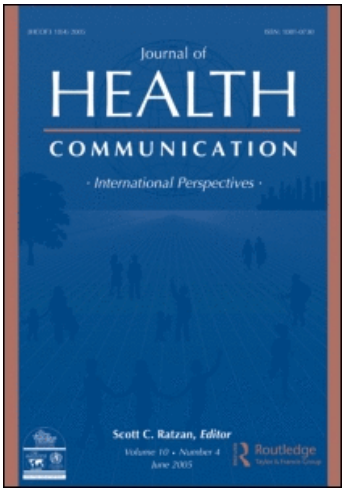


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# Using Data to Guide Action in Polio Health Communications: Experience From the Polio Eradication Initiative (PEI)

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# Using Data to Guide Action in Polio Health Communications: Experience From the Polio Eradication Initiative (PEI)

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*Health communication is increasingly considered a priority element of investments and interventions intended to improve personal and public health (Piotrow et al., 1997). But a prevailing focus in health communication on information, education, awareness, and knowledge—and their assumed relation to changing behaviour among target individuals or households—can underestimate the complexity of wider ecological conditions that influence and limit individual, household, and even community choices and capacity to choose. Experience from the Polio Eradication Initiative (PEI)—drawing on evidence from the India and Nigeria country programmes—provides some insights into how the health communication interventions can be strengthened through the adoption of a more holistic ecological model of people and their health-related behaviours analysed in the context of larger social, economic, political, and cultural forces (see, for example, Kelly et al., 2008). In particular, polio eradication health communication offers useful lessons in the importance of generating and using data of sufficient quality to enable a more ecological analysis—combining and measuring specific communication inputs and epidemiological "outputs."*

Health communication[1] developed out of public campaigns, initially in Europe, to promote hygiene and immunisation in the 18th and 19th centuries, cross-fertilising with behaviour, persuasion, and diffusion of innovations studies in the decades after

[1]For the purposes of this article, the main elements of "health communication" are the following: mass media, advocacy, social mobilisation (defined as the encouragement of popular or community participation for collective benefit towards a common goal), programme communication, and interpersonal communication. Except where more specifically distinguished, the term "health communication" (or "communication") will be used throughout to refer collectively to these activities, recognising the distinct purposes and contributions of each type of activity.

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World War II (Thomas, 2006). Within the relatively young epistemological field of "communication" more generally, health communication is not strongly embedded in or structured around one specific theory or operative model (Schiavo, 2005), and it continues to evolve conceptually and empirically.

Health communication emerged in epochs (Piotrow, Rimon, Payne Merritt, & Saffitz, 2003)—from a primarily medical focus on service-related information to more outreach-oriented and social marketing objectives.[2] Over time, the concept of health communication as, fundamentally, the delivery of information, education, and communication (IEC) materials—largely through mass and local-mass media channels—has been challenged by the recognition that simple information delivery has variable and often limited impact on behaviour across populations (Murphy, 1998). This article reviews orientations in health communication. It argues that, nested in multiple conceptual traditions and building from an often ambiguous empirical base, health communication has developed a somewhat awkward conflation of conventional "audience"-style messaging in inputs and yet the expectation of foundational behavioural changes in outcomes. Empirically, there remains a dissonance between claims of efficacy in health communication interventions and the limited availability of robust data demonstrating impact at the level of actual health outcomes and trends over time.[3] Conceptually, a behaviourist emphasis on individuals, households, and communities appears often inadequate in addressing a wider set of determinants conditioning people's health–related behaviours at a socioecological level.

This article offers some analysis of experiences in the global PEI, primarily drawing on evidence from the India and Nigeria country programmes, showing how challenges in the progress of PEI have provoked significant evolution in the concept and practice of communication.[4]



## Health Communication

Health communication advocates health behaviours, raises public awareness, and changes attitudes. Although these practices acknowledge a spectrum of levels from the individual to the social, the emphasis in practice remains heavily focused on the behavioural—implicitly the level of the individual or household (Institute of Medicine, 2002; Seidel, 2005). This focus can result in less attention to the influence of wider social forces, often outside of a person's control.

The Institute of Medicine states that the major objective of health, communication is to modify a person's beliefs, on the premise that such individually held beliefs are arguably the most significant determinant of how that person

[2]Social marketing defined as the application of marketing principles to programmes design to influence human behavior for the purposes of social benefit rather than commercial profit.

[3]Some studies have claimed considerable impact in health communications (e.g., Porter et al., 2000; Seidel, 2005). Meta-analyses have, by contrast, shown negligible or small effects of health communications (e.g., Hornik, 2002; Huang, Hui, & Kahn, 2007; Snyder et al., 2004; Snyder & Hamilton, 1999).

[4]Methodologically, the choice of India and Nigeria is influenced by their continuing prominence among remaining polioendemic countries, the prominence of emerging health communication programmes in both countries, and the availability of qualitative (direct author or reported observations) and quantitative (documented) data on PEI.

subsequently behaves (Institute of Medicine, 2002). In this respect, a behaviourist model construes health communication as primarily the conveyance of information in convincing and compelling forms; with individuals and communities as audiences in a pedagogic process (Schiavo, 2005); and of a reliable set of causal relationships among information, awareness, knowledge, attitude, belief, and, finally, behaviour. When people's behaviours do not reflect health-favourable options, the interpretation of the problem often is located back in the individuals—as ignorance or lack of information or understanding, neglecting, or underestimating the role of wider social, political, economic, cultural, and environmental factors.

