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### Why do parents who usually vaccinate their children hesitate or refuse?

#### General good vs. individual risk

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## Why do parents who usually vaccinate their children hesitate or refuse? General good vs. individual risk

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This study examines vaccination hesitancy or refusal following the 2013 polio outbreak in Israel, based on two theoretical models. The first is Sandman's theoretical model, which holds that risk perception is comprised of hazard plus outrage. The second model is the affect heuristic that explains the risk/benefit confounding. It aims to expose the barriers that inhibited parental compliance with OPV vaccination for their children. The study employed mixed methods – a questionnaire survey ( $n = 197$ ) and content analysis of parents' discussions in blogs, Internet sites, and Facebook pages ( $n = 2499$ ). The findings indicate that some parents who normally give their children routine vaccinations decided not to give them OPV due to lack of faith in the health system, concerns about vaccine safety and reasons specific to the polio outbreak in Israel. Some vaccinated due to a misunderstanding, namely, they believed that OPV was supposed to protect their children, when it was actually for overall societal well-being. This study highlights the difficulty of framing the subject of vaccinations as a preventive measure, especially when the prevention is for society at large and not to protect the children themselves. The findings of this study are important because they provide a glimpse into a situation that can recur in different places in the world where a disease considered to have been 'eradicated' returns, and the public is required to take measures which protect the public but which might put individuals at risk. The conclusions from the analysis of the findings of this study are that the public's risk perception is based on a context-dependent analysis, which the communicating body must understand and respect.

**Keywords:** polio outbreak in Israel; OPV vaccination; vaccination hesitancy or refusal; risk perception and communication; context-dependent analysis; hazard plus outrage; affect heuristic

### 1. Introduction

#### 1.1. Vaccination hesitancy and refusal

Parental refusal to immunize their children has long been a cause for concern for health authorities, scholars and doctors (Flanagan-Klygis, Sharp, and Frader 2005; Simpson, Lenton, and Randall 1995; Smith, Chu, and Barker 2004). However, studies increasingly reveal that direct opposition to vaccination is actually a marginal phenomenon (Jacobson 2010), and that in recent years, absolute refusal and anti-vaccination attitudes are gradually being replaced by a trend often defined as

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‘vaccination hesitancy’ (Diekema 2012; Healy and Pickering 2011; Jacobson 2010; Smith and Marshall 2010). This trend, in which benefits and dangers of vaccines are evaluated rationally (Jacobson 2010; Velan et al. 2012), is reflected in the growing number of parents who delay vaccination of their children or refuse selected vaccines.

The concept of inoculation to prevent disease has met with opposition since the advent of vaccination in the eighteenth century (Durbach 2000; Healy and Pickering 2011). Typically, parental refusal to vaccinate children, fully or selectively, is rooted in personal beliefs, attitudes, and values. These include religious beliefs (Muhsen et al. 2012; Simpson, Lenton, and Randall 1995) and ethical considerations, e.g. animal and child exploitation to study vaccines (Keane et al. 2005). Others include the dilemma between individual vs. common good and contributing to ‘herd immunity’<sup>1</sup> (Hobson-West 2007; Keane et al. 2005), distrust in the medical establishment (Hobson-West 2007; Omer et al. 2009) and in physicians (Smith and Marshall 2010), and ideological beliefs, such as that contracting the disease naturally is healthier (Flanagan-Klygis, Sharp, and Frader 2005; Healy and Pickering 2011). In addition, socio-environmental factors, including media coverage of vaccines, perceived social norms, and the powerful influence of peer groups, also play a major role in parents’ vaccine-related decision-making (Sturm, Mays, and Zimet 2005; Tickner, Leman, and Woodcock 2006). For instance, it has been noted that in the case of the autism-associated scare with the measles–mumps–rubella vaccine, a vocal and active anti-vaccine movement has encouraged parents to refuse immunizations for their children, and that the hesitancy may have been increased by celebrities’ airing of their own concerns regarding vaccines (Smith et al. 2011). Studies in many countries have also shown that vaccination refusal or hesitancy are associated with higher level socioeconomic status and the mother’s education level (Smith, Chu, and Barker 2004; Smith et al. 2011). Another major reason for this phenomenon is that many vaccine-preventable diseases are not perceived as a serious risk (Omer et al. 2009). Paradoxically, this perception stems from the decrease in the transmission of diseases, largely due to the successful implementation of vaccination programs (Muhsen et al. 2012). Since most parents today are not familiar with these diseases, their threat is less concrete (Omer et al. 2009). As a result, many tend to selectively grade individual diseases in terms of their risk (Healy and Pickering 2011). Following the decrease in many of the vaccine-preventable diseases, the concerns regarding these diseases have been replaced by concern for vaccine safety (Healy and Pickering 2011; Omer et al. 2009). More than 20% of parents are reported to have significant concerns about the safety of childhood immunizations (Allred et al. 2005; Shui, Weintraub, and Gust 2006), and approximately 15% of under-immunization has been attributed to such concerns (Gust et al. 2004; Taylor et al. 2002). Adding to these concerns is the increase in vaccines routinely given to children. This has led to an increased fear that multiple vaccines might overwhelm children’s immune systems (Healy and Pickering 2011; Smith and Marshall 2010). As a result, alternative vaccination protocols have been proposed including fewer injections per visit and spreading vaccine administration over a longer period (Sears 2007).

### ***1.2. Vaccination, risk perceptions and communication***

Risk perceptions of the public regarding vaccination are influenced by personal, psychological, environmental, and cultural factors (Sandman 2003; Slovic 1999).

