

# Scaling Up Zinc Treatment Through Pharmaceutical Marketing: An Assessment of Zinc and ORS Prescription for Childhood Diarrhea by General Practitioners in Indonesia

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## **Executive Summary**

### **Background**

In 2009 the Government of Indonesia adopted World Health Organization/UNICEF recommendations for the clinical management of acute diarrhea to include both oral rehydration therapy and zinc as its national treatment policy. Zinc is widely recognized as a highly effective and inexpensive way to treat childhood diarrhea. Clinical research suggests that if children take 20 mg of zinc (10 mg for children under six months of age) for 10 to 14 days, the outcome is up to a 25 percent reduction in the duration of acute diarrhea and a 40 percent reduction in treatment failure or death (WHO/UNICEF 2009).

USAID's Point-of Use Water Disinfection and Zinc Treatment project (POUZN) worked with the government of Indonesia from 2007 to 2010 to create clear national guidelines; spur public sector investment; develop a vibrant, competitive market for zinc within the private sector; influence the prescribing behaviors of health care providers; and generate demand among caregivers. POUZN's success in improving the awareness and prescribing behavior of zinc among key opinion leaders and pediatricians led to the launch of a 12-month extension to expand the promotion effort beyond pediatricians in select cities through a pharmaceutical marketing intervention.

The goal of this follow-on activity was to extend the cascade of influence to the front-line health care providers that treat childhood diarrhea at the community level—mainly general practitioners (GPs) and midwives—and to convince drug manufacturers of the viability of targeting these groups as potential prescribers of zinc. The contract was awarded to the former Academy for Educational Development's Communication for Change (C-Change) project, which viewed the GP market as one of tremendous untapped potential.

Over an intensive period of approximately three months from May through August 2011, C-Change, in close collaboration with pharmaceutical partners, put three elements of a pharmaceutical marketing intervention into place: symposia to introduce zinc as part of the recommended treatment for childhood diarrhea, zinc promotion training of pharmaceutical representatives and their subsequent detailing visits to GPs, and publication of feature articles and advertisements in two professional association journals and websites. Baseline and endline surveys were conducted to assess the use of zinc and ORS by GPs and midwives for treatment of childhood diarrhea. The project intended to use the results to demonstrate the viability of an expanded market so that pharmaceutical partners would invest their marketing resources to introduce zinc to first-line health providers, not only to pediatricians and hospital doctors.

### **Objectives**

The overall objective of this study was to assess the ORS and zinc prescription behavior of GPs and midwives for treatment of childhood diarrhea following an intensive pharmaceutical marketing intervention. The specific objectives were to examine prescription behavior and exposure to information on oral rehydration salts (ORS) and zinc before and after the intensive pharmaceutical marketing intervention as well as the association between ORS and zinc information provided by the intervention and ORS and zinc-related knowledge, attitudes, and beliefs. This research report focuses only on the GPs' prescription of ORS and zinc and exposure to information on zinc given the immediate relevance of these findings for the potential expansion of the pharmaceutical partners' marketing efforts.

## **Methods**

A panel study with two time points of data collection was conducted. A total of 495 practitioners participated in the baseline and endline surveys: 366 GPs and 129 midwives. Interviews were conducted with GPs and midwives at primary practice locations. Descriptive and bivariate analyses were conducted among 338 GPs who saw their last case of diarrhea within one month of the baseline and endline surveys. Frequency distributions were generated on the key variables. A Chi-square analysis was used to examine the association between exposure to information about zinc and ORS and zinc prescription behavior.

## **Results**

The proportion of GPs who used neither ORS nor zinc (23 percent to 16 percent) or only ORS (46 percent to 32 percent) decreased between the baseline and endline while the proportion who prescribed both ORS and zinc almost doubled (25 percent to 44 percent). An increase was also found in the proportion of GPs who received information about zinc (28 percent to 57 percent) within the two months before the baseline and endline surveys. An association was found between the level of exposure to information about zinc and the prescription of both zinc and ORS to treat childhood diarrhea providing preliminary support for the usefulness of a pharmaceutical marketing intervention among GPs.

## **Discussion**

The findings specifically suggest that the pharmaceutical marketing intervention maintained, increased, and/or facilitated prescription of ORS and zinc among GPs. The study limitations include the possibility that the exposure questions used may reflect under-reporting of exposure among GPs who may not recall receiving information about zinc. GPs may have also found it difficult to distinguish earlier mass media messages and regular visits from pharmaceutical representatives from information they received about zinc two months before the baseline and endline. A number of next steps are suggested to build on the initial success observed. The recommendations include identifying ways to sustain the collaboration between the Ministry of Health, pharmaceutical companies, and professional associations; using the study findings to improve and expand the intervention to more cities and regions; and working with the pharmaceutical companies involved on the intervention strategy design.

## **Conclusion**

The study results indicate a change in prescription behavior among GPs even though the intervention was implemented over a short period of time. Given these preliminary findings, program implementers can build on C-Change's success by working with pharmaceutical companies to design a marketing intervention that communicates information about zinc through pharmaceutical representatives and outreach from well known and respected doctors, medical associations, and medical journals. Pharmaceutical companies can be assured that their marketing mechanisms are well placed to broaden their scope when marketing zinc for treatment of childhood diarrhea to GPs. An expansion of zinc and ORS to a broader market of health care providers should make the allocation of marketing resources well worth a company's investment. Development agencies have a critical role to play in facilitating this expansion by coordinating public-private partnerships and helping share the cost of creating a broader generic market for zinc.

## Background

Despite improved treatment protocols, diarrhea continues to be a major cause of childhood morbidity and mortality around the world. Although Indonesia no longer considers the disease a top killer of children under five years of age, each year approximately 40,000 children die from diarrhea in the country (Aitken et al 2007). The 2012 Demographic and Health Surveys reported 14 percent of children under age five had diarrhea in the two weeks prior to the survey; caregivers sought treatment in 65 percent of those cases, and a solution prepared from oral rehydration salts (ORS) packets was given to 39 percent (BPS and ICF International 2012).