## Health Communication—The Relation of Knowledge to Action

Contemporary health communication incorporates a number of conceptual models that describe mechanisms and processes through which information—via communication—influences perceptions, knowledge, attitudes, and behavioural choices.[5]

In reviewing these health communication models, Baranowski and colleagues (2003) raise two common critical problems: First, absence of a clear empirical linkage between changes in knowledge and directly attributable changes and behaviour (Knowledge-Attitude-Belief model; Health Belief model); second, a lack of attention to wider social, economic, political, cultural, and environmental conditions necessary to enable and support the interaction between changing knowledge, attitudes, and behaviours (Behavioural Learning Theory model; Social Cognitive Theory model; Theory of Reasoned Action model).[6]



A focus on behaviour—and on information, knowledge, and attitude as the drivers of behaviour—does not adequately address the question of *how* increased knowledge results in change. Recognition of a wider set of variables affecting the knowledge-behaviour transfer is needed (Baranowski et al., 2003). If health communication is seen as a way of affecting people's risk perceptions and thus behavioural intentions (Huang et al., 2007), the effectiveness of such health communication must be predicated on the assumption that attitudes and intentions are consistently and positively correlated. Research suggests, however, that this is not reliably the case (Keller & Lehmann, 2008).

The health communication field is still in a process of growth and formation, with arguments about conceptual framing and debates over empirical validity. The need remains to move beyond the behaviourist paradigm and to acknowledge more coherently complex relationships among knowledge, attitude, intention, and action; and among individual choices and wider structural determinants of peoples' behaviours. The empirical basis, on which health communication interventions claim to improve people's health and their effectiveness can be reliably assessed, is also being strengthened. This requires stronger approaches to evaluation (both formative and summative), using a more coherent conceptual framework, including measurable

[5]The knowledge-attitude-behaviour model; the behavioural learning theory model; the health belief model; the social cognitive theory model; and the theory of reasoned action (or theory of planned behaviour) model. A central problem, however, is the lack of empirical support through research-derived data that validate accuracy and impact at higher levels.

[6]Additionally, it would be important in applying and assessing these models to distinguish between "one-off" behaviour changes (such as inoculation) and sustained lifetime changes (such as diet).

indicators of individual, interactional, and socioenvironmental factors as well as behavioural and epidemiological measures of health outcomes.

The evolution of health communication in the global Polio Eradication Programme may provide some valuable lessons for health communication, both in terms of the shift from mass awareness and behaviourist emphases to a more ecological understanding of PEI realities in local contexts, as well as improvement in the use of empirical evidence—better data—to improve understanding of local realities and to strengthen the overall programme's capacity to fashion appropriate responses.

## The Polio Eradication Initiative

The global initiative to eradicate poliomyelitis, a crippling infectious disease predominately affecting children, was launched by the World Health Organisation (WHO) in 1988. The original goal was to eradicate wild poliovirus (WPV) transmission by the year 2000. In 2001, cases of WPV globally had fallen to 483, from an estimated average of 350,000 a year prior to PEI's launch. Circulation of WPV serotype 2 was interrupted; and the number of polio-endemic countries dropped precipitously from 126 in 1988, to 30 in 1998, to just 4 (Nigeria, India, Pakistan, and Afghanistan) in 2006 (Global Polio Eradication [GPEI], 2009; United Nations Initiative Children's Fund [UNICEF], 2001).



Health communications in the initial years of the PEI were dominated by supply-side—largely technical and logistical—concerns (Taylor, 2003). The assumption was that demand for polio vaccination existed broadly across populations and that making vaccine available—and informing people of its availability—would be sufficient to get children immunised (Waisbord, 2004). Thus, the initial strategy focused on large-scale, relatively straightforward information dissemination (Waisbord, 2004). A considerable part of communications investments and activities were directed to mass media,[7] high-level political advocacy, and some largely events-based attempts at social mobilisation (Lahariya, 2007). In 2003, the majority of communication budgets in the three major endemic countries (India, Nigeria, Pakistan) were allocated to mass communication efforts (Taylor, 2003).[8]

## PEI—Crisis[9]

By the end of the 1990s, WPV circulation continued in only a handful of countries—and primarily in persistently susceptible subregions. After almost interrupting WPV

[7]For example, engagement of high-profile celebrities; use of mass media, TV, and radio spots; and print materials such as posters and leaflets.

[8]As earlier, communication here includes activities also described as social mobilisation. Social mobilisation often involved somewhat formulaic meetings and public ceremonies (for example, in Nigeria, rallies, public address systems, football matches, fanfares, flag-off ceremonies). Interpersonal or programme communication activities were increasing as a proportion of total activities, but they remained relatively smaller scale.

[9]In this article, the period 2000–2005 is described as a period of crisis for the PEI. This period is epitomised by the suspension of oral polio vaccine (OPV) delivery programming in Nigeria between 2003 and 2004, which resulted in increased cases in Nigeria and exportations to countries that previously had interrupted indigenous WPV transmission.

circulation in most countries in 2001, however, the number of WPV cases in endemic countries increased again, with exportations to other countries. The number of WPV cases globally rose from a low of 483 in 2001 to 1,997 in 2006, with Nigeria increasing from 56 cases in 2001 to a high of 1,122 cases in 2006. Cases in India declined since 2002 (when 1,600 cases were reported) but were higher in 2006 (676 cases) than the 3 previous years. Additionally, 13 nonendemic countries reported reimportations in 2006 (GPEI, 2009).