Risk perceptions hinge on elements from risk communication including uncertainty, transparency, trust, and the capacity to mitigate gaps between experts and the public. How the public responds is influenced not only by the information it has about the risk (JHSPH 2011), but also by the way the risk is communicated.

Uncertainty–ambiguity is present when the situation can be interpreted in multiple ways, or when there are divergences or contested perspectives regarding its meaning (Brugnach et al. 2008). Uncertainty–ambiguity is often associated with decreased willingness to adopt preventative measures, such as vaccination (Rubin et al. 2009). It has been argued that access to honest and diversified information can encourage the public's participation in decision-making about health risks (Beierle 2004; Leighton, Roht-Arriaza, and Zarsky 2002; Palenchar and Heath 2007). Research on risk perception has demonstrated that the lay public is not 'irrational,' as is sometimes assumed, when their response to risk is different from that expected by experts or public health recommendations. Rather, the public evaluates risks based on criteria and values not necessarily obvious to experts, but relevant to their everyday lives (Alaszewski 2005). This insight spurs a more dialogic approach to risk communication, which considers members of the public as actively constructing the meaning of the message, rather than passively receiving it (Russell and McClintock 1990), and emphasizes the importance of transparency. The success of risk communication depends on the communicator's efforts to minimize the gap between the expert's risk assessments and the public's perceptions, in order to create mutual feedback between experts and the public (Fischhoff 2004). These ideas are also relevant in the context of vaccination hesitancy. The importance of affect on decision-making is being recognized increasingly. Therefore, the process of decision-making regarding health behaviors depends largely on affect heuristic, which holds that there is a tendency for people to rely on experiential thinking, and that individuals differ in the way they react affectively (Peters and Slovic 2000).

According to Sandman, risk perception is comprised of hazard plus outrage (1989). This means that other than the scientific aspect, feelings of outrage toward the risk must be considered. People associate high risk with issues toward which they have negative attitudes, regardless of the proved risk. The public's view of risk (as opposed to that of the experts) reflects not just the danger of the action (hazard), but also how they feel about the action and what emotions it produces (outrage). Lack of agreement between experts' and the public's perception of hazard and outrage can lead to controversy. According to Sandman, one of the most important ways to deal with negative feelings of a population toward a certain issue is continuous communication with that population (Sandman 1989).

Like Sandman, Alhakami and Slovic (1994) found that affect influences decision-making. They found that the inverse relationship between perceived risk and perceived benefit of an activity is linked to the strength of positive or negative affect associated with that activity. This result implies that people's judgments are based not only on what they think about something, but also what they feel about it. The process of 'affect heuristic' suggests that if a general affective view guides perceptions of risk and benefit, then perception regarding risk can be changed (affected) by receiving information about benefit – and vice versa. Finucane et al. (2000) showed that risk and benefit judgments are influenced, at least in part, by the overall affective evaluation, which was influenced by the information provided in their experiment on risk perceptions of nuclear power. They present four matrices of risk/benefit

confounding, showing how information about risk could increase or decrease positive affective evaluation.

These two models (Sandman and Alhakami and Slovic) show that the transition from a mechanistic and linear model of risk communication to a more participative and iterative approach has the potential to empower the public in the process of decision-making about risk and uncertainty (Fischhoff 1995; Pidgeon 2008).

### ***1.3. The case of the polio outbreak in Israel – background***

In Israel, compliance with childhood vaccination programs is generally very high. Nevertheless, despite the accessibility of routine childhood immunizations, thousands of children are not immunized (Knesset Research and Information Center 2009). The reasons for vaccination refusal or hesitancy in Israel are concordant with those found in other countries, including religious beliefs, ethical and ideological considerations, etc. There is an evidence of underutilization of vaccines ('pockets of low compliance') in ultraorthodox communities – a very religious sector that constitutes a Jewish minority – despite frequent outbreaks of vaccine-preventable diseases among this population (Muhsen et al. 2012). Additionally, much like in other countries, there are groups that resist vaccination for ideological or philosophical reasons, due to concerns about vaccine side effects, or due to technical or economic difficulties (Knesset Research and Information Center 2009). A recent study by Amit-Aharon, Baron-Epel, Nehama, and Rishpon has found that university-educated mothers are significantly more likely to refuse vaccinations than mother with only a high school diploma, and that socioeconomically better-off mothers are more likely to refuse vaccinations as a matter of choice, while poorer mothers miss vaccinations because of behavioral or cultural blocks, lack of knowledge or organization (Even 4.6.2013). One of the researchers has described it in the following terms: 'The phenomenon is not "refusal" but includes parents who want autonomy over their lives and the lives of their children' (Rishpon quoted by Even 4.6.2013). However, what is interesting here is that this area is usually characterized by vaccination compliance no different from other locations in Israel and therefore this situation is compelling. Perhaps, in this specific case, the generally higher socioeconomic levels generated a different set of reactions that included a more careful approach in which people may have consulted with more than one doctor and/or read information to help them decide whether to vaccinate.

In February 2013, Israel's Health Ministry reported that wild poliovirus type 1 (WPV1) had been detected in environmental sewage samples from southern and central Israel. WPV1 was subsequently isolated in stool samples from 42 carriers (4.4% of the sampled population) tested in area of WPV1 circulation (Ministry of Health Israel 18.8.2013). All viruses were detected in sewage and random stool samples only, and no clinical cases of paralytic polio were reported (Ministry of Health Israel 28.5.2013). Between 1990 and 2005, infants in Israel received a combine schedule of both IPV and OPV. In 2005, this schedule was changed to an IPV-only schedule that had previously been adopted by most developed countries. More than 95% of Israeli infants are routinely immunized in this program. Since then, there have been no reported cases of polio in Israel (Tulchinsky et al. 2013).