Zinc is widely recognized as a highly effective and inexpensive way to treat childhood diarrhea. Clinical research suggests that if children take 20 mg of zinc (10 mg for children under six months of age) for 10 to 14 days, the outcome is up to a 25 percent reduction in the duration of acute diarrhea and a 40 percent reduction in treatment failure or death (WHO/UNICEF 2009). Because zinc is an important component of the immune system, a complete course can reduce the reoccurrence of diarrhea for about three months. In 2004 the World Health Organization and UNICEF revised the recommendation on clinical management of acute diarrhea to include both oral rehydration therapy (ORT) and zinc (WHO/UNICEF 2004). The Indonesian government with the help of USAID's Point-of Use Water Disinfection and Zinc Treatment project (POUZN), managed by the former Academy for Educational Development (AED) and the BASICS project, adopted zinc treatment in its national diarrhea treatment policy in 2009.

## POUZN

The acceptance of zinc treatment requires changes in usual behaviors—by health care providers and caregivers—as well as large-scale manufacture and distribution of quality products to accessible outlets. (POUZN/AED 2010). The POUZN approach accomplished this by:

- Creating an enabling environment through support of clear national guidelines and public sector investment
- Developing a vibrant, competitive market for zinc within the private sector
- Influencing the prescribing behaviors of health care providers and generating demand among caregivers

POUZN began work in Indonesia in 2008 to introduce zinc treatment in combination with ORT as the standard for childhood diarrhea management. To ensure sustainability the project worked with the Indonesia government, professional health care associations, and the pharmaceutical industry to harmonize the public and private sector approaches to diarrhea treatment. POUZN's advocacy supported the recommendation of zinc and ORS for the improved treatment of childhood diarrhea in the national policy guidelines. The project helped develop a consistent communication message, a five-pronged approach called *Lintas Diare*—oral rehydration salts, zinc for 10 days, continued breastfeeding or feeding, antibiotics only for bloody diarrhea, and caregiver advice.

Taking a multi-partnership approach, POUZN created interest for zinc treatment production and marketing within the pharmaceutical industry. Prior to POUZN's intervention, no zinc product was produced in the country. By the end of the project in 2010, eight pharmaceutical companies were marketing 11 brands of zinc products nationwide. To promote improved treatment of childhood diarrhea among health care providers across the country, POUZN and its partners initiated a cascade

marketing strategy, a proven technique used by the pharmaceutical industry for new product launches. POUZN pharmaceutical partners began with a nationwide effort to reach out to key opinion leaders, pediatricians, and pharmacies through repeated visits by its pharmaceutical representatives. A typical cascade approach (Figure 1) would continue over time to reach general practitioners, rural drug sellers, nurses/midwives, and finally the general public. However, because zinc is identified as a treatment for pediatric diarrhea, all pharmaceutical companies targeted their promotion to pediatricians, who are mainly in urban areas. To demonstrate a larger market beyond pediatricians, and because of the limited time left on the project, POUZN began providing support to develop and implement zinc promotional activities to the middle steps of the cascade. The project concluded with a mass media campaign on radio and television to raise awareness of the new government-endorsed treatment recommendations among caregivers, the bottom rung of the cascade.

**Figure 1: Cascade of Influence**



Professional associations such as the Indonesian Pediatrics Association, the Indonesian General Practitioners Association (PDUI), and the Indonesian Midwives Association (IBI) were active participants in this promotion effort with health care providers and included sessions on zinc and ORS during their annual seminars at the local and national level. In addition, working within the existing structure of the pharmaceutical companies, POUZN provided support to develop the marketing plan and to “detail” zinc products—training pharmaceutical representatives to present the benefits of zinc to health care providers including general practitioners (GPs), midwives, and pharmacists nationwide. This element of the pharmaceutical marketing intervention was expanded and combined with outreach through print media and professional symposia to focus exclusively on GPs and midwives under the C-Change funding mechanism described below.

### **C-Change Follow On**

At the conclusion of POUZN, the government of Indonesia through its Ministry of Health (MOH) continued its roll out of training to health care providers, but additional efforts were needed to accelerate behavior change of providers in both the public and private sectors, and ultimately of caregivers. POUZN’s success in improving the awareness and prescribing behavior of zinc among key opinion leaders and pediatricians led to the launch of a 12-month extension to expand the promotion effort to more health professionals in select cities through a pharmaceutical marketing intervention. The goal of this follow-on activity was to extend the cascade of influence to the first-line health care providers that treat childhood diarrhea at the community level—mainly GPs and midwives—and to convince drug manufacturers of the viability of targeting these groups as potential prescribers of zinc.

Though some providers in these two groups had been exposed to zinc promotion through seminars of their local professional associations under POUZN or the general media campaign, few had been directly targeted by the pharmaceutical industry.

In August 2010, USAID/Indonesia awarded the former Academy for Educational Development (now FHI 360) a field support grant through the Communication for Change (C-Change) Project for the period of October 2010–September 2011. Building on the achievements of POUZN, C-Change intensified the existing collaboration with the MOH, pharmaceutical companies producing and marketing zinc, and professional associations. C-Change’s aim was to institutionalize the prescription of zinc and ORS treatment among GPs and midwives by getting zinc marketing into the product mix of pharmaceutical representatives that target GPs and raising awareness of the treatment protocol through symposia for GPs and midwives. Project implementers observed that pharmaceutical representatives from drug companies had not been influential enough alone to change prescribing behavior of practitioners, especially to introduce a new medical concept like zinc treatment for diarrhea. So C-Change channeled additional promotional messages through well-known and respected doctors (opinion leaders), medical associations, and medical journals.

C-Change viewed the GP market as one of tremendous untapped potential. In a country where pediatricians are a small subset of the overall health care provider landscape, GPs treat many more children with diarrhea. Furthermore, the pharmaceutical industry already had an established and robust sales force in place to target GPs. However, none of the eight zinc manufacturers placed their zinc brand in the large sales forces that covered the GPs. Because zinc indication is limited to children below five years old, the companies handed zinc promotion to the smaller sales force that covered pediatricians. C-Change’s challenge was to convince these companies that zinc would be worth their while to promote to first-line providers who see most cases of childhood diarrhea, thereby increasing its prescription rate. Two companies agreed to test the market potential for zinc among GPs.