A problem was the persistent immunisation gap of up to 15% (and in some instances more) within the target population in specific areas of the remaining endemic countries. Continued susceptibility among children in a few limited areas was sustaining WPV transmission and thus threatening the outcome of the entire global programme (Taylor, 2003). From 2002, the majority of the circulating virus in India, for example, primarily was localised to two northern states (Uttar Pradesh and Bihar).[10] Upward of 80% of Indian cases occurred in Uttar Pradesh, the majority of these originating in relatively confined reservoir areas in western and central-eastern districts. A disproportionately heavy load of cases were from predominantly Muslim demographic areas. During the same period, most polio cases in Nigeria were confined to six states in the north (also with majority Muslim populations), around the epicentral reservoir in Kano State.[11]

It became clear that the global arena for polio eradication had changed and that better understanding was needed of the populations in which WPV circulation continued.[12] The causes of remaining susceptibility in northern India and northern Nigeria required more detailed data than the epidemiological or coverage information alone could provide. Other kinds of "social" data were needed, which were more readily available through the health communication component of the PEI programme. This required the PEI to reexamine its concepts and practices—notably, to collect additional data and develop new strategic approaches considerably beyond the conventional health communication models applied previously.[13] Central to these strategies was stronger use and linkage of epidemiological, social, and communication data.



## Data

By the end of the 1990s, epidemiological data suggested that mass awareness and general public support were no longer the priority issue for the eradication end game, yet the communication programme initially was slow to respond. From its inception, the use of data in polio health communication was of variable consistency and quality. There was a fundamental absence of evaluation research throughout the PEI communications work. Strategic decisions were "often based on gut feelings

[10]Local spread occurred elsewhere in India, for example, in West Bengal, Rajasthan, Gujarat, and Haryana.

[11]The six high-risk Nigerian States in 2006 were Kano, Katsina, Jigawa, Bauchi, Zamfara, and Kaduna.

[12]For example, given the size of birth cohorts and the target population, the 0.7% of children unreached, unvaccinated, or inadequately vaccinated could hold up India's eradication goal and set back the enormous progress made (UNICEF, 2003).

[13]In April 2002, the Technical Consultative Group (TCG) of the global polio programme had called for an urgent review of communication activities and evaluation of progress in addressing social mobilisation needs for the PEI.

and beliefs'' (Waisbord, 2004, p. 3). Data collection and analysis were operationalised through independent surveys—primarily focusing on measuring levels of knowledge and awareness of polio, the polio programme, and specific campaign supplemental immunization activities (SIAs).[14] Such surveys, it may be argued, are data limited and perpetuate the assumption that a certain amount of information and knowledge will translate into desired behaviour.

In essence, up to and during the early part of the PEI crisis, the communications programme was operating relatively independently of the technical programme (epidemiological surveillance, vaccine delivery, and logistics), setting its own goals (largely to do with levels of public awareness), and measuring achievement without clear reference to the core, overall objective of the initiative—to get all children adequately vaccinated and thus halt viral transmission.

A central element of PEI's strategic renewal in the early 2000s was the near universal call for a better use of combined technical/epidemiological and social/communications data across the programme (Polio Communication Technical Advisory Group [TAG], 2006; Taylor, 2003; UNICEF, 2000, 2001, 2003).



## Formative Data Use—Analysing "Missed Children"

From the late 1990s, alarm at persistent WPV circulation and corresponding patterns of undervaccinated children provoked a search for explanations among polio programme stakeholders. It was recognized that understanding the causes of remaining missed children was vital to the global programme's success. The concept of ''resistance'' emerged as a leading explanation for missed children. To the extent that residual WPV and undervaccinated children in the early 2000s appeared disproportionately (in both India and Nigeria) to be found in Muslim communities, a link was formed originally between religion and resistance (subsequently modified to include other attitude and knowledge-related conditions such as illiteracy and susceptibility to rumours). One popular assumption across the polio programme held that resistance to OPV was a result of negative rumours, for example, that OPV was contaminated with HIV, or that it contained elements injurious to fertility designed to reduce Muslim population numbers (Lahariya, 2007; UNICEF, 2001).

Consistent with this interpretation—and in keeping with a health communication model that emphasized knowledge/belief, attitude, and behavior—the programmatic response to resistance (or as it subsequently became known, ''noncompliance'') was to redouble conventional health communication interventions focused on providing accurate information and correcting misunderstanding. Communication in this respect remained pedagogic in nature, didactic, and one-way, using information, education, advocacy, and persuasion (UNICEF, 2001; Nigeria National Programme for Immunisation [NPI], 1999).[15]

The interpretation of resistance or noncompliance as a matter of religious objection or misperception, however, has been increasingly widely contested—both

[14]The Pakistan PEI programme, for example, employed Gallup to conduct such surveys regularly through the late 1990s.

[15]Most [communication] training seems to be related to polio facts, data, and ''convincing'' strategies, but for the most crucial aspects of communication—the difficult aspect of negotiating and reasoning and positively engaging and facilitating group processes, however, there appears to be little training (UNICEF, 2007).

empirically, through research-based evidence, and conceptually (Institute of Development Studies [IDS], 2006). Central to the problem was analysis based on inadequate specificity and investigation of data. In the India programme, for example, internal monitoring data showed that around 75% of children described as ''noncompliant'' were missed as a result of practical issues—such as households being unaware of the time of vaccination or of the need for vaccination. Yet the communication programme reaction was the standard response to ''rumours and misconceptions'' (UNICEF, 2001).