After the latest detection of WPV1, the Health Ministry launched a supplementary campaign in early August 2013, immunizing children under age 10 (already protected by IPV) with a bivalent OPV vaccine (OPV 1 and 3) (Ministry of Health

Israel 4.8.2013). The campaign, called ‘Two Drops,’ was initiated in southern Israel on 5 August, and was expanded nationwide on 18 August (Ministry of Health Israel 18.8.2013). As suggested by its slogan – ‘Just two drops, and the family is protected from the polio threat,’ the campaign stressed the fact that ‘children who have never received OPV vaccine but have received all the doses of IPV vaccine can still transmit the virus to family members who are not vaccinated,’ and that although not one case of the disease has been reported, ‘it is important to continue to protect immediate family.’ (Ministry of Health Israel 4.8.2013).

By late August 2013, 560,000 children were vaccinated out of an estimated 1.2 million eligible bivalent OPV candidates (about 50% compliance) (Ministry of Health Israel 28.8.2013). Nevertheless, in central Israel, especially in Tel-Aviv, only about 17% of the children were vaccinated (Yasur-Beit Or 28.8.2013). It is worth mentioning that Central Israel is characterized by a higher socioeconomic level. Tel-Aviv is Israel’s largest city and the country’s financial capital, and of the six largest cities in Israel, it is characterized by the highest socioeconomic level (Israel Central Bureau of Statistics 2013). During August, a Facebook group called ‘Mothers say no to the weakened virus vaccine’ was launched. Members of the group claimed that the OPV ‘was banned [in Israel] in 2005 and declared dangerous by the Health officials in Israel and everywhere in the world, since it caused dozens of children to contract polio and become paralyzed.’ They also stressed that it was not clear whether the new vaccine, which was approved in 2009, ‘was ever subject to an independent safety study,’ and that no study has ever been carried out to fully evaluate the risks (Even 11.8.2013).

In an effort to convince reluctant parents and to overcome the voices of opposition, the Health Ministry held a press conference, and the Health Ministry Director-General at the time said ‘Considering the high level of immunization among the public, the risk of the vaccine that will be given is zero. It is our duty to do it and help protect the entire population.’ (Even 5.8.2013). Intensifying its persuasion efforts, the Health Ministry also initiated an aggressive television campaign, sent thousands of phone calls and text messages to parents (Fox 2.10.2013), and held meetings for parents, especially in Tel Aviv (Yasur-Beit Or 28.8.2013).

The latest estimates of vaccination compliance indicate that more than 890,000 children were vaccinated out of an estimated population of 1.2 million eligible candidates (about 75% compliance) (European Centre for Disease Prevention and Control 15.10.2013). Still, central Israel remained a ‘pocket of low compliance,’ with 45.74% compliance in Tel Aviv; 38.86% in Givatayim; and 29.76% in Kfar Shmaryahu (Ministry of Health Israel 26.12.2013). In October 2013, the Health Ministry decided to incorporate OPV vaccines into the routine immunization program (Doctors Only 2013). From the data available, no differences in vaccination compliance were identified between this area and other locations in Israel, and therefore this situation is compelling. This can be explained through generally higher socioeconomic levels that lead to a more careful approach, wherein people may have consulted with more than one physician and/or read information to help them decide whether to vaccinate.

## 2. Objectives

This study aims to examine the risk perception (hazard + outrage) which inhibited parental accordance with OPV vaccination for their children.

### 3. Methods

In order to examine the barriers inhibiting OPV vaccination compliance, a qualitative approach was taken to convey the detail of parents' responses (Noakes, Yarwood, and Salisbury 2006). This was combined with a quantitative technique to help create an initial mapping of parent responses. Data collection was completed over four months, starting two days after the campaign was initiated (7 August 2013 to 14 November 2013). The study employed two methods: A survey and a content analysis of parent discussions in blogs, Internet sites, and Facebook pages.

#### 3.1. The survey

##### 3.1.1. The target population

The study's target population comprised parents of children aged <10 years, residents of central Israel (Gush Dan). This population was chosen because children <10 years old were the '2 Drops' campaign target population, and because in central Israel, vaccination compliance was low.

##### 3.1.2. Sample

A total of 197 parents were recruited (see Table 1 for sampling characteristics). Our study population was designed using *Google Docs* online software. It enabled a quick and efficient distribution of an interactive online questionnaire that could potentially reach our study population. Namely, when dealing with real-time potential pandemics that, by nature, tend to develop unexpectedly, one must gather data quickly. Hence, there is a constant information evolution that can affect people's stances on particular issues during various stages of risk index (Gesser-Edelsburg, Walter, and Green 2014). For that reason, we chose an online sampling method that could enable us to reach a relatively large population in a short time. We asked only parents who were residents of central Israel – our target population, to complete the survey.

Table 1. Sample characteristics.