## **Intervention Design**

The pharmaceutical marketing intervention took place in four cities—Semarang, Surabaya, Medan, and Makasar—selected in consultation with the MOH and local chapters of professional associations and based on the availability of an existing sales force of the two drug companies that C-Change partnered with, Indofarma and Kimiafarma. Over an intensive period of approximately three months from May through August 2011, C-Change, in close collaboration with the pharmaceutical partners, put three elements into place: symposia to introduce zinc as part of the recommended treatment for childhood diarrhea to GPs and midwives; zinc promotion training of pharmaceutical representatives and their subsequent detailing visits to GPs; and publication of feature articles and advertisements in two professional association journals and websites. While the pharmaceutical companies promoted zinc at the symposia for both the GPs and midwives, the midwives were not targeted for one-on-one zinc promotion and did not receive detailing visits from pharmaceutical representatives.

A local event company was hired to organize two symposia in each target city, one each for GPs and midwives. To develop its list of invitees C-Change asked drug companies to provide names of GPs that they normally visit for their drug promotion efforts, and local chapters of IBI were surveyed for names of midwife members of the association. These same lists were used to survey participants during the baseline and endline. A key opinion leader made the presentation on the improved treatment for childhood diarrhea, emphasizing the importance of using both zinc and ORS.

The second element, and main thrust of the intervention, was to deploy the existing teams of well trained pharmaceutical representatives to promote the use of zinc and ORS for treatment of childhood diarrhea through visits to GPs who had been invited to attend the symposia. C-Change support included supplementing the pharmaceutical representatives' existing training and developing generic marketing materials for them to consult and distribute along with their branded promotional material during visits to GPs. The limited time of the intervention combined with C-Change's interest in sustainability meant that it was most practical to use the drug companies' existing sales force, GP visitation schedule (GPs are typically visited on a monthly basis), and marketing mechanism. Although C-Change had hoped to time its intervention to coincide with the time of year where diarrhea was most prevalent in the target areas, implementation of the intensive intervention did not actually take place until the end of the season.

The project provided a consultant who specialized in diarrhea treatment, zinc, and ORS to enhance the drug companies' marketing training. With agreement from the pharmaceutical companies, the pharmaceutical representatives promoted zinc as their primary product during the first two visits to the GPs and as a secondary product on subsequent visits. This promotion was tied to the harmonized message about diarrhea treatment, the *Lintas Diare* (the five elements for the treatment of childhood diarrhea developed with the MOH under POUZN), which included use of both ORS and zinc.

The third element was the publication of feature articles promoting zinc and ORS and advertisements for zinc in professional journals and websites of the GP and midwives associations (PDUI and IBI) between the months of May and August.

Finally baseline and endline surveys were conducted to assess the use of zinc and ORS by GPs and midwives for treatment of childhood diarrhea following the short, yet intensive pharmaceutical marketing intervention. The project intended to use the results to demonstrate the viability of an expanded market so that pharmaceutical partners would invest their marketing resources to introduce zinc to the first-line health providers, not only to pediatricians and hospital doctors.

## **Survey Objectives**

The overall study objective was to assess the prescription behavior of GPs and midwives for treatment of childhood diarrhea following an intensive pharmaceutical marketing intervention. The specific objectives are listed below followed by a description of the findings presented and the rationale for focusing the data analysis on exposure to information about zinc and prescription of ORS and zinc among GPs.

Specific objectives:

- To assess GPs' and midwives' prescription of ORS and zinc to treat childhood diarrhea before and after an intensive pharmaceutical marketing intervention
- To assess exposure of GPs and midwives to information on ORS and zinc before and after an intensive pharmaceutical marketing intervention
- To examine if there is an association between GPs' and midwives' exposure to information on ORS and zinc through at least one component of an intensive pharmaceutical marketing intervention and prescription behavior of using both zinc and ORS to treat childhood diarrhea

- To examine if there is an association between GPs' and midwives' exposure to ORS and zinc to at least one component of an intensive pharmaceutical marketing intervention and knowledge, attitudes, and perceptions related to zinc and ORS for treatment of childhood diarrhea

In this research report findings are reported on the GPs only given the immediate relevance of these findings for the potential expansion of the pharmaceutical partners' marketing efforts. Data from the midwives are not included because the midwives only received two of the three elements of the pharmaceutical marketing intervention. The analysis focused on the association between exposure to information about zinc and prescription of ORS and zinc since inclusion of zinc in the existing treatment protocol was the main focus of the pharmaceutical marketing intervention.

This report first describes GPs' background characteristics, practice settings, exposure to information about zinc, and prescription behavior. Findings are then presented on the association between GPs' exposure to information on zinc and their ORS and zinc prescription behavior before and after the short, intensive intervention period.

## **Methodology**

### **Study Design**

To assess the impact of the short, intensive marketing intervention a panel study with two time points of data collection was conducted. The target population for this intervention and surveys were GPs and midwives identified through provider outreach activities in the four cities.

### **Sample Size**

A total of 528 practitioners participated in the baseline survey, 386 GPs and 134 midwives. The study sample consisted of a census of GPs visited by representatives of the two pharmaceutical companies that took part in the current intervention. The midwives that participated in the surveys were members of local chapters of the Indonesian Midwives professional association. The attrition rate was 3 percent to 5 percent between the baseline and endline surveys. A total of 366 GPs and 129 midwives participated in the endline survey.

### **Data Collection Instruments**

A structured questionnaire that was used in the evaluation of a six-month pilot among the midwives under POUZN was adapted for this study. The adapted structured questionnaire for GPs and midwives covered the following areas: background characteristics; professional training and memberships; practice settings and location; childhood diarrhea caseload; childhood diarrhea management and treatment; sources of information about treatment for childhood diarrhea generally, ORS, and zinc, including information channels used by the intensive intervention; and ORS and zinc-related knowledge, attitudes, beliefs, and prescription behavior. The same questionnaire was used in both rounds of surveys. Myriad Research, a local research agency, translated the questionnaire into three local

dialects—Batak, Makassar, and Javanese—and conducted a pre-test with three GPs and three midwives in each of the four project cities.

