REPORT ON THE ISSUES IN AND SOLUTIONS FOR ORGANIZATIONAL RESPONSIVENESS TO LQAS AND VILLAGE ACCEPTANCE OF THE MALARIA CONTROL PROGRAMME:

A Pilot Study in the Districts of Sundargarh and Kandhamal of the Government of Odisha, India[a]

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Abbreviations

An attempt has been made to keep the number of abbreviations to an absolute medium, but the following have been used:

FTDs are Fever Treatment Depot Holders (FTDs), who are the volunteer health assistants who have been trained in malaria control. They come from the pool of accredited social health activists called ASHAs. Their monthly sector meeting is usually called the ASHA meeting rather than the FTD meeting because it involves multiple programmes of health.

MTS are the malaria technical supervisors who are hired on a contractual basis to collect the LQAS findings and make reports

NVBDCP is the national vector borne disease control programme and includes includes Filaria, Dengue, Chickungunya, JE, Kala azar besides malaria.

VBDC is in charge of the vector borne disease programme and supervises the MTSs in the collection of the LQAS findings. Again, this position is a contractual one.

Executive Summary

The Liverpool School of Tropical Medicine requested a pilot study be conducted on the issues in and solutions for organizational responsiveness to LQAS findings and recommendations and village acceptance of the malaria control programme. The programme was first introduced in four districts of the state of Odisha in November, 2009 and at the time of the pilot study had been in operation for two years. The pilot study was conducted by a research team of Hage, Devkota, and Das in two blocks each of the two districts of Kandhamal and Sundargarh during the period of 3 December through 21 December, 2011. The blocks and districts were selected because they illustrated disparate kinds of issues with the former district in a very high malaria infested area and the latter less so. In addition to discerning issues and obstacles and finding solutions for increased organizational responsiveness and village acceptance, the Liverpool School of Tropical Medicine asked that the pilot study be replicable and that important research projects be indicated. Once in the field, still another objective was included because of its importance for stakeholders, namely how to prove the efficacy of this particular model of LQAS and how to institutionalize this model. Although this study was not designed to answer these questions, some suggestions are made for accomplishing these objectives.

In conducting the pilot study, the research team adopted the theoretical framework of the learning organization since in fact LQAS in its present form is demanding that health care officials develop solutions to the various problems that are reported to them. Key structural components in a learning organization are upward vertical communication and horizontal communication. What has perhaps not been recognized is that LQAS short-circuits the normal downward pattern of communication in a health care bureaucracy and provides upward communication directly from the village level to the upper levels of the health care organization, i.e., the district and Government of Odisha levels. But as it does this, it presents a problem, namely a demand that these officials become problem solvers without their necessarily being trained in either public health or in problem solving techniques more generally.

The first important research finding is that the implementation process of LQAS is not completed as measured by the various indictors used to report the malaria control programme. To date the major issues that have been identified as slowing the implementation process have been the skill level of the health volunteers in the villages (called FTDs), the level of acceptance of spraying in the villages, and the supply of nets and anti-malarials. What has not been appreciated is that it takes time for health care officials to learn new responsibilities such as problem solving to say nothing about finding the correct solutions for the problems that are identified.

The second important research finding is that the various individuals in different status levels of the health care organization have begun to problem solve, especially relative to the first two issues. In particular, some of the FTDs have begun to convince their villagers to put mud plaster on their walls before the spraying. In general, they report a growing trust in their competence. This provides an optimistic picture for the future of LQAS.

At the same time, there are other issues that are retarding the extent of problem solving in the districts of Kandhamal and Sundargarh. An important one is the engagement of both the Medical Officer in Charge of the Block and the Health Workers who are the supervisors of the FTDs. These are issues involving both problem solving capacities and communication channels. But it should be recognized that both of these positions handle a variety of health care problems, not just malaria, and this overload has to be appreciated in any recommendations that are made. Beyond this, vacancies and turnover in the health care organization mitigate against the development of problem solving capacities. Furthermore, there are many reasons why the villagers do not necessarily accept spraying beside the mud plaster problem. This means that a multi-pronged attack has to be made although the growing trust of the FTD provides a window of opportunity.