Gender	<i>n</i> = 196
Male	49 (25%)
Female	147 (75%)
Religious affiliation	
Ultraorthodox	1 (1%)
Orthodox	10 (5%)
Traditional	37 (19%)
Secular	139 (71%)
Non-Jewish	9 (5%)
Education	
Elementary education or less (8 years)	0 (0%)
Partial secondary education (9–11 years)	5 (3%)
Full secondary education (12 years)	113 (58%)
Higher education (non-degree – 13–14 years)	49 (25%)
College/University education (degree – B.A or more)	29 (15%)

### 3.1.3. The survey design

The survey was conducted through 7 August 2013 (following the beginning of the '2 drops' campaign) to 14 November 2013 (toward the end of the campaign). It was based on open-ended questionnaires, designed to evaluate parents' decision-making process regarding the OPV vaccination, and their reasons for vaccinating or for reluctance to vaccinate. Parents were asked whether they gave their children the OPV during the current campaign or intended/did not intend to do so, and were asked to explain why. Also, they were asked to what degree they agree with the statements: 'The Ministry of Health has provided full and clear information about the reasons for giving children the OPV,' and 'In my opinion, the Ministry of Health provided accurate reporting about the OPV.'

Table 2. Websites, blogs, and Facebook pages characteristics.

	Websites/blogs/Facebook pages	No. of responses
Central news websites	Haaretz	277 (197 Talkbacks + 80 Facebook responses)
	Even (11.8.2013)	33 Talkbacks
	Lior (18.8.2013)	21 (14 Talkbacks + 7 Facebook responses)
	Hecht (28.8.2013)	70 Talkback
	Shpern-Gitelman (22.8.2013)	153 (80 Talkbacks + 73 Facebook responses)
	ynet	972 (854 Talkbacks + 118 Facebook responses)
	Kelner (5.8.2013)	31 (30 Talkbacks + 1 Facebook responses)
	Kelner (9.8.2013)	3 Facebook responses
	Blumenthal & Rabad (10.8.2013)	148 (127 Talkbacks + 21 Facebook responses)
	Kelner (11.8.2013)	198 (150 Talkbacks + 48 Facebook responses)
	Gal (11.8.2013)	300 (261 Talkbacks + 39 Facebook responses)
	Melnik (30.8.2013)	159 (158 Talkbacks + 1 Facebook responses)
	Kelner (4.10.2013)	133 (128 Talkbacks + 5 Facebook responses)
	Walla!	21 Talkbacks
	Ben-Yshai (5.8.2013)	21 Talkbacks
	The Marker	30 Talkbacks
	Linder-Ganz (28.8.2013)	30 Talkbacks
	NRG	148 (79 Talkbacks + 69 Facebook responses)
	Gruto (12.8.2013)	80 (11 Talkbacks + 69 Facebook responses)
	Yofe (9.8.2013)	68 Talkbacks

(Continued)

Table 2. (Continued).

	Websites/blogs/Facebook pages	No. of responses
Anti-Vaccination Blogs/Facebook pages	Another truth	145 (118 Talkbacks + 27 Facebook responses)
	Project Manager (4.8.2013)	97 (79 Talkbacks + 18 Facebook responses)
	Matia (20.8.2013)	48 (39 Talkbacks + 9 Facebook responses)
	Mothers say no to the weakened Polio vaccine	37 Facebook responses
	Solomon (20.10.2013)	15 Facebook responses
	Kain (26.10.2013)	22 Facebook responses
	Returning Balance	21 Facebook responses
	Blog Manager (4.10.2013)	21 Facebook responses
	Davidson Online	19 Facebook responses
	Aleksandrovitch (12.11.2013)	19 Facebook responses
Pro-Vaccination Blogs/ Facebook pages	Hayadaan	69 Facebook responses
	Landsman (6.8.2013)	69 Facebook responses
	e-pochondriac	123 Facebook responses
	Goren (18.8.2013)	123 Facebook responses
	End of the World – A View from the Grandstand	518 Facebook responses
	Landsman (5.8.2013)	518 Facebook responses
	Personal Blogs	119 Facebook responses
	Internet Screamer (11.8.2013)	79 Facebook responses
	Ariela Raviv (19.8.2013)	29 Facebook responses
	Liat Eini (21.8.2013)	11 Facebook responses
Total	2499 Responses (1248 Talkbacks + 1251 Facebook responses)	

### 3.2. Parents' responses in blogs, Internet sites, and Facebook pages

Google search of parent responses was based on keywords, compound words and phrases related to the vaccine and to the vaccination campaign, such as 'polio vaccine' + 'my child/ren'; and 'OPV vaccine' + 'my child/ren'. This method ensured reaching a range of websites, including pro-vaccination and anti-vaccination websites.

As presented in Table 2, the Google search yielded 2398 responses (966 Talkbacks + 1289 Facebook responses), published on five central Israel news websites (Haaretz, Ynet, NRG, Walla!, The Marker); three anti-vaccination blogs/Facebook pages ('Another truth'; 'Mothers say no to the weakened Polio vaccine'; and 'Returning Balance'); four pro-vaccination blogs/Facebook pages ('Davidson Online,' 'Hayadaan,' 'e-pochondriac,'<sup>2</sup> and 'End of the World – A View from the Grandstand'); and three personal blogs ('Internet Screamer,' 'Ariela Raviv,' and 'Liat Eini').

### 3.3. Analysis

Data from both the questionnaires and the Web were analyzed according to the method of inductive content analysis (Elo and Kyngäs 2008). This process of analysis includes open coding, creating categories, and abstraction, and tends to move from very specific to more general to create a picture of the larger whole. This

method of analysis was chosen to facilitate the identification of themes surrounding parent responses and the decision-making process related to the OPV. To this end, an inductive detection of the primary themes which emerged was conducted, using textual analysis of overt discourse to determine themes explicitly stated, and additionally of the latent discourse (Bryman 2001; Clarke and Everest 2006). We divided the themes according to the categories suggested by Sandman's model, namely hazard and outrage.