### **Data Collection**

The baseline data were collected in April–May 2011 before the short, intensive intervention began. The second data collection point was post-intervention in July–August. Face-to-face interviews were conducted with GPs and midwives at primary practice locations. The interviews lasted for about 35 to 45 minutes. A pre-recruitment stage was included to schedule the interviews at a time most convenient for the participants. Interviewers received a full day of training prior to conducting interviews. Two teams consisting of 10 to 15 interviewers were assigned to each of the four cities. One team interviewed the GPs and the other interviewed midwives.

### **Data Management**

A double entry process was used in the first 30 percent of questionnaires to limit the amount of error that may be introduced during data entry. Descriptive statistics were used to check for missing data, outliers, or illogical values and clean the data as needed. Codes were created for responses to open-ended question and translated into English.

New variables were created to allow for more detailed analysis of the data. One variable measured GPs' level of exposure to information about use of zinc to treat childhood diarrhea. The following three information channels were the sources for information on zinc: pharmaceutical representatives, feature articles or advertisements in medical journals, and C-Change symposia. Participants were defined as having been exposed to information about zinc for childhood diarrhea if they reported receiving information about zinc from one or more of these information channels during the two months before the interview. Both spontaneous and probed responses to questions about source of information on zinc were used.

Separate variables were created for the baseline and the endline interviews to reflect exposure to information about zinc. These variables were then used to categorize study participants according to whether they reported having been exposed to information about zinc at the following time points: neither at the baseline nor endline survey, baseline only, baseline and endline, and endline only.

A similar variable was created to measure reported prescription of both ORS and zinc for the last child with diarrhea that the GPs had seen before the interview. Separate variables were created for the prescription behavior reported during the baseline and endline interviews. These variables were then used to categorize study participants according to whether they had prescribed both ORS and zinc at the following time points: neither at baseline nor at endline, baseline only, both baseline and endline, and endline only.

For the exposure variable these categories distinguish GPs who were exposed to information about zinc prior to and/or during the C-Change intensive intervention. General practitioners who reported having received information before both the baseline and endline represent GPs whose exposure to information prior to the baseline was reinforced by information they received during the marketing

intervention. Those who reported having information at the endline only represent GPs who received information on zinc only during the intervention period.

Similarly since some study participants were already practicing the promoted behavior before the marketing intervention, the newly created outcome variables differentiate between prescription behavior that may be attributable solely to the intensive intervention from prescription behavior that existed prior to the intensive intervention period and was either maintained or no longer practiced. These variables also identify prescription behavior that is likely to have been facilitated by the intervention among GPs who had been exposed to information on zinc before and during the intervention period but reported prescribing ORS and zinc at the endline only.

## Data Analysis

Given the short duration of the intervention period descriptive and bivariate analyses were conducted among 338 GPs who saw their last case of diarrhea within one month of the baseline and endline surveys. While there is still a chance that some GPs may have received the intervention after their last case of diarrhea, conducting the analysis among this group allowed for inclusion of 92 percent of the respondents who completed both the baseline and endline surveys, and excluded respondents who had the highest chance of receiving the intervention elements after seeing their last case of childhood diarrhea.

Frequency distributions were generated on the following variables: background characteristics, practice settings, childhood diarrhea caseload, ORS and zinc prescription behavior, and exposure to information about zinc from the three information channels used by the intervention. Following this, a Chi-square analysis was used to examine the association between different levels of exposure to information about zinc from at least one information channel used by the intensive intervention and ORS and zinc prescription behavior at different time points. This allowed for a preliminary understanding of the role of the intensive intervention on GPs' prescription behavior.

## Results

### Background Characteristics

Over half of the respondents had more than 15 years of experience working as a GP while another 15 percent had 10 to 15 years of experience. This suggests that a majority of the study participants were well established professionals in their area of practice.

**Table 1: Years of Experience as General Practitioner**

<b>Years of experience</b>	<b>%</b>
1–4 years	9.5
5–9 years	14.5
10–14 years	15.4
15–19 years	17.2
20+ years	41.4

Missing	2.1
Total	100
Number of respondents (N)	338

More than 40 percent of the respondents indicated that they had at least 20 years of experience working as a GP. Slightly over 30 percent of GPs had 10 to 19 years of experience while 15 percent had five to nine years, and 10 percent had less than five years of experience (Table 1).

### Practice Setting

The geographic location, type of sector, and practice location where the general practitioners worked show that few respondents worked exclusively in clinics and hospitals within the public sector. More than two-thirds of the respondents interviewed practiced exclusively within health facilities in the private sector. About a quarter worked in both the public and private sector. A private hospital/clinic or practice was the main practice location for nearly four-fifths of the respondents.

**Table 2: Practice Sector and Main Location**

Sector and location	%
Sector: Public	
Main location: Public	7.1
Sector: Public and private	
Main location: Public	15.7
Sector: Public and private	
Main location: Private	6.5
Sector: Private	
Main location: Private	70.7
Total	100
Number of respondents (N)	338

While 7 percent of respondents worked only in the public sector, about 70 percent worked only in the private sector. Another 16 percent worked in both the public and private sector and had their main practice located in the public sector, and 7 percent worked in both the public and private sector and had their main practice location in a private setting (private hospital/clinic and/or practice) (Table 2).

### Childhood Diarrhea Cases Seen by General Practitioners

A majority of the GPs saw one to four cases of childhood diarrhea per day at both the baseline and endline. The last case of childhood diarrhea seen by most GPs was either mild or moderate at both survey points.

**Table 3: Average Number of Children with Diarrhea Seen by General Practitioners in One Day**

Number of children	Baseline	Endline
	%	%
Less than 1 child	11.5	22.2
1 to 4 children	76.6	62.7
5 to 9 children	9.2	12.1

10 or more	2.7	3.0
Total	100	100
Number of respondents (N)	338	338

The proportion of respondents who saw less than one child or between five and nine children per day increased slightly between the baseline and endline while the number who saw one to four cases decreased (77 percent at baseline and 63 percent at endline). The percentage of GPs who saw 10 or more children per day remained the same (Table 3).