Inadequacy in understanding (and thus responding effectively to) resistance was, to some degree, due to the data generation systems. Monitoring forms in India for missed children and noncompliance for the period 1999–2000 did not ask sufficient questions to enable adequate analytical distinction between causes. Forms lacked obvious and practical questions, such as whether the family or missed child had been out of town at the time of vaccine delivery. At the same time, households enumerated as ''no response'' to questions about missed children were classified under the heading ''Fear (associated with rumours).'' For that time period, 43% of all missed children were analysed as noncompliant based on fear. In 2000–2001, when additional reasons for missed children were added to the monitoring form,[16] these new reasons immediately accounted for 25% of missed children. Simultaneously, the number of missed children recorded as being noncompliant ''due to fear'' fell by nine-tenths, to 4.3% (UNICEF, 2003).[17] In 2004, in Nigeria, almost three-quarters of all missed children in Kano State were recorded as having been missed as a result of noncompliance based on ''religious objection'' or ''ignorance'' (Polio Communication TAG, 2004a). With the addition of new categories of reasons for missed children in 2006 and 2007, the proportion of non-compliance attributed to religious belief fell to between 7% and 15% (Polio Communication TAG, 2007b).

Initial analysis and explanation of missed children and noncompliance focused on issues of deficit knowledge or inaccurate beliefs within communities and, primarily, individuals. Better research and data generation and use, however, have contributed to more ecological analysis of the underlying issues manifesting as noncompliance.[18] A growing body of evidence suggests some very practical and rational reasons behind noncompliance. For example, changes in service delivery resulted in some access problems or confusion (e.g., from house-to-house to outreach points and booths or a combination of these). Additionally, communities in northern Nigeria expressed concern that the massive emphasis on polio vaccination distracts from pressing local priorities in, for

[16]Including ''unaware of the polio programme,'' ''out of town,'' and ''too busy to take child to vaccination booth.''

[17]In 2007, ''refusal'' as percentage of missed houses was recorded as 0.17% (Polio Communication TAG, 2007a). In 99.44% of cases of missed children, the causes were either that the house was locked or that the family was out of the village.

[18]It should be noted that progress towards a more ecological approach to data gathering and analysis in and for health communication in PEI, whilst notable and welcome, is by no means perfect. A variety of wider ecological variables, such as political context—which are more difficult to capture in quantitative data, and more difficult to thus correlate robustly with objective changes in vaccine delivery and immunologic status of target groups—are starting to be included in surveys and other ground-level analyses, but they continue to be developed.

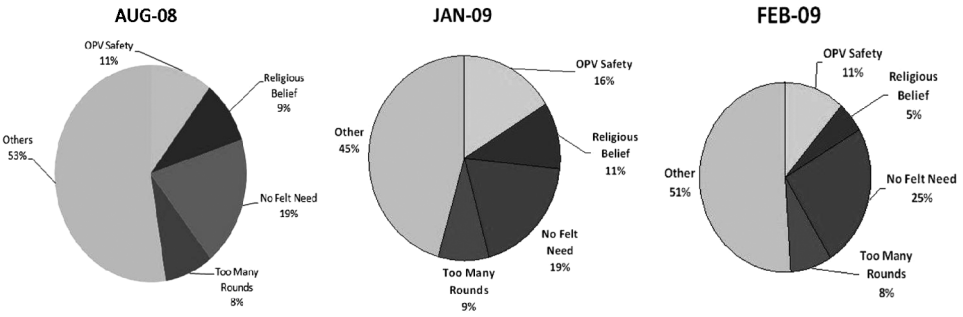



**Figure 1.** Reasons given by parents for refusing to vaccinate children with OPV, tracked by SIA round through Monitoring Data in Kano, Katsina, and Zamfara States, Nigeria, August 2008 and January and February 2009 (World Health Organization [WHO]/AFRO, 2009).

example, measles and malaria, drawing scarce health system resources away from other primary health care issues (Renne, 2006).[19]

From a single, poorly disaggregated category (''resistance'') attributed as a primary cause of missed children, communication actors in both India and Nigeria, in collaboration with technical/epidemiological colleagues, developed more nuanced and informative data gathering systems for problem analysis in the formative stage of programme strategy. Figure 1, for example, shows a breakdown in categories of reasons for refusal to vaccinate children with OPV from three states in northern Nigeria during three rounds of SIAs, which is used to frame appropriate responses and adjust strategies over time.

A key shift in the quality and application of health communication in the polio eradication programme came when communication protocols were linked with the epidemiology and jointly mapped. In both India and Nigeria, communication actors contribute significantly to defining, targeting, and mapping high-risk communities in increasingly localised endemic areas using indicators that combine social and epidemiological data. These then are mapped at a number of levels to guide programming and allocation of resources, as shown in the three maps of Uttar Pradesh (UP, northern India) in Figure 2. The map (left) shows data on the WPV3 cases from January to October 2009. These data are updated and compared with each round of SIAs, for which data such as missed households are tracked (centre map) and program support, including communication, adjusted accordingly. Mobilisers also are placed, and their locations readjusted, from round to round (right map) based on the data and response needed.

Having identified broader causes for poor vaccination, the establishment of the ''underserved strategy'' in India after 2004 developed systematic activities to engage with a range of local (particularly Muslim) actors with potential to influence their communities on behalf of the PEI programme. The strategy acknowledged a broader

[19]It is now suggested that suspension of polio programme activities in 2003–2004 in several northern Nigerian states should be understood as the product of a complex interplay of factors and political objectives (Clemens, Greenough, & Shull, 2006; Jegede, 2007; Obadere, 2005). Rather than indicating a religious nature in noncompliance, high rates of missed children can be interpreted as the result of systematic exclusion of communities from a range of political, social, and economic resources.