Two researchers read and openly coded X randomly chosen responses, identifying emerging issues, concepts, and themes surrounding the decision-making process used by parents regarding the OPV. The researchers then met and discussed their individual codes and created a list of preliminary codes.

#### 4. Results

As Table 3 indicates, in response to the question 'Did you give your child the polio vaccine during the current campaign?' about half of the parents (109) surveyed responded that they had not given their children the OPV (refused) or that they were deliberating/hesitating (RH). In contrast, only 40% (79 participants) responded that they had vaccinated their children (V) and another 7% (14 participants) said they had not vaccinated, but intended to (I).

Despite these findings, the open answers to the question 'Explain briefly why you chose this option' indicated that among 40% (44/109) of the RH parents, those decisions did not arise from principled objection to vaccinations, and that, generally speaking, those parents normally vaccinate their children. For example:

I was not convinced it was necessary to give an additional vaccine to my children, who had already received all of the recommended vaccinations to date. (Respondent #39)

I had the feeling he had already received enough vaccinations. (Respondent #186)

Only 3/109 RH parents noted that generally they do not vaccinate their children:

I do not give my children any vaccinations. I see nothing different about this one. (Respondent #103)

The finding that overall, deliberation/resistance to the OPV was specific to this vaccination and not based on a principled opposition to vaccinations also emerged from an analysis of parents' comments in talkbacks, on Facebook pages, and on various websites on the subject. For example:

I gave my children all of the vaccines on time so I have no objection to vaccinations in principle, but in this case I don't understand why the health of the unvaccinated population rests on my children's shoulders ... (Lior, End of the World – A View from the Balcony, August 6, 2013)

Table 3. The rate of vaccination among survey participants.

Vaccinated their children (V)	Had not vaccinated but were intending to do so (I)	Had not vaccinated and were not intending to do so (RH)	Deliberating/hesitating (RH)
40% (79 participants)	7% (14 participants)	42% (84 participants)	13% (25 participants)

As these comments indicate, many parents' deliberations and/or decision not to vaccinate (OPV) did not result from a principled and broader objection to vaccinations but from a reasoned decision about this particular vaccination, weighing the risks of the vaccine and the disease.

An analysis of the questionnaire responses, as well as parents' comments in talk-backs, Facebook pages, and websites, reveals arguments that can explain the barriers behind the deliberations and opposition in this particular case. Some of the barriers were not new and have been reported in studies on previous vaccinations, and some were specific to this case (Table 4). Based on Sandman's theoretical model (1989), the findings are divided into barriers related to hazard (i.e. parent's view of the danger involved in giving their children the OPV), and those related to outrage (i.e. how they feel about the action and the emotions it produces).

#### **4.1. Barriers related to hazard**

##### *4.1.1. Vaccine safety*

The theme of concern over vaccine safety is a salient barrier that has emerged in vaccination compliance studies (Hobson-West 2007; Omer et al. 2009; Smith, Chu, and Barker 2004). In the present study, it emerges in the answers of 36 of the RH parents. Many parent questionnaire responses indicated that they were not convinced by the Health Ministry's assurances regarding its safety, nor were they satisfied by the explanation that it was not a 'new' vaccine but rather the same vaccine minus Strand 2 that was already eradicated from the world (Grotto 12.8.2013).

I don't think the vaccine was sufficiently monitored, there have been a lot of misleading reports and it seems too dangerous to me to put a live virus into my child's body. (Respondent #121)

I can't make up my mind whether the benefit outweighs the risk. The Health Ministry's explanations are not really convincing. (Respondent #138)

Furthermore, concern over the vaccine's safety and the uncertainty about whether it was a new vaccine or one whose safety had already been proven led many parents to feel that it was actually an experiment in which their children were the guinea pigs. For example:

Table 4. Known vs. new barriers to vaccinating.

Parents' barriers to children's vaccination		No. of responses	% of parents who refused/hesitated to vaccinate
Known barriers	Distrust in medical establishment	35	32
	The vaccine isn't safe	36	33
New barriers	My child is already vaccinated (OPV vaccine)	44	40
	Altruism and mutual accountability	42	39
	Conflicting and unsatisfactory explanations	44	40
	Why vaccinate against a pandemic if nobody has gotten sick	12	11

I will not let my daughters be guinea pigs for the company that manufactured the vaccine and for the Health Ministry. A vaccine that has not undergone clinical experiments is not a vaccine that we should give our children. (Respondent #43)

This feeling also emerged in many of the talkbacks, Blog and Facebook responses.

Another argument that appeared in parent responses both to questionnaires and on talkbacks was that the health officials' claim of 'zero side effects' increased their suspicions and reduced their trust.

According to the information from India (where children received a bivalent vaccination), the side effects are terrible and I am not willing to expose my children to that risk. Regarding the Health Ministry's claim of 'zero side effects' – as a doctor, I must say there is no such thing. (Respondent #72)

I want something very simple: for officials not to use language such as 'this vaccine has a 0% risk factor'... There is a difference between saying 'no connection was found' and 'there is no connection.' No serious scientific journal would ever make the latter claim and I think the standards should be the same when addressing the public. (Davidson Online, Zohar Lederman, November 12, 2013).

