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**Peru Threshold Program**

**Component 2: Increase Immunization  
Rates**

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*January, 2008*

## 1. Overview and objectives

Peru's health services coverage increased during the last decades. Immunization coverage with 3 doses of Diphtheria-Pertussis-Tetanus (DPT3) and measles rose from 16% and 23% respectively in 1980, to 90% and 97% respectively in 1995, and continued at those levels until 2001<sup>1</sup>. Moreover, starting in 1990, the government assumed 99.9% of the total costs of immunization operations (e.g. vaccines, equipment, supplies, and operation costs).

Starting 2002, however, there was a sharp decline in coverage due to several factors. First, the high turn-over of health workers, including those that were in charge of the immunization system (planning, logistic, service delivery, etc.), at different levels of the health system, which caused disruption in the management of the immunization program and affected adequate planning for investments to sustain the gains of previous years.

Second, the relapse in the acceptance of immunizations among rural populations due to supply problems, which affected the provision of quality vaccines in several sites, together with misinformation on its effects, particularly DPT.

Finally, and most importantly, the sudden transition from National Vertical Health Programs to National Sanitary Strategies, which required reorganization within the Ministry of Health (MOH), change in protocols, and larger coordination efforts among its different offices. Since 1972, immunization activities within the Ministry of Health were organized as Vertical Health Programs. Under this scheme, each program worked as an independent entity and had a national scope. Despite the important advances achieved (especially regarding basic immunization coverage for children), this type of organization led to a duplication of efforts and to very dissimilar results regarding funding and coverage of health interventions. In addition, this scheme was inconsistent with the decentralization process that the government had started. Because of this, in 2002, all Vertical Health Programs were dismantled in favor of an Integrated Health Services Model, designed to prevent diseases and provide specific health care for every age cohort in the population. In this way, measles and DPT3 immunizations are now part of an integral health package to be delivered to children between 0 and 1 years of age.

The factors mentioned above, had its costs in terms of a lack of timely access to statistical information regarding coverage, deficient coordination among the different operative units within the Ministry, difficulties to deliver health services in rural, scattered and hard-to-reach populations, and inadequate funding allocated for basic immunizations. As a consequence, immunization coverage for measles and DPT3 declined in recent years and, in 2005, these went down to 80% and 84%, respectively, explaining why is that Peru failed the MCC Immunization Rates indicator (scoring 26<sup>th</sup> percentile) according to the FY 2007 country scorecard.

Nevertheless, the government is committed to invest in its people to ensure the sustainability of economic growth gains. A major priority, not only for the national government, but also for the regional governments and civil society at large, is to reduce

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<sup>1</sup> As a result, Peru was declared polio-free in 1991 and there has not been a reported case of measles since 2001 nor neonatal tetanus since 2003.

chronic malnutrition by five percentage points, where child immunization, particularly in rural areas, is a key element to achieve this objective.