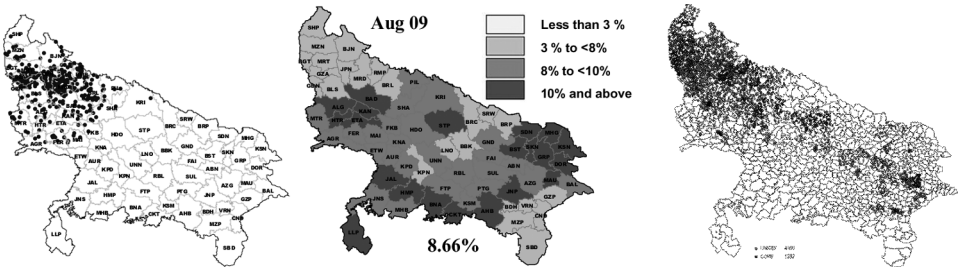



**Figure 2.** Left to right: WPV3 cases in UP from January to October 2009 (left), percentage of missed houses by district during August 2009 SIA round (center), and location of community mobilisers in October 2009, Uttar Pradesh, India, 2009 (India Expert Advisory Group [IEAG], 2009).

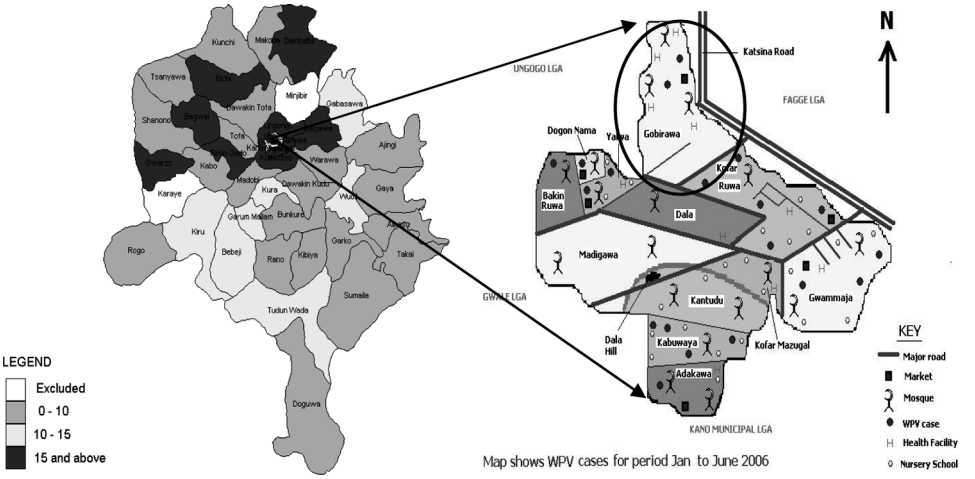
set of ecological factors affecting communities with high rates of missed children. Intensified interventions, using both communications and vaccine delivery, were implemented using comparable indicators to measure outcome and impact (see following Summative data use section). Block- and community-level (subdistrict) mobilisation personnel were deployed, reassigned, or both to where epidemiological and coverage data showed WPV cases and missed houses. This also involved a significant increase in investment in human capacity on the ground. Between 1995 and 2007, PEI communications in India, notably through the Social Mobilization Network, grew from three full-time staff to a team of 244, with 10 full-time coordinating actors (UNICEF India, 2008), additional nongovernmental organization (NGO) partners, and a cadre of thousands of community mobilisers based in the high-risk districts. Mobilisers were recruited locally and worked in their own communities to explain—both in household and community settings—the purpose and processes of the PEI and to engage with households with evidence of low immunisation status. The India polio programme also further has increased the sophistication of formative data analysis through increasingly segmenting target groups.[20] Additionally, these groups are analysed to specify the concerns and questions that underpin their disposition towards the polio programme.[21]

Similar strengthening of data, analysis, mapping, and targeting can be seen in Nigeria. Epidemiological and social data are combined in identifying very high-risk communities (including tracking 0-dose children[22] and trends in noncompliance).

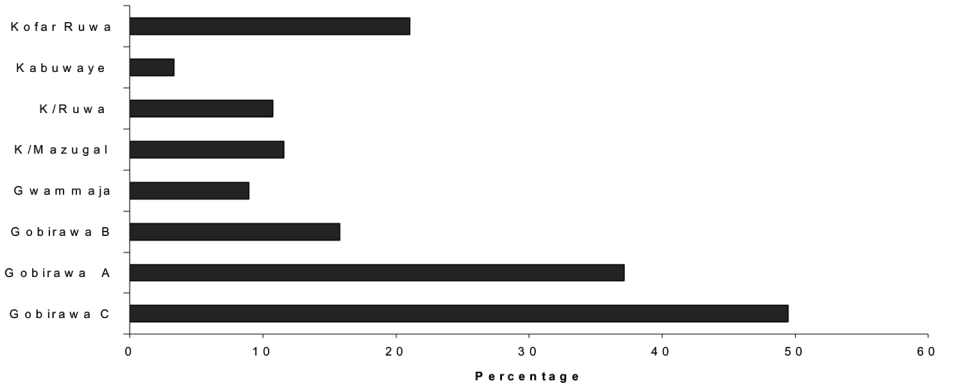
[20]For example, India PEI programme data disaggregate respondent households into those who accept polio drops and would go to the booth; accept polio drops but whose interest in taking children to the booth might wane; are indifferent about polio drops and unaware of date, time, and venue for booth vaccination as well as home visits; reject polio drops because of misconceptions, mistrust or rumors; or all of these.