In addition to concerns over the safety of the OPV, parent responses specifically mentioned past vaccination campaigns that caused distrust in the health system, namely, the H1N1 and HPV vaccines. Examples include:

With the hullabaloo over the HPV vaccine, now I don't trust the Health Ministry. (Respondent #191)

Only 11% vaccinated against the terrible and dangerous avian flu that threatened to annihilate humanity. And then what happened? Nothing!!! Just a regular seasonal flu. Except that meanwhile the government spent millions on vaccines and the pharmaceutical companies went to town. So what do we learn from that about the necessity of that vaccine despite the orchestrated hysteria? (Haaretz, Anonymous, August 5, 2013)

#### 4.1.2. *The child has already been inoculated with IPV*

An argument that arose from the answers of the parents who responded that they had decided not to give their children the OPV was that their children had already received the IPV as part of the standard vaccination program. This argument recurred in 40% (44/109) of the answers of RH parents. For example:

I see no need for a vaccine other than the one she already received (usually as part of the HiB-DTaP-P vaccine). (Respondent #52)

This argument also appeared in many of the comments parents raised in talkbacks, forums, Facebook, and websites. For example:

I'm considering not vaccinating my children since they have already gotten the IPV. (Adi, End of the World – A View from the Balcony blog, September 1, 2013)

#### 4.1.3. *Vaccination – for the wrong reasons*

The findings from the questionnaires and an analysis of the talkbacks and forums showed that a considerable number of those parents who vaccinated their children did so out of a 'misunderstanding' of the reasons that led the Health Ministry to embark on the vaccination campaign. 24/87 answers (or 27.6% of V/I parents)

indicated that those parents did not actually understand at all that the purpose of the vaccine was not to protect their own children. The following examples illustrate this:

I vaccinated my children because I don't want them to contract the disease, God forbid, and I will not take the risk, just like I gave them all the other vaccinations. (Respondent #194)

Such confusion also appears in parents' responses in talkbacks, blogs, forums, and websites. For example:

The real question is whether someone who is not vaccinated is at risk for contracting polio. And then might have to deal with a sick child for the rest of their life. (Haaretz, Rob, August 11, 2013)

In conclusion, whereas many of the responses of the RH parents (at least 40%) understood that the purpose of the vaccine was not to protect their own children, it was found that a significant proportion (almost 30%) of the V/I parents did not in fact understand that the vaccine was not meant to protect their own children, and less than 10% of the V/I parents noted as a key factor the element of 'mutual accountability.'

#### 4.1.4. *Contradictory and insufficient explanations*

As the findings of the quantitative analysis indicate (see Table 5), more than half of the questionnaire responses noted that the information provided by the Health Ministry explaining why they should get OPV was not comprehensive, clear, or accurate. In contrast, only one quarter of the parents noted that the information provided by the ministry was comprehensive and clear. These findings are reinforced by the open answers to the questionnaire, which raise the issue of 'unsatisfactory explanations.' For example, parents who noted that they were deliberating over vaccinating explained their doubts:

I don't feel I have enough information to decide. (Respondent #183)

Furthermore, even parents who did decide to vaccinate their children brought up the issue of the Health Ministry's unsatisfactory explanations:

Table 5. Quantitative data – the extent to which parents think the information provided by the Health Ministry was comprehensive, clear and accurate.

Degree of agreement	The Ministry of Health has provided comprehensive and clear information about the reasons for giving children the OPV vaccine	In my opinion, the Ministry of Health has reported accurately about the OPV vaccine
Strongly disagree	34% (66)	35% (68)
Disagree	27% (52)	24% (47)
Do not really agree	15% (29)	16% (31)
Agree	19% (37)	15% (30)
Strongly disagree	6% (12)	10% (20)

I vaccinated them just to be on the safe side. I have to admit I did not understand exactly why, but because the risk is almost nil I decided to err on the side of caution. (Respondent #90)

A sense of unsatisfactory explanations about the effectiveness, safety, and necessity of OPV also arose from parents' comments on talkbacks, forums, and websites. For example:

The difficulty in making the decision stems from the ambiguity surrounding basic questions such as exactly who needs to be vaccinated, who is at risk from the vaccine, who has to get it and who is advised not to, but it comes mainly from parents' inability to understand the real reason for the vaccines. (Idit Shafran-Gittelman, Haaretz, August 22, 2013)

Furthermore, an analysis of questionnaire answers indicates that some of the parents felt the information presented did not rely on scientific and research-based data but on dramatization and even intimidation. For example:

I heard Health Ministry officials ... the inaccuracy of their statements and their silly and childish formulations ('smart virus' ... 'An enemy has infiltrated our country' ...) Instead of providing accurate, comprehensive information about the vaccine in a way that respects our intelligence ... I submitted two requests for information and data from the ministry (and not baseless declarations and slogans) ... I have yet to receive an answer. (Respondent #53)

A similar claim arises from the analysis of parent responses on the social media network. Many demanded to receive the research data on which the Health Ministry relied when calling on parents to vaccinate their children with OPV. For example:

My problem with my doctor's arguments is that, as opposed to the virus opponents, he does not bother to provide specific data to back up his claims. Instead, he resorts to dramatization and generalizations. The doctors would be well advised to present the specific studies upon which they base their arguments. In the Internet era the public has tools to check the credibility of information and not just follow orders. (Yonatan the Knower, September 8, 2010)

Furthermore, some of the parents even appraised the studies presented by the Health Ministry and by experts who supported the vaccine, and did not take the research recommendations presented by the experts at face value. The parent responses indicate that some of them asked for additional studies to clarify the issue of safety. For example:

The WHO's response says specifically that there is another clinical trial of the specific vaccine by GSK whose results have not been published yet ... When are results expected? I think this refers to a study from 2008 in South Africa, judging by a document describing the different experiments conducted and planned by the polio vaccine manufacturers ... If that is so, why haven't the results been published? (e-pochondriac, Ido, August 18, 2013)