**Table 4: Type of Diarrhea Observed for the Last Child Seen by General Practitioners**

Type of diarrhea	Baseline	Endline
	%	%
Mild	67.5	59.5
Moderate	30.8	38.8
Severe	1.8	1.8
Diarrhea with bloody stools	0.0	0.0
Total	100	100
Number of respondents (N)	338	338

A slightly higher percentage of GPs saw a child with mild diarrhea at the baseline (68 percent) compared to the endline (60 percent). The percentage of GPs who saw a child with moderate diarrhea increased from 31 to 39 percent between the baseline and endline. Very few GPs saw children with severe diarrhea or bloody stools at either the baseline or the endline (Table 4).

### Prescription Behavior for Treatment of Childhood Diarrhea

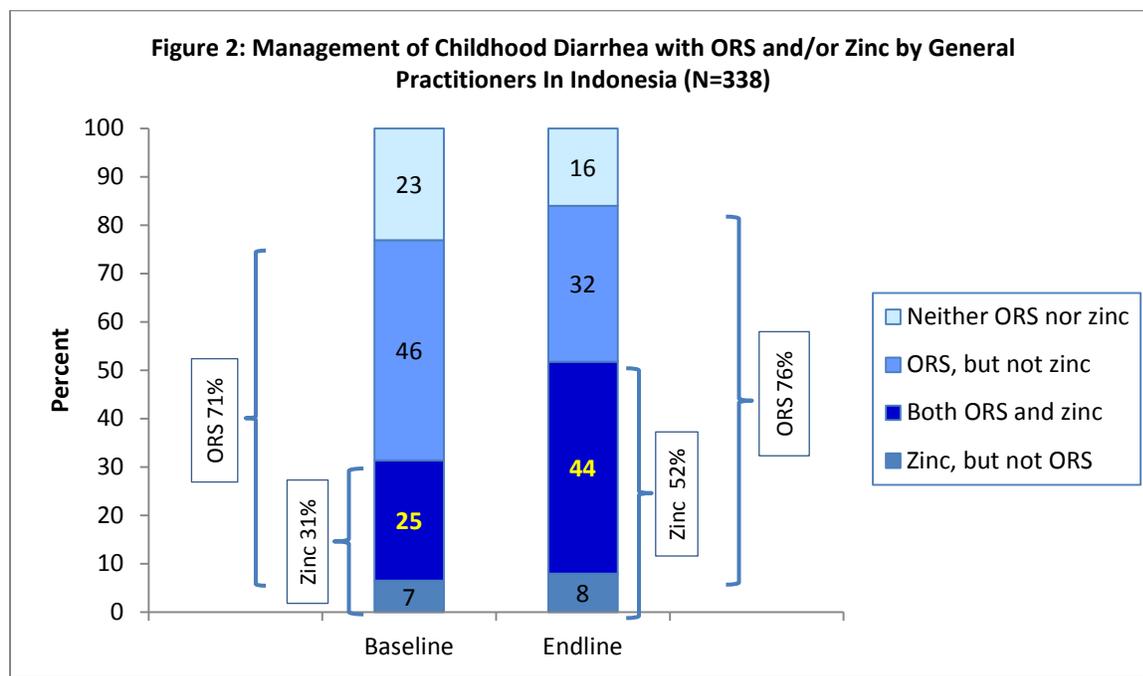
The proportion of GPs who prescribed neither ORS nor zinc or only prescribed ORS decreased between the baseline and endline, while a large increase was found in the proportion who prescribed both ORS and zinc. Across the two time points, about a fifth of GPs reported prescribing both ORS and zinc at the baseline and endline while about a quarter of GPs reported prescribing both ORS and zinc only at the endline.

**Table 5: Management of Childhood Diarrhea with ORS and/or Zinc**

ORS and/or zinc prescription	Baseline	Endline
	%	%
Neither ORS nor zinc	23.1	16.0
ORS, but not zinc	45.6	32.3
Both ORS and zinc	24.9	43.8
Zinc, but not ORS	6.5	8.0
Total	100	100
Number of respondents (N)	338	338

The percentage of GPs who prescribed both zinc and ORS (the main intervention outcome) increased from 25 percent at baseline to 44 percent at endline, while the percentage of practitioners who only prescribed zinc (without ORS) essentially stayed the same (7 percent to 8 percent). The percentage that

only prescribed ORS decreased from 46 percent to 32 percent. The percentage who prescribed neither ORS nor zinc decreased from 23 percent to 16 percent (Table 5).



Additionally, when combining some of the categories shown in Table 5, it is clear that the percentage of general practitioners who prescribed zinc (with or without ORS) increased from 31 percent to 52 percent from baseline to endline, while the percentage who prescribed ORS (with or without zinc) increased from 71 percent to 76 percent (Figure 2).

**Table 6: Management of Childhood Diarrhea with Both ORS and Zinc at Different Time Points**

ORS and zinc prescription	%
Neither at baseline nor endline	49.7
Baseline only	6.5
Both baseline and endline	18.3
Endline only	25.4
Total	100
Number of respondents (N)	338

Among the 338 GPs, 50 percent reported prescribing a treatment of both ORS and zinc neither at the baseline nor endline; 7 percent prescribed ORS and zinc at baseline only; 18 percent prescribed ORS and zinc both at baseline and endline; and 25 percent prescribed ORS and zinc at endline only (Table 6).

### Exposure to Information about Zinc

An increase was observed between the baseline and endline in the proportion of GPs who reported receiving information about zinc within the two months prior to the baseline and endline interview. This

was the case for information received from pharmaceutical representatives, journals/books, or from either one of these information channels used by the C-Change pharmaceutical marketing intervention.