[21]Such as, ''Why the need for NIDs again?; Why the need for repeated doses?; the concern and doubts of parents with children below 3 months (e.g., my child is too young to be immunized, and there might be side effects); the concern of parents with children above 2 years old (e.g., My child has already received greater than 5 doses, so why the need to get more doses?); misconceptions that polio drops would cause impotency/sterility in children; and rumour that poor quality vaccine was administered to minority groups'' (UNICEF, 2003). Beyond the analysis of concerns relating to missed children, noncompliance, or both, the India programme sought to develop methods of understanding ''conversion factors''—that is, assessing the negotiation approaches of community mobilisers at the household level to identify what specific aspects of an approach appear to provoke a positive shift in the household response (Polio Communication TAG, 2004b).

[22]Children who previously had not received a dose of OPV.




(a)




(b)



**Figure 3.** (a) Kano State map (left) with numbers of WPV cases by LGA; and Dala LGA map (right) with Ward boundaries, polio cases, and local social institutions/resources; (b) Wards in Dala LGA with corresponding rates of missed children by Ward, notably in Gobirawa A and C Wards. *Source*: Polio Communication TAG, 2007b.

A particular improvement was disaggregation of such data to the Ward level (the administrative unit below the Local Government Authority [LGA]). Figures 3a and 3b show an example from Kano State on the progressive data-driven targeting process from high-risk State, to high-risk LGA, to high-risk Ward.

After a period of over-reliance on the concept of resistance, the willingness across the polio programme to explore underlying causes, break down categories of analysis, and set indicators more finely tuned to the actual conditions and perspectives of the targeted communities was key to understanding and addressing the global deadlock.

## Summative Data Use—Setting Objectives and Measuring Impact

Prior to the early 2000s, there were substantive weaknesses in the evaluation of communication activities' contributions to polio eradication. Many activities

(in particular, local-level social mobilisation) had unclear objectives and lacked measurement or evidence of impact (Taylor, 2003).[23] Some evaluation focused primarily on process—"numbers of posters printed, number of persons trained, number of community events held" (Bernardt, 2004), which failed to answer the question, "Did the desired outcome occur" (Bernhardt).[24] Much measurement focused on mass media and sources of information—in keeping with the early conception of communication for PEI as primarily delivery of information and improvement in awareness. As noted previously, this did not reliably assess whether the knowledge-to-action translation led to the desired health outcomes.[25] Measurement of communication activity impact was largely unlinked to programmatic and epidemiological data.

A synopsis review of five PEI country programmes conducted in 2000 emphasised the need for communication programmes to institute better indicators for measuring impact (UNICEF, 2000). Additionally, a review of PEI communications from 2001 highlighted the need for standard indicators to be systematically assessed.[26] Most indicators, however, were concerned with the measurement of knowledge. No epidemiological indicators were included, and only one indicator related to the quality of vaccine delivery programme management (UNICEF, 2001). As WPV circulation continued in high-risk areas despite intensified communication activities, it became clear that evaluation of communication activities and impact would have to combine epidemiological analysis with analysis of the characteristics of persistently vulnerable households and children. As a result, in both India and Nigeria, there were significant attempts to advance the use of combined social and technical datasets for summative evaluation and measurement of impact.

In India, for example, evaluation of intensive mobilization activities in "resistant" communities was reestablished with a more concise set of indicators that considered progress toward meeting programme objectives. The indicators included



[23]In cases where attempt was made to assess the impact of mobilisation activities, methodological approaches frequently were limited to "before-and-after" tests, with little attention to possible confounding factors of secular trends or controls.

[24]Early approaches to impact measurement for the India social mobilisation network in Uttar Pradesh were critically appraised on these grounds: "As with many communication and social mobilization interventions in developing countries, the SM Network primarily measured its output in terms of activities or processes. The drawback from its initial year of operation was the lack of systematic monitoring and evaluation of impact" (UNICEF, 2003).

[25]Polio programmes have recorded high rates of awareness and supportive intention and yet continued to fail to eliminate circulating WPV.

[26]Possible indicators included the following "percentage of caretakers of infants under 1 year who know correctly when the next immunisation is due; percentage of caretakers of infants under 1 year who know the number of visits needed to complete childhood immunization; percentage of vaccinators who know how to recognise AFP and where such a case should be reported; percentage of caretakers of infants under 1 year who know the number of visits needed to complete childhood immunisation; percentage of caretakers of infants under 1 year who know where to take their baby for routine immunisation; percentage of caretakers at NIDs knowing that NIDs do not replace routine immunisation; percentage of caretakers at NIDs who are advised about routine immunisation during NIDs; percentage of vaccinators who know how to recognise AFP and where such a case should be reported; percentage of vaccinators who can correctly explain how to interpret and use vaccine vial monitors (VVMs) on polio vaccine vials; percentage of district/subdistrict plans that map resistant or difficult groups, including "zero dose" children, and propose strategies for reaching them."

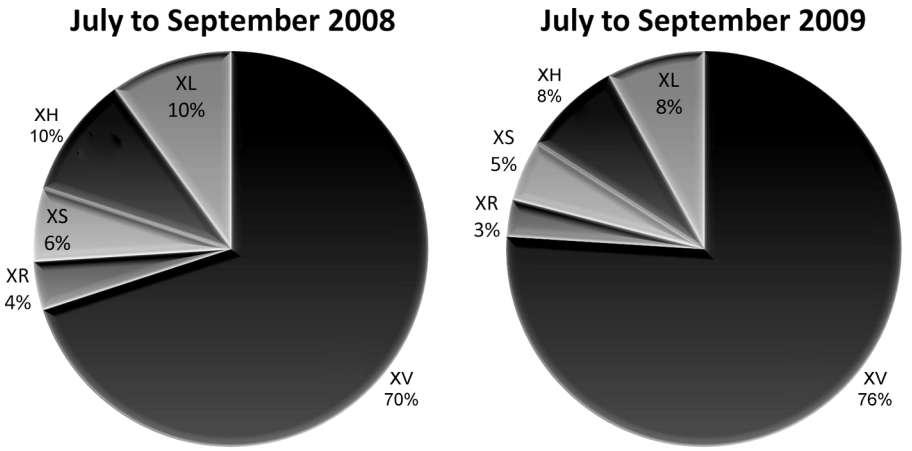



**Figure 4.** Reasons for remaining X houses tracked by mobilisers from tally sheets in high-risk areas in UP. *Source*: IEAG November 2009. XV = outside of village (e.g., migratory populations), XL = house locked; XH = out of house; XS = child at school; XR = refusal to vaccinate.