#### 4.1.5. *Why vaccinate against an epidemic if nobody has become ill?*

In this specific case, the barrier seems to have arisen from the Health Ministry's framing of the situation as an 'epidemic,' even though not even a single case of the disease was detected. One representative response:

Of course there is no real reason to vaccinate. So far there has not been even one case of polio. (Respondent #54)

Similar responses found on the Internet:

How frightened can you be? There's not even a single polio case, not to mention an epidemic. (Alternative Truth, blue beam, August 28, 2013)

## 4.2. Barriers related to outrage

### 4.2.1. Feelings of distrust

The theme of distrust of the medical establishment, a salient theme that emerges in research on parents' barriers to vaccinations (Hobson-West 2007; Omer et al. 2009; Smith and Marshall 2010), recurred in the analysis of the survey responses in the answers of 35/109 RH parents. For example:

Unfortunately, I do not trust the Ministry of Health's professionalism and credibility. (Respondent #53)

Meanwhile, the theme of lack of trust in the health system also arises from an analysis of parent responses in talkbacks, on Facebook pages and on topical websites. The responses indicate that the distrust many parents expressed toward the health system referred both to its professionalism and to its credibility and trustworthiness, reflected in their expression of doubts as to whether the best interest of the children was the decision-makers' main consideration. For example:

We have no trust in a state that gives an order to all of its doctors to give a single answer to its citizens ... (Haaretz, Eden, August 28, 2013)

Moreover, the following quotes indicate that some parents even raised explicit doubts as to the involvement of economic interests underlying the decision-makers' considerations:

... This whole campaign is controversial. And the company that manufactures the vaccine is also controversial. And the Health Minister has a staff official who works for that company. (Respondent #79)

A 2005 Ynet report said point blank that the Health Ministry stopped giving the drops because it could cause an outbreak of the disease among those vaccinated. That and a lot of other complaints against the Health Ministry and the fact that everything is only because of economic interests! (Respondent #46)

These misgivings also emerged in an analysis of parent responses on websites, Facebook pages and blogs on the subject. For example:

It smells like a conspiracy, one day there is going to be an investigation about how the whole country got vaccinated against a virus that was detected in suspicious circumstances in a few unknown areas. Where are all the voices (and there were more than a few) who called on the public not to vaccinate or at least not with the vaccine produced by GSK, which had already been caught bribing doctors? How much is this costing us in health and money? (Ynet, Roi, August 11, 2013)

However, an analysis of the survey responses and the additional sources indicates that suspicion of corruption and economic interests were not the main cause for parents' distrust in the health system. A much more salient argument that arose in parents' responses was concern over the vaccine's safety.

#### 4.2.2. *Altruism at my child's expense*

Although the dilemma between personal well-being and maintaining 'herd immunity' has been described in the literature as a barrier to children's vaccination (Hobson-West 2007; Keane et al. 2005), in the present case, the dilemma was charged with a unique barrier. As opposed to other vaccinations, the drive to protect one's own child was irrelevant, because the sole purpose of the campaign was for the greater good.

An analysis of parent responses to the questionnaire found a noticeable difference in the attitude toward the concept of mutual accountability between parents who did and did not vaccinate their children. The main argument found in the responses of the parents who decided not to vaccinate was that their responsibility as parents was first toward their own children and not society, and therefore they did not see any reason to put them at risk 'for the greater good.' Some examples:

My children received the IPV and are not going to get sick themselves. I see no reason to put them at any risk to protect people who decided not to vaccinate. As for populations at risk (cancer patients etc.) – there are countless diseases they can contract and this is just one of them. To my mind that is a weak and populist argument ... (Respondent #6)

This claim also appears in parents' responses in talkbacks, on forums and on websites. 'Cost-benefit' considerations were a central factor in decisions of parents not to give their children the OPV, as, on one hand, they considered the fact that the vaccine was not intended to prevent the vaccinated child from getting sick, while on the other, the vaccine involved a risk, albeit slight. For example:

I understand the health system is under insane pressure ... I understand that supposedly I am supposed to vaccinate my children, who already received the IPV, so that they protect their friends, whose parents were irresponsible enough not to protect their children ... I do not intend to poison my children ... I am not vaccinating them!!! (Ynet, Carine, August 8, 2013)

Conversely, an analysis of the responses of the parents who did decide to give their children the OPV indicated that a small number of them had responded to the Health Ministry's call for 'mutual accountability.' For example:

Because herd immunity is important to me too ... I know the vaccines will not harm my children, who were inoculated with IPV, so I am happy to contribute to society by eradicating diseases. (Respondent #95)

It is important to inoculate to build a protective wall for society at large, especially those who could not get vaccinated for health reasons ... People who don't want to get vaccinated for reasons of conspiracy/ideology/ignorance – can drop dead! (Respondent #32)

However, such answers, based on a sense of social responsibility and a desire to protect the environment, were given only by 9% (8/87) of parents who said they did or intended to vaccinate their children.

## 5. Discussion

The research findings from our survey and analysis of talkbacks and Facebook discussions indicate that parents who normally give their children routine vaccinations decided not to give them OPV for a variety of reasons. While some of the reasons

found in this study – distrust of the health system and concerns about the vaccine’s safety – are barriers described in the literature, others are new reasons, specific to the polio outbreak in Israel, which are not found in the literature concerning children’s vaccination. One such reason was the claim that the children had already been vaccinated and they were protected. A second reason was the belief that the vaccination was for the general good at the child’s expense (‘altruism at my child’s expense’). In addition, we found that some parents vaccinated their children due to a misunderstanding of the reason for vaccinating. Namely, they vaccinated because they thought that OPV was meant to protect their children, whereas it was actually for overall societal well-being.