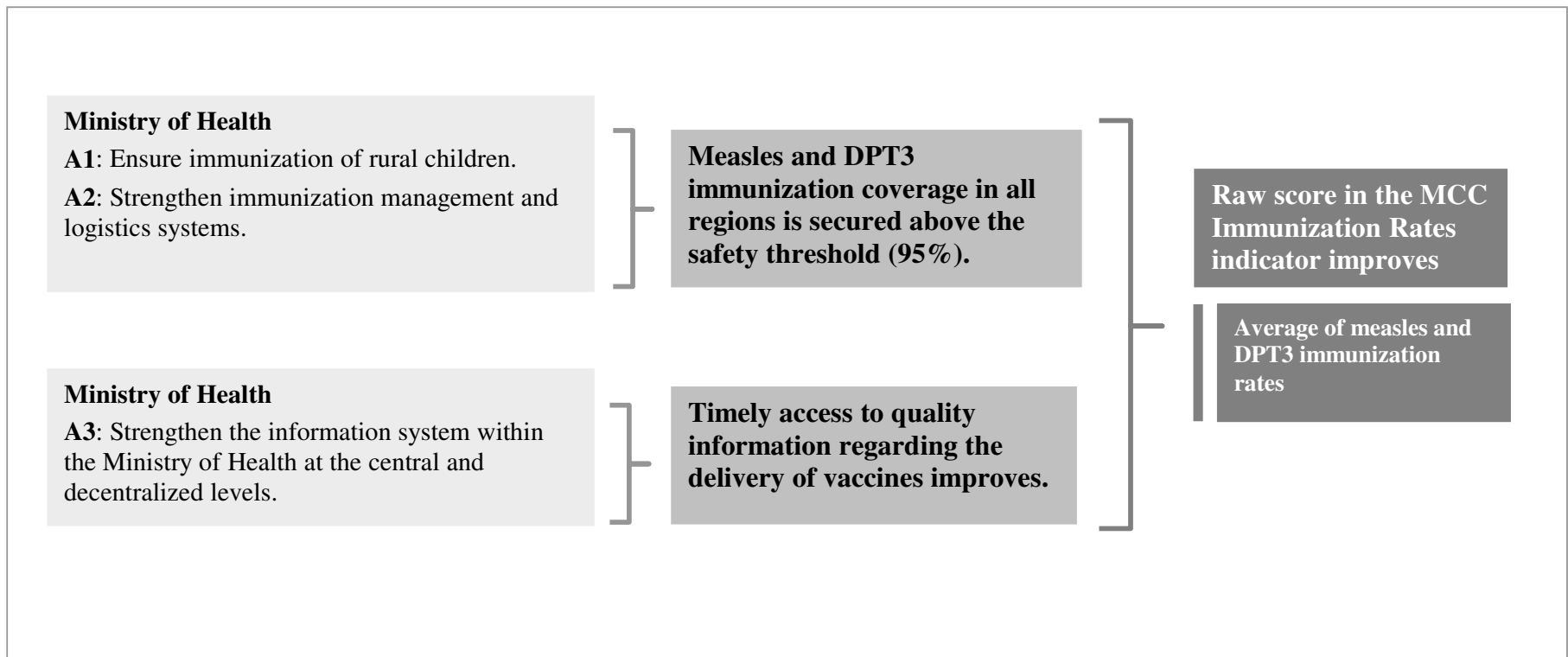
To advance this objective and tackle the problems in the immunization area, the MOH is strengthening the National Strategy of Immunizations in all its components. Since 2005, the regular immunization scheme for children increased the number of vaccines provided from six to eleven. Currently, the MOH has planned to strengthen the cold-chain resources at the central and regional levels with funds made available via the “Investment Shock” supplementary credit for fiscal year 2007, and is currently working in coordination with social assistance programs (including the conditional cash-transfer program *Juntos*) to expand health services in the poorest districts of the country. Registry problems (caused by the failure to record the delivery of poly-vaccines despite encompassing DPT3) have also been partially solved, new software and data gathering protocols have been developed and, via a Health Ministry Decree (690-2006/MINSA), DPT3 has been officially included in the poly-vaccine protocols the Ministry is now using as part of its new health services model.

As a consequence, final coverage figures for 2006, as reported by the World Health Organization, reveal a significant improvement: average measles and DPT3 immunization coverage is now as high as 96.5% and has allowed Peru to score 66<sup>th</sup> percentile in the MCC FY 2008 scorecard. Despite this, underlying weaknesses persist, especially regarding coverage and vaccine supply management, and timely access to reliable information regarding the delivery of vaccines. The MOH is aware that this situation precludes the sustainability of the results discussed above and, therefore, we propose to focus Threshold Program assistance for Component 2 on 3 activities that imply ensuring immunization coverage for rural children and strengthening the immunization’s management, logistics and information systems. With this, we seek to secure immunization coverage in all regions above the safety threshold of 95%<sup>2</sup> and improve the quality and timely access to information regarding the delivery of vaccines. Figure 1 summarizes our strategy within Component 2 and describes these 3 activities.

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<sup>2</sup> Following PAHO’s recommendations as established in the Health Ministry Decree 1146-2006/MINSA (12/05/2006).

**Figure 1: Summary of Component 2**



## 2. Activities and performance objectives

### 2.1. Activity 1 – Ensure immunization of rural children

#### (i) Overview and specific goals

The main objective of Peru's National Health Plan is to provide quality health services to people suffering of social exclusion (who are the poor) and, among them, the indigenous populations living in rural areas, who represent 15% of the total population. These populations have the worst health indicators in terms of infant and maternal mortality and immunization coverage. Our approach to serve these populations is through itinerant immunization brigades (devoted to deliver basic health care services to hard-to-reach and scattered populations) and the implementation of a promotion and awareness strategy.