The recommendations are reported relative to the four objectives of 2, organizational responsiveness; 3 village acceptance; 4 research projects; and 5 institiutionalization of LQAS, since objective one was to conduct a pilot study. All the recommendations were evaluated on their basis of having a number of positive benefits rather than just one. Five of the seven recommendations for increasing organizational responsiveness and village acceptance focus on creating new communication channels and two of them on building the capacities of various officials in the health care organization. In particular, recommendations 2A and 3A advocate the transfer of solutions along the same status level, which creates horizontal communication channels and encourages problems solving. Recommendations 2C and 3C suggest how supplies can be shared that also facilitates horizontal communication and we might add cooperative behavior. Recommendation 2B focuses on how to engage the Medical Officers in Charge and the Health Workers by opening new vertical communication channels. In contrast, recommendation 3B suggests ways in which the capacity of the FTDs and the MTSs can be built for greater village acceptance and beyond this better analysis of the problems that need to be solved. Finally, recommendation 2D indicates that it would be advisable in the future to train health care officials in the kinds of problems that they have to handle before LQAS is introduced. A brief section considers the costs of these various recommendations.

Recommendation 4 provides a list of research projects that need to be conducted and addresses the legitimacy problem of this more intensive effort in providing technical support.

Finally, recommendation 5 indicates how the LQAS system can gradually be extended in the future to address the most important health care issues facing the health care organization.

Report on the Issues in and Solutions for
Organizational Responsiveness to LQAS and
Village Acceptance of the Malaria Control Programme

In 2007, the World Health Organization held a brain-storming session on how to contain malaria in Odisha (see www.searo.who.int/en/Section10/Section21/Section1979_1386.htm). The concern flowed from the following facts: Odisha has 3% of the population but 23% of the malaria cases and 40% of the most deadly form of malaria, P falciparum, and as a consequence 17% of the total malaria deaths in India. These rates are higher than in Africa. Given this, the World Bank decided to enhance its malaria control programme in this state and supported the use of lot quality assurance sampling in 13 high burden districts. The World Heath Organization made a series of recommendations that included the idea of a pilot trial of enhanced technical support in several districts. This report examines such a trial funded by the Department of International Development in the United Kingdom.

The National Vector Borne Disease Control Programme has been using Lot Quality Assurance Sampling (hereafter LQAS) under the supervision of the Liverpool School of Tropical Medicine in four districts of the state of Odisha in India to reduce malaria (NVBDCP, 2008) with support from the Development Fund for International Development of the United Kingdom (see Valadez and Devkota, 2011 for a description of the programme and Pradhan, 2011 for the kinds of technical support provided). Its objective is to provide more technical support including enhanced training and capacity building to overcome the weak surveillance and low quality supervisory support noted in the state of Odisha (see Odisha/55.NVBDCP.pdf). Thus, it is a more intensive effort than is generally being implemented by the World Bank in the 13 high burden districts.

The intervention of enhanced technical support by the Liverpool School of Tropical Medicine has been in place since November-December of 2009. Since then four reports have been made in three districts (Sundargarh, Mayurbhanj, and Nabarangpur) and three in the control district of Kandhamal, with the last report presented in October (Pradhan, 2011).[1] The timing of this intervention was in one sense fortunate and in another sense unfortunate. On the fortunate side, it meant that perhaps fewer deaths did occur than would have if the LQAS was *not* in place. On the unfortunately side, it meant that the success of the intervention is being measured against a resurgence of the disease. In 2010, the number of malaria deaths in Odisha rose to its highest level in six years. Thus, the situation deteriorated just as the programme was being implemented, obscuring its potential benefits.

To evaluate this trial study of strong technical support in four districts, Jerald Hage, an organizational sociologist with a special interest in improving health care delivery systems and

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[1] A fifth/fourth round of data collection is presently being carried out in the field and will be completed by the end of December. This round provides an opportunity to test some of the propositions that emerged while collecting data for this report.

especially for the poor, was hired as a consultant.[2] With the help of Devkota and Das, he was charged to conduct a pilot study of the reporting process of LQAS with the following objectives:

1. Investigate the process of how LQAS results are being used at four different levels within the health care delivery system within the state of Odisha;
2. Identify potential issues that deter the field managers/workers in exploiting recommendations and provide suggestions that might help resolve these issues or organizational responsiveness;
3. Locate potential blockages in the culture of the villages and indicate possible approaches that might reduce them or village acceptance.