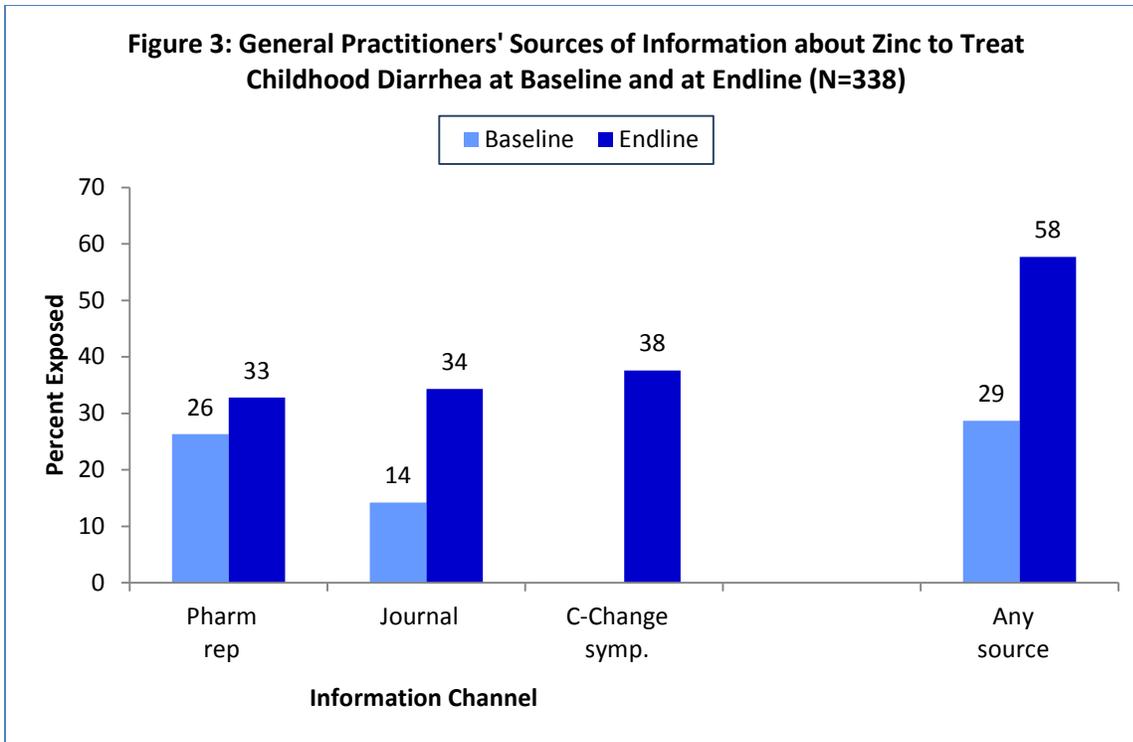
**Table 7: GPs Source of Information about Zinc for Diarrhea Treatment**

Information channels	Baseline %	Endline %
Pharmaceutical representative	26.3	32.8
Journals	14.2	34.3
C-Change symposium		37.6
Any source (b)	28.7	57.7
Total number of respondents (N)—applies to all percentages in each column	338	338

The proportion of GPs who reported receiving information about zinc for treatment of childhood diarrhea from a pharmaceutical representative increased from 26 percent to 33 percent between baseline and endline. The percentage of respondents who reported receiving information about zinc from journals/books also increased, by about 20 percentage points, from 14 percent at the baseline to 34 percent at the endline (Table 7 and Figure 3).

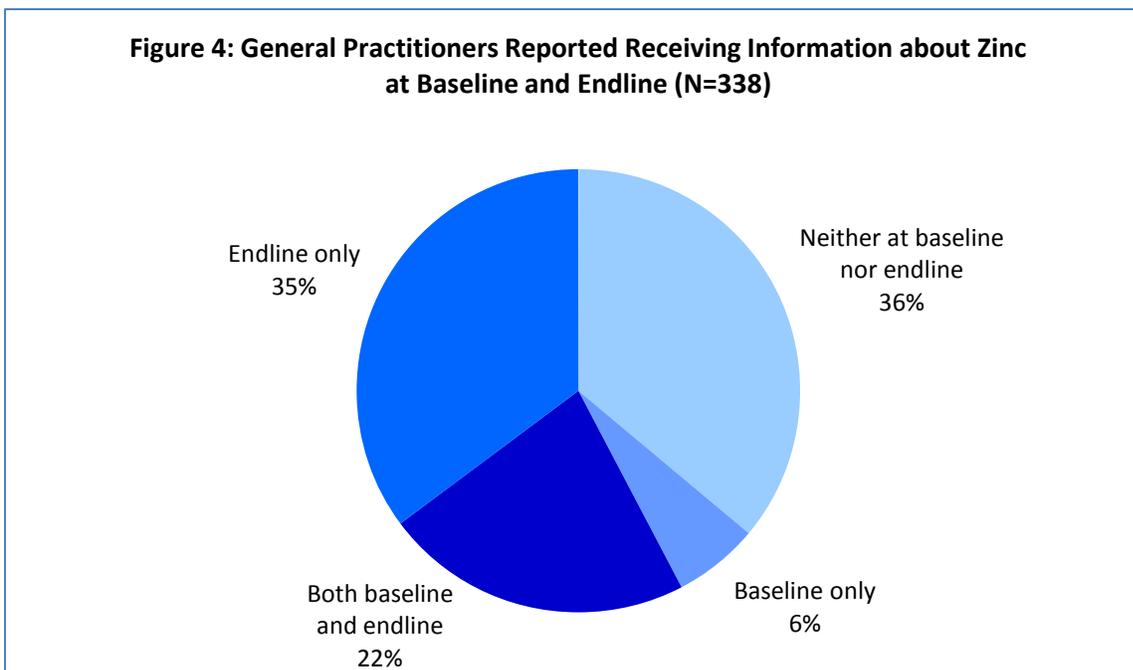
During the endline interview, 38 percent of respondents said that they heard about zinc for treatment of childhood diarrhea from a C-Change symposium. No C-Change symposia were held prior to the baseline interview; hence a comparison is not possible between the two points in time (Table 7 and Figure 3).

The percentage of GPs who had heard about zinc from any of the information channels used by the pharmaceutical marketing intervention increased by about 30 percentage points from 29 percent at baseline to 58 percent at endline (Table 7 and Figure 3).