Itinerant brigades have been delivering basic health care services for distant and scattered populations as part of the AISPED (*Atención Integral de Salud a las Poblaciones Excluidas y Dispersas*) program since 1998. However, it was only in 2005 that the AISPED program was officially structured as an activity within the National Operational Plan. Since then, the program's basic needs (salaries, vaccine supplies, clothing and transportation) have been funded via the MOH's regular budget and the contribution of other agencies (e.g. Prime Minister Office and the Ministry of Finance) such as the Basic Health for All Program (*Programa Salud Basica Para Todos - PSBPT*), the *Juntos* program, and the Public Health Insurance (*Seguro Integral de Salud - SIS*)<sup>3</sup>.

As a result, there has been an important expansion in the number of itinerant brigades and the number of people served by this program. In particular, in year 2004 the AISPED program comprised 61 brigades that served a total population of 224,917. By year 2006, the program had a total of 124 itinerant brigades and was able to provide basic health care services to a total population of 532,801, 24% of which are children under 5. To further expand services coverage, the MOH plans to include 21 additional itinerant brigades into the AISPED program by the end of this year. Recurrent costs (salaries and transportation) associated to each brigade (which have an average of 5 members) are around US\$ 5,300 per month, which implies a total annual cost that surpasses US\$ 9 million. To cover these needs, the MOH has already assigned US\$ 4.5 million from its regular budget and secured an additional US\$ 4.5 million via a supplementary credit.

Despite these efforts, AISPED still lacks adequate funding to guarantee proper training and the provision of equipment such as basic medical supplies and an adequate camping gear. In fact, most training activities have had an informal nature covering only basic information required to update brigadiers' knowledge regarding basic health care practices. Due to the nature of their work, further training is crucial in order to secure the delivery of vaccines and other basic health care services to communities with strong cultural differences. The provision of specialized equipment remains insufficient and itinerant brigades usually have to rely on what is available in the jurisdiction's health center (frequently under-equipped).

The MOH is aware that these weaknesses may preclude the possibility of securing measles and DPT3 immunization coverage in some rural areas. In fact, and as shown in Table 1 of Appendix 3, several regions where there is a large concentration of rural population living in distant and

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<sup>3</sup> Which has recently assumed recurrent costs of 14 itinerant brigades serving distant and scattered populations in 4 Regional Health Offices: Ayacucho, Huancavelica, Junin and Apurimac.

hard-to-reach areas (which is the focus of AISPED), still exhibit coverage figures well below national averages. In these areas, estimates built using MOH 2006 data reveal that only 14% of targeted children have received the DPT3 vaccine and 38% the measles vaccine. Thus, the government, as part of its new health strategy for rural areas through the MOH and *Juntos*, plans to increase progressively the number of health professionals<sup>4</sup>, and has designed and is implementing a health promotion strategy in these areas.

Community participation in activities to ensure the provision of basic health services for children, as well as political support of local authorities and leaders, is essential for the sustainability of the services. To increase awareness about preventable diseases, including the effectiveness of vaccines to prevent those diseases, the MOH has been implementing a promotion and communication strategy to strengthen the linkage between health facilities and the communities. This will improve the identification of children to be vaccinated, among other health services needed, and will help overcome the local fears, misconceptions and cultural barriers about some health practices, such as immunizations. Advocacy with local leaders, and engagement with local mass media, especially radio, is important to leverage efforts (and resources) from local governments, private sector and the community to support outreach activities, provide logistical support and oversight to the itinerant brigades, and ensure that services to children are provided with quality.

In order to complement the Ministry's current efforts to provide basic immunization (and other elementary health care services) to these populations (with the objective of not only increasing the national average but also fostering inclusion), this specific activity comprises the provision of training and basic equipment for itinerant brigades within the AISPED program, along with the support of a promotion and awareness strategy.

(ii) Outputs, expected outcomes and related indicators

Threshold Program assistance within this activity will focus on the provision of basic equipment for the 145 itinerant brigades operational by the end of 2007. This equipment will cover: (i) basic medical supplies (thermometers, blood pressure cuffs, stethoscopes, scales, portable coolers to carry vaccines, etc.); and (ii) camping gear (tents, backpacks, lanterns, etc.).