We would like to propose that the reason why parents who usually comply with vaccinations and the vaccination programs objected in the specific case of OPV stems from what Sandman (1989) called ‘the gap between the risk perception of the public and the expert.’ Whereas the experts viewed the spread of polio as a dangerous threat, the parents who chose not to vaccinate their children were not convinced of its severity, or of a genuine reason for vaccination. Moreover, according to Sandman, experts are driven mainly by hazard (conveying scientific information) when they approach the public, and do not take into account the affect which may influence the public’s risk perceptions. Our findings reveal that the public is actually driven by both sides of the equation (hazard and outrage), since it explains its attitudes *both* emotionally (outrage) and analytically (hazard) – the latter being generally thought of as the territory of the experts. According to our findings from the social media, the public actually feels that the explanations they are offered were not analytical enough and the explanations from the Health Ministry were neither satisfactory nor convincing.

This can be conceptualized in terms of matrices provided by Finucane et al. (2000) in their experiment on positive affective evaluation. They put forward four matrices showing how information about benefits (low or high) or risk (high and low) creates either a positive or negative affect. We find most applicable the matrix in which information which indicates a low benefit, which generates a negative affect, and which in turn generates the perception that the risk is inferred to be high. This is applicable here, because parents do not perceive the benefits of their children’s second vaccination, and therefore this generates negative affect, which in turn generates a high-risk perception of the vaccination. This perception of lack of benefit creates gaps between parents and policy-makers.

This gap can be explained by two reasons. First, the decrease in the transmission of many vaccine-preventable diseases, which has occurred largely due to the successful implementation of vaccination programs across the world (Muhsen et al. 2012), has led to most parents today not acquainted with these diseases, and their threat is less concrete for them (Omer et al. 2009). Therefore, those diseases are not perceived as a serious risk today, and many tend to selectively grade individual diseases in terms of their risk (Healy and Pickering 2011). A second reason stems from our findings, namely that parents knew their children were already protected by the IPV. That is, the concerns were in fact ‘responsibility-dependent’: While the experts, whose responsibility is to care for the general population’s health, feared a polio outbreak, the parents who refused or hesitated to vaccinate perceived their private children’s health as their main responsibility, and since they knew they were protected, they saw no need for the OPV.

In addition, this study found that the public faced an exceptional ethical dilemma. Normally, the public is asked to vaccinate as a preventive measure to avoid contracting the disease and spreading it to others. In the polio outbreak, the public was asked to take a preventive measure although it was already protected, involving possible risk. Furthermore, the target population consisted of children, a vulnerable population in every society. This study highlights the difficulty of framing the subject of vaccinations as a preventative measure, especially when the prevention is for society overall and not to protect themselves.

The barrier concerning ‘herd vaccination,’ which the literature says prevents some parents from vaccinating their children, was heightened. Thus, in the perception of those who refused the vaccine or hesitated, this was not a case of ‘mutual accountability’ but rather of ‘unilateral risk,’ whose purpose was to protect the public but not the individual. The fact that some parents did not understand the real reasons for the vaccination campaign and thought they were vaccinating their children to protect them can be interpreted, on the one hand, as a misconception for which the recipient is responsible, but on the other, according to the risk communication approach, as a ‘failure’ of the Health Ministry. Perhaps, the Health Ministry’s campaign was not sufficiently coherent and transparent. This perceived ambiguity might in the long term even create distrust toward the system.

Trust is one of the most dominant conceptual elements in communicating and managing risk between communicator and public (Cvetkovich and Lofstedt 1999; Earle and Cvetkovich 1995; Lofstedt 2005). Furthermore, the case of the polio outbreak in Israel emphasizes the importance of transparency and credibility in risk communication. The Health Ministry campaign conveyed that the vaccine had ‘zero side effects.’ One of the main barriers that usually prevent the public from vaccinating is the question of vaccine safety and side effects (Healy and Pickering 2011; Omer et al. 2009). The findings indicate that claiming there is no risk whatsoever was interpreted as neither respecting the public nor credible, and as such, it raised the resistance of those who were deliberating and caused a boomerang effect (Hovland, Janis, and Kelley 1953).

The findings of this study are important because they provide a glimpse into a situation that can recur in different places in the world where a disease considered to have been ‘eradicated’ returns, and the public is required to take measures that are designed to protect the general public but may put individuals at risk. The conclusions from these findings are that the public’s risk perception is based on a context-dependent analysis, which the communicating body must understand and respect. The recommendation for the risk-communicating organizations is to expose the dilemmas, communicate facts and talk ‘science’ even to laypeople, especially in conditions of uncertainty: the communicators must educate the public and include it, and not speak in all-or-nothing slogans.

Research limitations include the fact that the research population of this study was not a representative sample of all the parents who did not give their children the OPV. Also, self-reporting may rest in some misclassification. However, this study used the triangulation method (Farmer et al. 2006; Pope and Mays 1995), using several tools to reinforce its validity.

Future studies could analyze the evaluation of risk and psychological factors that can influence parental decision-making, in cases where there is a reappearance of a virus for which parents (and children) had already received a vaccine in the past.

## Notes

1. 'Herd immunity' describes a form of immunity that occurs when the vaccination of a significant portion of a population provides a measure of protection for individuals who have not developed immunity (John and Samuel 2000).
2. Websites were defined as pro/anti-vaccination following text analysis which indicated that articles published on those sites consistently supported/opposed vaccination.

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