It should be observed that objectives 2 and 3 each have two sub-parts, that is really two goals each: Requesting the identification of problems *and* the development of solutions. The major difference between objectives 2 and 3 is that the former concentrates on issues in the donor organization whereas the latter involves issues inherent to the recipients of the health care intervention. As indicated in the theoretical framework, these two objectives can be subsumed under one idea, namely the importance of creating a learning organization that solves problems, especially public health blockages that affect the malaria control program in the recipient villages.[3]

In addition to these very clear objectives, the pilot study was asked to develop a framework, both theoretical and methodological, that could easily be employed in any future research on LQAS, in particular in those developing countries where the health care delivery system is located primarily in the public sector.[4] Beyond this, it is understood that ideally both publishable papers and doctoral projects might be generated. To satisfy this additional demand, a special sub-section is included in the third and fourth sections of this report about unexplored research questions and future research projects to provide answers.

The purpose of this report is to address these various objectives. It is based on a limited stay of about three weeks, including travel time, in the field. The success of this project relies heavily on the support of three individuals--Babu Ram Devkota, Hemant Kumar Das, and Dr. M. M. Pradhan--who assisted in the development of both the survey questions and discussion points for the focus groups, in the collection of data including the handling of multiple languages (Odisha uses the language of Odia but dialects are in use in different areas as well including one with no script), and in making the travel plans and the necessary telephone calls ensuring

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[2] Ideally the comparison should be broader then these four districts and include districts in which the World Bank has established LQAS.   But the short time frame and the politics of receiving approval from both the World Bank and the Government of India prevented such a broader assessment. This should be done in the future. In the interim, recommendation 4A speaks to this limitation in the pilot project.

[3] Although it must be admitted that the Liverpool School of Tropical Medicine is probably more concerned with objective 2 rather than 3 but in the long term, 3 becomes the more critical one.

[4] Technically, the specific objectives do not include the idea of a theoretical framework. But this is so critical for understanding LQAS and the responses to findings from it, that this has been added to this report.

considerable cooperation at all levels.[5] The pilot study concentrates on only two of the four districts in which this experimental programme of high technical support was involved: Kandhamal and Sundargarh. The former district is at particularly high risk because of insufficient human resources. It is in a zone (there are six zones of malaria control in the state of Odisha) that has 18% of the population but a surprising 63% of the deaths. A major reason for this high death rate, beyond the problem of human resources, is the lack of village acceptance. Many of the villages are tribal (see Odisha/55.NVBDCP.pdf for more detail). Therefore, if providing more technical support reduces the death rates in Kandhamal closer to those in Sundargarh, this would be a singular sign of success, but as is indicated in this report, the process of implementation of this enhance technical support is still unfolding.

The organization of this report addresses the various objectives listed above in almost reverse order. The first section places the LQAS system of performance measurement in the theoretical context of the importance of the learning organization given the evolution of societies, especially India. A particularly crucial point is that the LQAS system itself is evolving beyond the original idea of information feedback to the identification of problems and solutions under the continuous leadership of Babu Ram Devkota. This report is designed to build upon his work and that of Hemant K. Das and indicates important research studies that can improve the amount of organizational learning in a large health care organization.

The methodology appropriate for the study of a large health care organization such as the Health and Family Welfare Department of the Government of Odisha, India, in a short time period is the focus of the second section. Many compromises from an ideal research design and set of research instruments and procedures, had to be made for a variety of reasons. In some instances, some innovative solutions were developed that can be assessed in the future.

 The third section discusses the general findings about the responsiveness of the health care organization and village acceptance of malaria interventions and the various problems and issues that need to be addressed.

The fourth section then moves on to the second part of each goal, suggesting some of the solutions that might improve organizational responsiveness and village acceptance. A continual theme is the desirability of a number of small-scale experiments to test the cost-benefits of these recommendations consistent with effective procedures for organizational change in developing countries (Hage and Finsterbush, 1987).

All of the above listed objectives are those of the Liverpool School of Tropical Medicine. Once in the field, several stakeholders indicated that there should be some additional goals in the pilot study. An important one is the relative efficacy of this specific approach to the use of LQAS, which has more training and field support than several other approaches present in the state of Odisha. Another critical one is how to institutionalize the practice of LQAS first in the

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[5] In the context of India, it should be noted that one telephone call is not sufficient and necessitates multiple reminders. In particular, without the presence of a champion such as Dr. Pradhan, this study would not have been possible. He contacted the district medical officers and he asked for their cooperation. Government bureaucracies are not the same as non-government organizations or NGO's and require personal relationships and champions within the hierarchy that can "open doors".

state of Odisha and beyond this in India more generally. Although this pilot study was not specifically designed to address these issues, they are discussed in the recommendations. In various ways, increased organizational responsiveness to LQAS and village acceptance of the malaria control programme would increase the institutionalization of this approach. Thus, there is a direct connection between the recommendations in the first two sub-sections and the desired goal of these stakeholders.