This activity will also involve the provision of five training workshops to be delivered in each of the 17 Regional Health Offices that concentrate all 145 itinerant brigades. Our goal is to train all 852 members in the period of one year covering five different topics (one in each workshop): (i) the provision of health services within the Integrated Health Services Model (2 days); (ii) basic health care for children, including basic immunization (3 days); (iii) how to organize the community to foster preventive health practices (2 days); (iv) first aid techniques (2 days); and (v) basic health care during pregnancy, delivery and puerperity (2 days). All training activities will be supervised by a representative of the Ministry's Central Health Services Office, and will be coordinated with the health center responsible of the health micro-network at the district level. Training modules will be replicated at the district level to address the annual personnel rotation.

The communication and advocacy campaign will be implemented at the district and community levels where the itinerant brigades operate. Threshold assistance will be used to fund advocacy campaigns, fairs, and meetings to increase the demand for immunization and other basic child health services, and engage community leaders, as well as local and regional authorities to

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<sup>4</sup> This year, 600 physicians, nurses and midwives will be assigned to the health facilities of the poorest districts.

promote and oversee the provision of reliable quality immunization services. Threshold assistance will also fund reprinting of materials and its translation to local languages, media training, posters, and other communication needs.

We expect this activity to be complemented by Activity 2. Thus, related outcomes will be described in the next section.

## **2.2. Activity 2 – Strengthen immunization management and logistics systems**

### **(i) Overview and specific goals**

Although it constitutes an important element for increasing coverage rates, strengthening itinerant rural brigades will not suffice to sustain coverage of basic childhood vaccinations above the recommended safety threshold in all regions over time. The MOH recognizes, for example, that an intact cold chain system to protect vaccine efficacy is a critical component in any immunization strategy, and that Peru currently has significant deficits in cold chain equipment. Management of cold chain operations and of vaccine logistics and distribution are also areas that require strengthening.

Regarding this, a baseline study conducted in 2004 (with the technical assistance of the United Nations Children’s Fund - UNICEF and PAHO) revealed that, of the 6,730 health establishments<sup>5</sup> inventoried, 6,694 were operative and 71% of these had cold-chain refrigeration equipment. However, 35% of these were more than 10 year old and only 30% of those acquired after 1995 conformed standard criteria for adequate vaccine conservation. Moreover, 24% of all inventoried health establishments had no access to any type of energy and 619 had no cold-chain complementary equipment. In fact, nearly 31% of these establishments failed to have a thermometer. Regarding human resources, on the other hand, this same diagnostic revealed that only 22% of the 6,214 employees in charge of managing cold-chain resources had received proper training.

To tackle these weaknesses, the MOH has already planned to expand three cold chains at the regional level and implement up to four new health centers in Lima. For this, nearly 14 US\$ million (secured via the “Investment Shock” supplementary credit) will be devoted to the acquisition of: (i) 4 cold chambers for central health establishments; (ii) 6 cold chambers for regional warehouses; (iii) 7 power generators for those areas where the electric supply is unreliable; and (iv) medium size refrigeration equipment and other complementary materials to strengthen vaccine supply logistics. The MOH has committed to direct a portion of the “Investment Shock” resources to sustain these efforts and provide proper maintenance for all existing and new equipment.

To complement these efforts and strengthen the systems required to sustain high levels of basic immunization coverage throughout the country, Threshold Program assistance for this activity will focus on the provision of a baseline study and training activities for personnel in charge of managing vaccine supply logistics.

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<sup>5</sup> Hospitals, health centers, health posts and warehouses.

(ii) Outputs, expected outcomes and related indicators

Output related to this particular activity comprises a baseline/diagnostic study including an evaluation of each of the different elements of the National Strategy of Immunization: vaccine logistics, cold chain, health information system, and human resources' technical and management capability and supervision.

In addition, a cold chain inventory (including the software for its implementation) will be provided.

To strengthen human resources, on the other hand, this activity also proposes the provision of a six-month virtual course in immunization and cold-chain management for 750 health workers, within the MOH scheme of continuous quality improvement.