**Exposure to Information about Zinc at Different Time Points**

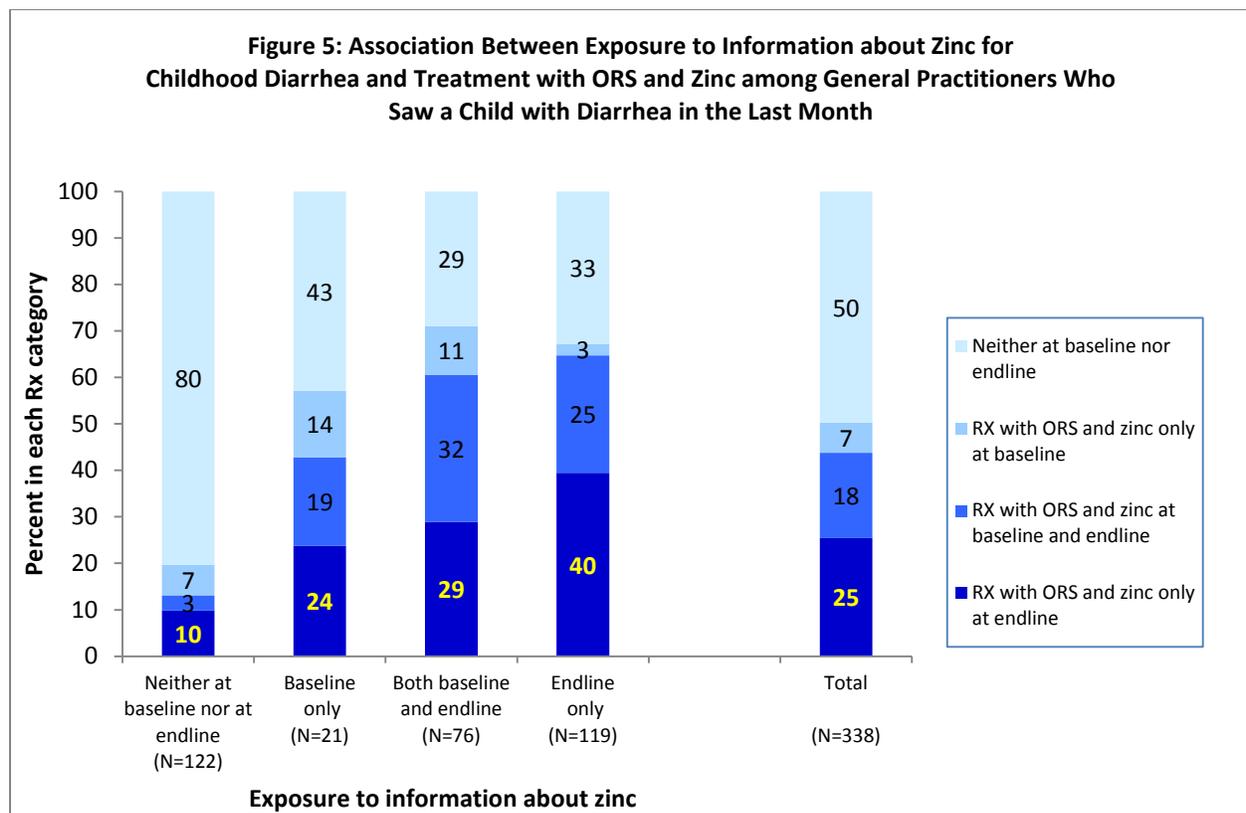
Almost three-fifths of GPs had heard about zinc during the two months before the endline from at least one information channel used by the pharmaceutical intervention (57 percent). The remaining two-fifths of GPs (42 percent) reported receiving information on zinc only during the two months prior to the baseline or not receiving any information before the baseline or endline.



About a third of GPs (36 percent) had not heard about zinc from any of the information channels used during the two months prior to both time points; 6 percent said they had heard about zinc at baseline only; 22 percent said they had heard about zinc at baseline and endline; while 35 percent said they had heard about zinc at endline only (Figure 4).

### Treatment of Childhood Diarrhea with Both ORS and Zinc and Level of Exposure to Information about Zinc

An association was found between exposure to information about zinc and treatment of childhood diarrhea with both ORS and zinc among GPs who had seen a child with diarrhea in the last one month before both the baseline and endline. The findings show that the proportion of GPs that prescribe both ORS and zinc at the different time points is significantly different across levels of exposure to the pharmaceutical marketing intervention ( $X^2=90.1326$ ,  $P < 0.001$ ). A detailed examination of the findings suggests that the C-Change intervention is likely to have maintained, facilitated, and/or directly contributed to the increased use of both ORS and zinc by GPs.



As expected zinc and ORS prescription was low among those who were **not exposed** to information about zinc before or during the intervention. Eighty percent of GPs in this group did not prescribe ORS and zinc at either of the time points. Ten percent prescribed ORS and zinc at endline only. Only 3 percent prescribed ORS and zinc for childhood diarrhea at baseline and endline, and 7 percent used ORS and zinc at baseline only (Figure 5).

A fair proportion of GPs who were exposed to information about zinc at **baseline** (exposed to zinc information in the two months prior to the intervention), **but not at endline**, reported prescribing ORS and zinc: 19 percent prescribed ORS and zinc at baseline and endline, 24 percent prescribed ORS and zinc only at endline, 14 percent prescribed ORS and zinc only at baseline, and 43 percent did not prescribe ORS and zinc at either time point. Prescription of ORS and zinc at endline only (24 percent) suggests the existence of **other factors that contributed** to the prescription of ORS and zinc by GPs in this group (Figure 5).

Among GPs who reported exposure to zinc information at **both points in time** (exposed to zinc information before and during the intervention period), 32 percent prescribed ORS and zinc at both time points, 29 percent prescribed ORS and zinc only at endline, 11 percent prescribed ORS and zinc only at baseline, and 29 percent did not prescribe ORS and zinc at either point in time. These findings suggest that exposure to information about zinc before and during the pharmaceutical marketing intervention **maintained behavior change** among those who had prescribed ORS and zinc at both time points and **facilitated behavior change** among those who reported prescribing ORS and zinc only at the endline (Figure 5).

