498
35. Nulty D. Is it ethical for a medical practice to dismiss a family based on their decision not to have their child immunized? JONAS Healthc Law Ethics Regul 2011; 13:122-4; PMID:22124471
36. Brunson EK. The impact of social networks on parents' vaccination decisions. Pediatrics 2013; 131:e1397-404; PMID:23589813; http://dx.doi.org/10.1542/peds.2012-2452

37. Holler K, Scalzo A. "I've heard some things that scare me". Responding with empathy to parents' fears of vaccinations. Mo Med 2012; 109:10-3, 16-8; PMID:22428439
38. Healy CM, Pickering LK. How to communicate with vaccine-hesitant parents. Pediatrics 2011; 127(Suppl 1):S127-33; PMID:21502238; http://dx.doi.org/10.1542/peds.2010-1722S
39. Centers for Disease Control and Prevention. Provider Resources for Vaccine Conversations with Parents. http://www.cdc.gov/vaccines/hcp/patient-ed/conversations/index.html
40. Stinchfield PK. Practice-proven interventions to increase vaccination rates and broaden the immunization season. Am J Med 2008; 121(Suppl 2):S11-21; PMID:18589063; http://dx.doi.org/10.1016/j.amjmed.2008.05.003
41. Stille CJ, Christison-Lagay J, Bernstein BA, Dworkin PH. A simple provider-based educational intervention to boost infant immunization rates: a controlled trial. Clin Pediatr (Phila) 2001; 40:365-73; PMID:11491130; http://dx.doi.org/10.1177/000992280104000701
42. Moyers TB, Rollnick S. A Motivational Interviewing Perspective on Resistance in Psychotherapy. JCLP/In Session. Psychotherapy in Practice 2002; 58:185-183
43. Singer A. Communicating Vaccine Safety Information to Parents: A New Framework. 44th National Immunization Symposium Apr 2010. https://cdc.confex.com/cdc/nic2010/webprogram/Paper22643.html
44. Nyhan B, Reifler J. When corrections fail: The persistence of political misperceptions. Polit Behav 2010; 32:303-30; http://dx.doi.org/10.1007/s11109-010-9112-2
45. Anderson CA, New BL, Speer JR. Argument availability as a mediator of social theory perseverance. Soc Cogn 1985; 3:235-49; http://dx.doi.org/10.1521/soco.1985.3.3.235
46. Bigham M, Hoefer M. Comparing benefits and risks of immunization. Can J Public Health 2001; 92:173-7; PMID:11496624
47. Centers for Disease Control and Prevention. Risk from disease vs. risk from vaccines. http://www.cdc.gov/vaccines/vac-gen/6mishome.htm#risk
48. Sears B. Ask me anything: I am a co-author of The Baby Book, Edition: Everything you need to know about your baby from birth to age two. Reddit discussion forum Jan. 22 2013. http://www.reddit.com/r/IAmA/comments/1728o9/iama_coauthor_of_the_baby_book_edition_everything/c81kou6.
49. Offit PA, Moser CA. The problem with Dr Bob's alternative vaccine schedule. Pediatrics 2009; 123:e164-9; PMID:19117838; http://dx.doi.org/10.1542/peds.2008-2189
50. Cacioppo JT, Petty RE. Effects of message repetition on argument processing, recall, and persuasion. Basic Appl Soc Psych 1989; 10:3-12; http://dx.doi.org/10.1207/s15324834basp1001_2
51 Cacioppo JT, Petty RE. Effects of message repetition and position on cognitive response, recall, and persuasion. J Pers Soc Psychol 1979; 37:97-109; http://dx.doi.org/10.1037/0022-3514.37.1.97
52. Weiss RF. Repetition of Persuasion. Psychol Rep 1969; 25:669-70; http://dx.doi.org/10.2466/pr0.1969.25.2.669
53. Cacioppo JT, Petty RE. Persuasiveness of communications is affected by exposure frequency and message quality: a theoretical and empirical analysis of persisting attitude change. Current Issues and Research in Advertising 1980; 3:97-122
54. Claypool HM, Mackie DM, Garcia-Marques T, McIntosh A, Ashton U. The effects of personal relevance and repetition on persuasive processing. Soc Cogn 2004; 22:310-35; http://dx.doi.org/10.1521/soco.22.3.310.35970
55. Jackson T. When balance is bias. BMJ 2011; 343:d8006; PMID:22187191; http://dx.doi.org/10.1136/bmj.d8006
56. Dixon GN, Clark CE. Heightening uncertainty around certain science: media coverage, false balance, and the autism-vaccine controversy. Science Communication 2012; 1075547012458290.
57. Dixon GN, Clark CE. The effect of falsely balanced reporting of the autism–vaccine controversy on vaccine safety perceptions and behavioral intentions. Health Educ Res 2013; 28:352-9; PMID:23193194; http://dx.doi.org/10.1093/her/cys110
58. Hayney MS, Bartell JC. An immunization education program for childcare providers. J Sch Health 2005; 75:147-9; PMID:15987009
59. Stille CJ, Christison-Lagay J, Bernstein BA, Dworkin PH. A simple provider-based educational intervention to boost infant immunization rates: a controlled trial. Clin Pediatr (Phila) 2001; 40:365-73; PMID:11491130; http://dx.doi.org/10.1177/000992280104000701
60. Daley MF, Glanz JM. Straight talk about vaccination. Sci Am 2011; 305:32-4, 34; PMID:21870438; http://dx.doi.org/10.1038/scientificamerican0911-32
61. Parkins C. Protecting the herd: a public health, economics, and legal argument for taxing parents who opt-out of mandatory childhood vaccinations. South Calif Interdiscip Law J 2012; 21:437-90
62. Haelle T. US states make opting out of vaccinations harder. NATNEWS 2012; 5; http://www.nature.com/news/us-states-make-opting-out-of-vaccinations-harder-1.11548.
63. Thompson JW, Tyson S, Card-Higginson P, Jacobs RF, Wheeler JG, Simpson P, et al. Impact of addition of philosophical exemptions on childhood immunization rates. Am J Prev Med 2007; 32:194-201; PMID:17296471; http://dx.doi.org/10.1016/j.amepre.2006.10.014
64. Omer SB, Richards JL, Ward M, Bednarczyk RA. Vaccination policies and rates of exemption from immunization, 2005-2011. N Engl J Med 2012; 367:1170-1; PMID:22992099; http://dx.doi.org/10.1056/NEJMc1209037
65. LawInfo. When can a parent deny medical treatment to a minor child? Published 5/2009. http://resources.lawinfo.com/en/articles/health/federal/when-can-a-parent-deny-medical-treatment-to-a.html
66. American Academy of Pediatrics Committee on Bioethics. Religious objections to medical care. Pediatrics 1997; 99:279-81; PMID:9024462; http://dx.doi.org/10.1542/peds.99.2.279
67. Prince v Massachusetts, 321 US 158 (1944).
68. People v Rippberger, 231 Cal App 3d 1667 (1991).
69. Plummer S. WVDE chief reports nearly all students are immunized. The Register-Herald.com, October 16, 2012. http://www.register-herald.com/local/x1200631944/WVDE-chief-reports-nearly-all-students-are-immunized
70. Taylor Z. Kanawha judge dismisses W.Va. school vaccination lawsuit. The Charleston Gazette, October 17, 2012. http://wvgazette.com/News/201210170077.