As already mentioned, this activity will complement the provision of training and basic equipment for itinerant immunization brigades (Activity 1). We expect products related to these two activities will allow raise measles and DPT3 immunization coverage above the safety threshold (95%) in the eight regions detailed in Table 2 of Appendix 3. According to 2006 MOH data, these regions exhibit an immunization rate below the national average (and the safety threshold) in measles and/or DPT3. In this way, these activities will allow to secure a measles and DPT3 immunization coverage, at least, above the safety threshold in all regions, nationwide.

### **2.3. Activity 3 – Strengthen the information system within the Ministry of Health at the central and decentralized levels**

(i) Overview and specific goals

As part of the health reform to improve and decentralize management and decision making, the MOH started a process to improve and revamp the information system for timely decision-making, and has started its testing and implementation since 2004. This has reduced the error levels in data transcription and processing from the central and the 34 regional offices. However, errors still persist at the local level. The provision of proper equipment and training will strengthen the system and decision-making capabilities at the sub-regional and local levels. Health facilities will be interconnected with the regional level to inform coverage, the number of cases of preventable diseases, vaccine reactions, cold chain status, and other inputs and reduce errors during the process.

Another aspect that adds to the occurrence of registry errors in data collection is the difficulty to verify if the information provided in vaccination formularies corresponds to the district where the targeted individual actually lives. In fact, temporary migration affects the reliability of this information (especially in rural areas) and, in some cases, the same individual appears as vaccinated in more than one health establishment. This causes a discrepancy between the number of vaccines delivered and the programmed objective population.

In addition, the Ministry's current information technology does not allow for fluent communication with itinerant brigades and prevents supervision and reporting mechanisms (related to the distribution and consumption of vaccines) to be implemented in all Health Centers. Moreover, the lack of reliable geographical information prevents an adequate planning of the distribution of vaccines to decentralized offices and the prioritization of itinerant brigades' duties.



Furthermore, lack of reliable demographic information at the community level, change in immunization protocols, as well as changes in the organization of the health system to respond to the decentralization needs, have originated the need to adapt information registry mechanisms, and this process has had its costs in terms of poor access to timely and reliable information regarding the delivery of vaccines.

To address these obstacles, the Ministry of Health has already signed an agreement with the National Institute of Statistics and Informatics (INEI) that guarantees that this institute (starting this year) will provide the Ministry with updated information not only at the district but also at the community level. In addition, the Ministry has designed an information system covering supplementary processes (special vaccination campaigns) and has updated registry mechanisms to consider targeted populations' place of residence down to the district level, new age cohorts, and the prevalence of poly-vaccines. These new mechanisms were tested during last year's rubella vaccination campaign, observing a significant increase in the speed at which the information generated by Health Centers and immunization brigades was delivered.

The Ministry of Health is aware that an efficient information system should unify supplementary and ordinary processes (regular vaccination activities) and allow a timely collection, processing and delivery of all information generated by itinerant brigades, health posts, health centers and Regional Health Offices. For this, we plan to focus Threshold Program assistance on: (i) the implementation of a software for the automatization of the information system already developed to be used to monitor regular vaccination activities; (ii) the implementation of an external audit for this information system; (iii) the provision of basic computer equipment for health centers and radios for itinerant brigades; (iv) the implementation of a geo-referenced system; and (v) the provision of training in the use of this new instruments. By fostering timely access to reliable information generated at the point of origin, strengthening equipment, improving the decision-making process when planning the distribution of vaccines and itinerant brigades' duties, and enhancing human resources, this activity will effectively add to all the efforts comprised in this component and provide reliable information to monitor its performance.

(ii) Outputs, expected outcomes and related indicators

As already mentioned, this activity will yield five different products:

- A flexible Integrated Immunization Information System (adjusted to the different vaccination schemes and health systems levels) that will allow permanent monitoring of the progress made regarding coverage, and timely access to information referred to the distribution of vaccines and the status of cold-chain resources.
- An external audit of this information system that will enhance the reliability of the data provided, which will serve to monitor the performance of the three activities comprised in this component of our Threshold Plan.
- Basic computer equipment (1 personal computer with the information system and a portable information storage device – USB) for 1,246 health centers (were the information regarding the distribution, consumption and coverage of vaccines is concentrated), and a radio equipment for each immunization brigade.
- A geo-referenced system with a Global Positioning System (GPS) equipment to be implemented in each of the eight Health Offices serving the regions detailed in Table 2 of Appendix 3. This will allow the MOH to identify and map scattered populations and

associated health centers and vaccine warehouses, in order to improve the distribution of vaccines, related supplies and itinerant brigades' priorities.