The over-arching themes are how to improve the amount of organizational learning and diffuse this learning more rapidly throughout the health care organization so that there are both more organizational responsiveness and village acceptance and therefore reductions in malaria morbidity and mortality. These recommendations or solutions (section four), general and specific, illustrate the advantages of having a new perspective for health care organizations, the learning organization paradigm, which is a topic within the theoretical framework. And another new perspective on the importance of trust and the building of social capital is equally relevant for increasing village acceptance and particularly in Kandhamal with its tribal villages (Putman, 1992). The report concludes with a vision of how the social science perspectives on the evolution of knowledge and a learning organization can be used to guide not only the institutionalization of LQAS in the Health and Family Welfare Department of the Government of Odisha but the creation of a knowledge pool about how best to employ LQAS.

Theoretical Framework for this Report

As LQAS gradually becomes the gold standard for improving health in developing countries, it is important that it be placed within a theoretical framework so that this important branch of applied research can enrich a theoretical field and also be nourished by various developments in basic research on health organizations and health care delivery systems (Robertson, S. and Valadez, J., 2006; Valadez, J. and Devkota, B., 2002). Before placing LAQS in a new and exciting organizational paradigm called the learning organization paradigm, which puts considerable emphasis on how organizations learn or fail to learn, it is important that we explain our interpretation of various aspects of LQAS that might not be immediately apparent since the name "lot quality assurance sampling" emphasizes only one aspect of the methodology, namely how the samples are drawn so that one can obtain fairly reliable estimates (the confidence intervals are always specified) with quite small samples (Valadez, J., 1991;Valadez, J., Weiss, W., Leburg, C. and Davis, R. ,2007). But it is more than a simple sampling technique. It is married to the selection of carefully chosen and quite rigorous performance measures, both knowledge and behavior, on the part of individuals living in various villages (e.g. does a mother know how to treat a child with diarrhea) or of health care workers in the same context (e.g. how to prepare a slide with a blood sample).[6] These concrete indicators reduce the margin of measurement error and also focus the attention of decision-makers on clear targets to be met.

The Evolution of LQAS

What is occurring in the field--if the intervention in the four districts of Sundargarh, Mayurbhanj, Nabarangpur and Kandhamal is any indication--is an evolution of the procedures

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[6] It should be stressed that these are not questions but instead demonstrations of knowledge and behavior that are observed by the individuals collecting the data, which is why it is rigorous.

associated with LQAS, from not only reporting the actual scores on the various indicators but to suggesting some of the reasons why the scores are less than perfect and even making recommendations for improving them.[7] Several examples of how this evolution has progressed are illustrated by the recommendations contained in the report of March 22, 2011 prepared by Devkota, Dr. Pradhan and Dr. Valadez:

> ➢ Prioritize low performing blocks (the name for sub-districts within the four districts indicated above) for more nets that have been impregnated with chemicals to kill mosquitoes);
> ➢ Improve the supply chain management of anti-malarials and rapid diagnostic tests.
> ➢ Create incentives for malarial technical supervisors, the ones who are collecting the LQAS data, to reduce turnover.

This evolution is towards problem solving to facilitate the implementation of the LQAS system. Each of these recommendations presents a problem that is not always easy to solve, especially if the decisions are at a higher level, particularly recommendations 2 and 3. One of our objectives is to try and locate solutions that do *not* require the expenditure of more money by either the State of Odisha or the Government of India.

Another sign of evolution is the introduction of training while the LQAS data is being collected. Starting in August 2010, if a lack of skill is detected in the FTDs, the accredited health care volunteers called ASHAs trained in malaria diagnosis and treatment, the Medical Technical Specialist (hereafter MTS) on the spot attempts to improve their skill level. Also, more generally, the MTSs are encouraged to build capacities at other times and in other ways. Several of the recommendations in section four build upon this and suggest additional ways in which this might be accomplished (see recommendation 3C). In general, the LQAS programme has been concerned with constant capacity building.

This report attempts to facilitate this evolution of LQAS, building upon what has already been accomplished. In particular, our objective is to develop a set of potential remedies that might be tried on an experimental basis to facilitate the further implementation of LQAS in reducing the extent of malaria in the National Vector Borne Disease Programme (hereafter NVBDCP) of the Government of Odisha, consistent with objectives 2 and 3 listed above (NVBDCP, 2008).[8] Furthermore, implied in this is that LQAS is still in an implementation phase though gradually a considerable amount of learning is occurring in all four districts but with fascinating variations. In some districts, three of four show progress, and one does not but which varies. In contrast, all four districts have shown considerable progress in the percent of children protected either by nets or spraying with most of this progress occurring between the third and fourth waves of data collection and households sprayed (Pradhan, 2011). But this learning can be enhanced and that is the goal of the many recommendations given in section four. This reflects another advantage of the LQAS system, it allows one to pinpoint problems and then attempt to solve them.