In the group who reported exposure to information about zinc **only at endline** (exposed to zinc information during the intervention period), 25 percent prescribed ORS and zinc at both time points, 40 percent prescribed ORS and zinc at endline only, and 3 percent did so at baseline only, while 33 percent did not prescribe ORS and zinc at either time point. These results suggest that exposure to information about zinc during the pharmaceutical marketing intervention only is likely to result in **behavior change** among GPs who did not prescribe ORS and zinc at the baseline and **maintain behavior change** among GPs who reported prescribing ORS and zinc before the intervention (Figure 5).

For GPs exposed to the C-Change intervention with or without previous exposure (a combination of the last two groups who reported exposure to zinc information at endline regardless of whether they also reported such exposure at baseline) the use of ORS and zinc was fairly similar, and these two groups prescribed ORS and zinc more than the other two groups. This suggests that the C-Change intervention had a positive influence on prescription of ORS and zinc by either directly changing behavior or facilitating or maintaining behavior change. In other words, in addition to changing behavior, the C-Change intensive intervention may have provided the reinforcements needed to persuade GPs who had previously received information about zinc but were not prescribing zinc with ORS as well as help maintain this behavior among those who were already practicing it.

## Discussion

This study assessed GPs' ORS and zinc prescription behavior and exposure to zinc information before and after a short but intensive pharmaceutical marketing intervention. The study also examined whether GPs' exposure to the C-Change intervention is associated with ORS and zinc prescription behavior. The results show an increase in both exposure and prescription behavior between the baseline and endline. More importantly a significant association was found between GPs' exposure to zinc information through channels used by the pharmaceutical marketing intervention and ORS and zinc prescription behavior.

Notable decreases were observed in the proportion of GPs who used neither ORS nor zinc (23 percent to 16 percent) or only ORS (46 percent to 32 percent), and an equally important increase was observed in

the proportion who prescribed both ORS and zinc (25 percent to 44 percent). These results suggest that a fairly significant proportion of GPs moved from only prescribing ORS or not prescribing either ORS or zinc to prescribing ORS and zinc between the baseline and endline. An increase was also observed in GPs' exposure to information about zinc (29 percent to 58 percent) between the baseline and endline suggesting that the channels used by the intervention were effective in getting information about zinc to the GPs.

Finally the association between the level of exposure to information about zinc and the prescription of both ORS and zinc to treat childhood diarrhea provides preliminary support for the usefulness of a pharmaceutical marketing intervention among GPs. A close examination of the relationship between the timing of exposure and prescription behavior suggests that the pharmaceutical intervention is likely to have resulted in **behavior change** among GPs who *only prescribed ORS and zinc at the endline* and had *not previously been exposed* to information about zinc. The intervention also appears to have **facilitated** behavior change among GPs who *prescribed ORS and zinc only at the endline* but had been *exposed to information about zinc before and during* the pharmaceutical intervention. Finally, GPs who *prescribed ORS and zinc at both time points* and were exposed to information about zinc *only during or before and during the intervention period* were likely to have **maintained** their prescription behavior.

The study limitations include possible under-reporting of GPs' exposure to information about zinc. The exposure questions used in this study asked if GPs received information about zinc from the symposia, journal articles, or pharmaceutical representatives. This is likely to have resulted in under-reporting of exposure among GPs who may have been exposed to the intervention channels used but may not necessarily recall receiving information about zinc. Additionally, while no other zinc promotion interventions were going on at the time of C-Change's intensive pharmaceutical intervention in the target cities, a number of GPs and midwives had been reached by POUZN's mass media messaging campaign and outreach to professional associations in earlier years. The GPs also continued to receive visits from pharmaceutical representatives about other products. The exposure questions used may have also made it difficult for GPs to distinguish earlier mass media messages and regular visits from pharmaceutical representatives from information they received about zinc two months prior to the baseline and endline.

The results of the current study are promising and provide support for the use of the pharmaceutical marketing intervention. The following next steps are suggested to build on the initial success observed and allow for a national scale up and a more rigorous evaluation.

- Identify ways to sustain the collaboration among the MOH, pharmaceutical companies, and professional associations
- Use the findings from this study and formative studies as appropriate to improve and expand the intervention to additional cities and regions
- Work with the pharmaceutical companies involved on the intervention strategy design
- Create a comprehensive brand that ties together the three intervention elements and facilitates recognition of the pharmaceutical marketing intervention by GPs
- Increase the duration of the intervention and implement the intervention to coincide with the time of year where diarrhea is most prevalent in the target areas
- Engage pharmaceutical companies in a discussion on the long term advantages of an evaluation study that uses a quasi-experimental design

## Conclusion

Prior to the C-Change intensive intervention pharmaceutical companies concentrated on opinion leaders and pediatricians, and did not consider general practitioners and midwives to be their primary focus when it came to zinc promotion. Through its predecessor project POUZN, the stage was set for public and private partners to work together to communicate the effectiveness of zinc and ORS to treat childhood diarrhea and to develop and supply a growing market. C-Change built on POUZN's experience with the pharmaceutical industry's cascade marketing strategy, observations of the caseload of health care professionals in Indonesia, and experience with practitioners' adoption of changed prescribing behavior based on its interventions to develop its intensive pharmaceutical marketing intervention.

As the study results indicate, prescription behavior change was noted even though the intervention was implemented over a short period of time. Given these preliminary findings, program implementers can build on C-Change's success working with pharmaceutical companies to design marketing interventions that communicate information about zinc through pharmaceutical representatives and outreach from well-known and respected doctors, medical associations, and medical journals. By promoting zinc and ORS for treatment of childhood diarrhea to GPs and other first-line providers, pharmaceutical companies can broaden and expand the market for both products. The expected returns make the allocation of marketing resources well worth a company's investment. Development agencies can play a critical role in facilitating this expansion by coordinating public-private partnerships and helping create a broad generic market for zinc (the tide that lifts all boats), hence encouraging companies to compete in an active market.

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