- Five workshops that will allow training 3 representatives from each of the 34 Regional Health Offices. These representatives will, in turn, train the members of all 7,000 health establishments with the aid of user guides (including a CD) to be distributed among all decentralized offices. The topics to be considered in these training activities include: (i) basic criteria for the use of the Integrated Immunization Information System; (ii) the use of information registry mechanisms; (iii) the design and analysis of indicators related to immunization; (iv) techniques for the assessment of the Integrated Immunization Information System; (v) applications in the use of geo-referenced information; and (vi) a basic course for supervisors of the Integrated Immunization Information System. Routine training will be established at the health center head of the micro-network, responsible to supervise health posts within its area.

These products will yield the following results that, together, imply an improvement in the quality and timely access to information regarding the delivery of vaccines:

- All 1,246 Health Centers use the Integrated Immunizations Information System to relay information (directly) to the Central Office.
- A reduction in the time required to process and receive (by the Central Office) information from decentralized health establishments from 2 months to 30 days.
- A reduction in the time required for the reception (by Health Centers) of the information produced by itinerant brigades from 30 days to 1 week.
- A reduction of, at least, 50% in the occurrence of registry errors, since Health Centers will now directly report (electronically) to the Central Office. Currently, information generated in Health Centers is sent (physically) to the Regional Health Offices that consolidate it prior to reaching the Central Office.

### **3. Sustainability**

As already mentioned, all three activities comprised in this Component of our Threshold Plan will complement current efforts by the Ministry of Health which already imply an important expansion in its regular budget. In fact, the Ministry is aware that the sustainability of this Component heavily relies on its commitment to further increase health expenditures and, in particular, those devoted to immunization.

Immunizations have their own line item within the MOH budget and, in 2007, amounted to US\$ 63 million (165% more than in 2006). For 2008, the recently programmed MOH budget considers that US\$ 100 million will be devoted to this line item. This trend reveals increasing GOP efforts to secure permanent funding sources to cover all inputs required to deliver basic health services for children.

## Appendix 1: Component 2 - Summary of activities, outputs and outcomes

Ministry of Health – Activities 1, 2 and 3			
Activities/Inputs	Outputs (two years)	Outcomes (two years)	Targeted Subcomponents (two years)
<p><b>Activity 1.</b> Ensure immunization of rural children.</p>	<ul style="list-style-type: none"> <li>- 145 itinerant brigades (852 members) properly equipped: basic medical supplies and camping gear.</li> <li>- 5 training workshops delivered in each of the 17 Regional Health Offices that concentrate all itinerant brigades.</li> <li>- A communication and advocacy campaign is implemented at the district and community levels where the itinerant brigades operate.</li> </ul>	<ul style="list-style-type: none"> <li>- An increase in measles and DPT3 immunization coverage above the safety threshold (95%) in eight targeted regions. <i>* Measles and DPT3 estimated coverage baseline values (2006) are provided in Table 2 of Appendix 3.</i></li> <li>- Measles and DPT3 immunization coverage is secured above the safety threshold in all regions, nationwide.</li> </ul>	<p><b>For activities related to the Ministry of Health (Activities 1, 2 and 3):</b></p> <ul style="list-style-type: none"> <li>- DPT3 immunization coverage improves from <b>84%</b> (2005) to, at least, <b>95%</b> (6 percentage points above the 2003 WHO figure for Peru) - World Health Organization</li> <li>- Measles immunization coverage improves from <b>80%</b> (2005) to, at least, <b>95%</b> (2003 WHO figure for Peru) - World Health Organization.</li> </ul>
<p><b>Activity 2.</b> Strengthen immunization management and logistics systems.</p>	<ul style="list-style-type: none"> <li>- The MOH identifies required resources regarding vaccine logistics, cold chain, health information system, and human resources' technical and management capability, and targets interventions accordingly.</li> <li>- A cold chain inventory (including the software for its implementation) is provided.</li> <li>- Six-month virtual course in immunization and cold-chain management delivered to 750 health workers.</li> </ul>		