measures of information and knowledge, household behavior (rather than attitude or intention alone), and, later, numbers of doses of OPV and ultimately remaining cases of polio:

1. 20% increase in under-5 children immunized on booth day during NIDs;
2. 25% reduction in X-marked houses during house-to-house vaccination following each round; and
3. 100% conversion of X-marked houses to P-marked houses following B-team activities (UNICEF, 2003).[27]

Since 2004, reasons for X-marked houses (see Figure 4) have been further segmented and compared between rounds and over time to adapt program response and refine communication indicators for the India programme, including the following:

1. 90% awareness and acceptance of polio vaccination among families and communities of children under the age of 5;
2. 100% of children under the age of 5 fully immunized against polio (reduced immunity gap);
3. 70% reduction in the amount of resistance and reluctance expressed by families and communities to receiving OPV;
4. 30% increase in booth coverage[28] over November 2003 booth coverage (Polio Communication TAG, 2004b).

[27]In programmatic terms, "X" marked houses were where an eligible child or children did not receive a dose of OPV during the polio round. A follow-up communication/vaccination team—known as a "B" team—then visited the X-marked house to encourage OPV acceptance. If the child/children received OPV, the house marking was changed to "P."

[28]Temporary fixed site location for vaccination scheduled in conjunction with the OPV campaigns each round.

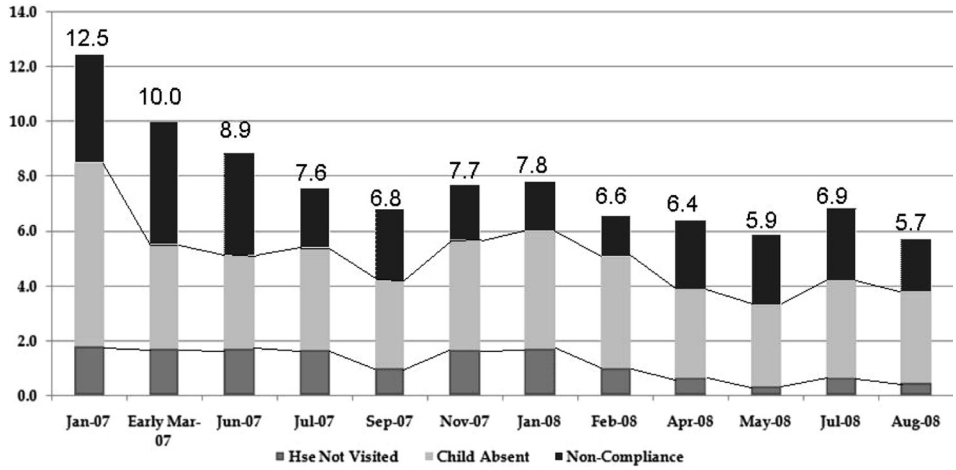



**Figure 5.** National trend of missed children by SIA round in Nigeria. *Source*: SIA tally sheets, TFI, 2008.



In Nigeria after 2006–2007, communication programme evaluation similarly included trend analysis for reasons for missed children (see Figure 5) and a combination of indicators for knowledge, behaviour, and vaccination outcomes:

1. percent reduction in noncompliant households from the 2006 level;
2. percent of heads of households that agree that multiple doses of OPV are safe;
3. percent of parents that had their under-age-5 children immunized with OPV during the last round of IPDs (polio Immunization Plus Days);
4. percent of parents who can state the number of DPT doses a child requires before the first birthday; and
5. percent of eligible children that received three doses of DPT (Polio Communication TAG, 2007b).

An explanatory note appended to a review of communication evaluation policy in India is instructive:

> Strictly, these [indicators] are not communication objectives, but good proxy indicators of behaviours integral to the programme and its target result. . . . Much as there was wide recognition that improvement of these indicators depended on families' attitude and behaviours (apart from a well-operated SIA), there was relatively little capacity within the health system to collect, collate and analyze a separate set of data that were exclusive to communication. (UNICEF, 2003, pp. 34, 55)

It is this merging of epidemiological, technical, and communication functions that constituted a significant advance in the conceptualization and operationalisation of the polio programme.