<p><b>Activity 3.</b> Strengthen the information system within the Ministry of Health at the central and decentralized levels.</p>	<ul style="list-style-type: none"> <li>- Permanent monitoring of the progress made regarding coverage, and timely access to information referred to the distribution of vaccines and the status of cold-chain resources, is provided by an automated and flexible information system.</li> <li>- An external audit of this information system is implemented.</li> <li>- 1,246 Health Centers properly equipped (1 personal computer with the information system and a portable information storage device – USB); 145 itinerant brigades have radio equipment.</li> <li>- A geo-referenced system implemented in 8 Regional Health Offices serving the regions detailed in Table 2 of Appendix 3.</li> <li>- 5 training workshops covering 3 representatives from each of the 34 Regional Health Offices; 7,000 user guides distributed among all decentralized offices.</li> </ul>	<ul style="list-style-type: none"> <li>- All 1,246 Health Centers use the Integrated Immunizations Information System to relay information (directly) to the Central Office.</li> <li>- A reduction in the time required to process and receive (by the Central Office) information from decentralized health establishments from 2 months to 30 days.</li> <li>- A reduction in the time required for the reception (by Health Centers) of the information produced by itinerant brigades from 30 days to 1 week.</li> <li>- A reduction of, at least, 50% in the occurrence of registry errors.</li> </ul> <p><i>*Data accuracy will be measured by the information system and its external audit.</i></p>	
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**Appendix 2: Component 2 - Schedule of activities and related tasks**

Activities / related tasks	Months	Year 1												Year 2											
		1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12
<b>Activity 1.</b>																									
Provision of the basic equipment for 145 itinerant brigades.				■	■	■	■	■																	
Training workshops; communication and advocacy campaigns.						■	■	■	■	■	■	■													
Monitoring of the itinerant brigades intervention.				■		■		■		■		■				■			■				■		
<b>Activity 2.</b>																									
Base line study for the immunization system / cold chain inventory.	■	■	■	■	■																				
Design and implementation of the virtual course in immunization and cold-chain management.			■	■	■			■			■				■			■		■			■		
<b>Activity 3.</b>																									
Implementation of the geo-referenced system.	■	■	■	■																					
Implementation of the integrated immunization information system.						■	■	■	■	■	■														
Training workshops.						■	■	■	■	■	■														
Provision of computer equipment for Health Centers; provision of radios for itinerant brigades.						■	■	■																	
External audit.															■	■	■	■	■						

## Appendix 3

**Table 1: Estimated rural immunization coverage in regions with significant rural population**

Regions	Rural Population (%)	2006 Rural Coverage (%) /1	
		Measles	DPT3
Amazonas	63%	18.87	14.03
Ancash	46%	14.43	11.80
Apurimac	61%	23.34	13.61
Ayacucho	56%	9.32	8.01
Cajamarca	74%	16.28	7.97
Cusco	57%	1.91	3.05
Huancavelica	78%	n.a.	36.46
Huanuco	65%	3.20	3.56
Junín	39%	23.01	19.48
La Libertad	31%	8.54	7.51
Loreto	39%	63.97	56.70
Madre de Dios	36%	31.09	55.56
Pasco	50%	13.63	5.02
Puno	63%	2.37	2.07
San Martin	38%	6.56	6.07
Ucayali	33%	31.35	19.92
<b>Average</b>		<b>38.37</b>	<b>13.89</b>

/1 177,057 children between 0 and 1 year of age live in rural areas in these 16 regions.

Sources: ENAHO 2006 survey, MOH.

**Table 2: Regions that exhibit immunization rates below the national average and the safety threshold (95%) in measles and/or DPT3**

Regions	2006 Coverage (%)	
	Measles	DPT3
Amazonas	94.02	85.76
Apurimac	93.41	90.33
Ayacucho	66.34	65.58
Cusco	91.26	88.26
Huancavelica	90.15	75.10
Huanuco	95.02	76.46
Ica	96.58	91.97
Puno	95.34	88.59
<b>National average</b>	<b>98.68</b>	<b>97.20</b>

Source: Ministry of Health.