In both India and Nigeria (though at differing speeds and rigour), intensified communication activities supporting social mobilisation and interpersonal communication in targeted localities were evaluated using control communities

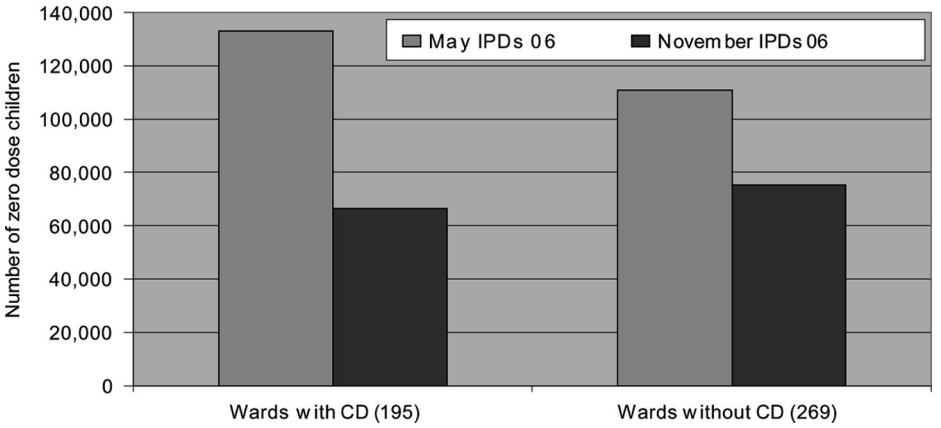



**Figure 6.** Community dialogues and 0-dose children, Kano State. *Source*: Polio Communication TAG, 2007.



to generate a degree of comparison. In India, for example, percentages of missed houses "converted" to adequately vaccinated houses have been measured in areas in which community mobilisers (CMCs) had been deployed compared with areas in which they had not. For example, in Meerut District, Uttar Pradesh, successful conversions between January and April 2004 rose from 49% to 58% in CMC areas, and by 67% to 68% in non-CMC areas (Polio Communication TAG, 2004).[29] These data continue to be collected in the various districts. Overall in Uttar Pradesh, for example, refusal households in CMC areas have reduced from approximately 4% in 2005 to 2.6% in 2009 (IEAG, 2009). A variety of questions can be raised about the reliable quality of such data in highly complex, often urban, conditions in which CMC placement constantly shifts between SIA rounds. In the early period, data emerging from control evaluations in India were somewhat ambiguous related to impact.

In Nigeria, Figure 6 shows a similar attempt at control comparison in the use of community dialogues (CDs) between two rounds of Polio IPDs in Kano State:

These and other communication data then are compared with trends in reduction in children who have not been vaccinated or are insufficiently vaccinated as a proxy for determining the communication interventions' contribution to impact (Figure 7).

While there is a shift toward a more ecological approach that merges social, behavioural, and epidemiological data, these data need to be further triangulated and analysed across PEI, to consider political conditions as well as more comprehensive behavioural and social determinants. It is important to note, however, that this programmatic advance constituted an attempt to apply some rigour and trend analysis to the communication activities' linkage with measurable health outcomes (e.g., degree of vaccination, remaining circulating WPV).

[29]Community mobilisers (CMCs) were placed in the highest risk and often lower coverage blocks in districts with circulating WPV and large numbers of missed children.

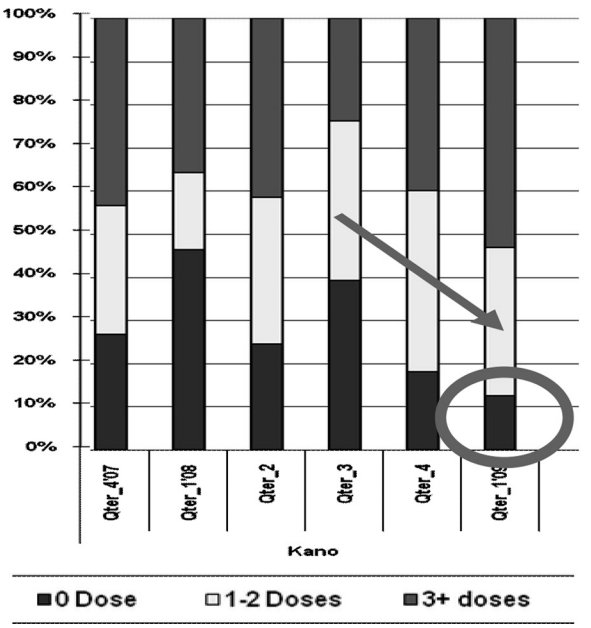



**Figure 7.** Oral polio vaccine (OPV) vaccination status in Kano among nonpolio acute flaccid paralysis (AFP) cases, fourth quarter 2007–first quarter 2009. *Source*: WHO/AFRO, 2009.



## Conclusion

> If any criticism can be levelled against the approach adopted by the WHO and UNICEF doing the polio immunisation campaign, it is their relative disregard of what might be called the 'social embeddedness' of medicine. (Obadere, 2005)

Although there is validity to this critique, this article has suggested evidence of substantive evolution in the way programme communication for polio eradication has developed, and how the experience of polio eradication has contributed to the development of health communications conceptually and in practice.

The PEI is a dynamic programme, learning over time (Lahariya, 2007; Taylor, 2009). The communication component in PEI expanded its organising concept from a focus on individuals' information, knowledge, and assumed consequent behaviour to one that embedded an understanding of individuals, their communities, their thought processes, and their actions, in a wider ecological framework of social, economic, political, and cultural determinants. Analysis of more distal ecological factors, however, such as political context and function of social institutions, is still, in many cases, in the early stages of development. The communication component in PEI has achieved some considerable success in this process, through a stronger, more rigorous use and analysis of data that includes, for example, identification, mapping, and measurement of programme communication activities for OPV vaccination of missed children. Further study to link communication interventions with epidemiological impact is needed, particularly in Nigeria. The cost of studies and

the continual shifting of geographic focus between rounds and based on where cases emerge, however, make comparison of data difficult. Despite these challenges, communications functions within the PEI programme have helped to provide more detailed, textured analysis of the local social, economic, institutional, and cultural conditions in which polio vaccine delivery—on the road to eradication—occurs.

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