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[7] This comparison is based on Hage's experience with LQAS in Nicaragua.
[8] Indeed, some of the recommendations flow from previous insights gained by Devtoka and Das from their field experiences.

Before presenting a short discussion of the proposed theoretical framework, it may be necessary to justify why one needs to unite basic research on health care organizations with the applied research of LQAS and other intervention efforts in the developing part of the world. To practitioners familiar with academics and their jargon, this might seem unnecessary and even counter-productive. But just as LQAS is evolving, so is applied policy research and scientific research in general (Hage, 2011). Since the publication of Stokes' book (1997) Pasteur's Quadrant, there has been recognition of the many advantages of combining basic and applied research relative to various policy problems as Pasteur did when he "invented" the specialty of biomedical research at the beginning of the 20th century (see Hage and Mote, 2008 and 2010), which is defined as basic research in biology (at the time mostly bacteriology) and applied research in medicine (meaning the development of treatment technologies such as vaccination).[9] But there is an even more important reason for why combining basic and applied research must be done to achieve progress in specific areas of research. Over time applied research problems such as changing health care behavior have become more and more difficult and complex. The tribal villages in India are no exceptions! The easy health care problems have been solved in part with vaccines, a generic solution. The more difficult problems of changing human behavior, such as cigarette smoking and safe sexual practices to prevent HIV/AIDS, remain. As difficulty and complexity increases, especially in the area of public health, it is important to create more complex research teams that combine both basic and applied researchers (for a general exposition of this theory and evidence to support this assertion see Hage, 2011).

This report represents an example of the benefits of such an approach. As indicated on the cover page, it has been prepared by a research team consisting of three individuals located on three different continents with specific language skills and a wide range of basic and applied research experiences. In particular, it is extremely important that one member of the team, Das, be an Indian who could translate the cultures--national of India, specific to the state of Odisha and particular, to the Health and Family Welfare Department or organizational culture (and the latter is frequently ignored by individuals who come from other countries)--and another member of the team, Devkota, be an expert in LQAS training and implementation with experiences in multiple countries. In this instance, it should be mentioned that Devkota has had the experience of collecting four rounds of data while Das has assisted in two of these collections. Both of them had an enormous pool of tacit knowledge that became especially useful when various suggestions were made and found wanting for one or another reason. Finally, Hage is an expert in organizations, in evolutionary theories of social change and has a particular interest in health care organizations and delivery systems.

Government bureaucracies, appropriately so, attempt to achieve rationality via planning and the search for practices that increase efficiency. One of these practices is the creation of a number of rules and instructions including the careful definition of the rights and responsibilities

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[9] This specialty was not recognized in the United States until after the Second World War. In addition, the French perspective on bacteriology in contrast to the German and English paradigms argued for a contextual view about the use of vaccines, serums and other treatments of illness. This was way in advance of its time. Again the nuance of different physiological contexts was ignored in all the genetic research until quite recently.

of the different positions and roles of the members of the hierarchy (see Weber, 1946).[10] However, once trained in a set of duties, the officials tend to be reluctant to move beyond what they know. Yet, when a new programme of treatment is added to the list of duties, as is the case of the NVBDCP to control malaria, which was established in 2003, then ideally they should receive in-service training in these responsibilities and in interactions with the new members of the hierarchy that have been added.

Although India has been involved in the eradication of malaria since the 1950s, the programme has gone through various transformations as it became apparent that DDT was no longer successful in controlling the disease (see Directorate of Health Services, Odisha, n.d.). The most important institutional change occurred with the creation of the NVBDCP program because it added new diseases carried by insects (Filaria, Dengue, Kala Azar, and Japanese Encephalitis), new diagnostic tools (the rapid diagnostic technique), new preventive techniques (long lasting impregnated nets and new kinds of spray) and medicines for malaria, especially the highly effective artemisinin based combination therapy (ACT), which became available in 2008. Starting in 2005, the World Bank began funding parts of this program and it expanded it in 2008 (www.searo.who.int/en/Section10/Section21/Section1979_13869/htm). Perhaps more critically, it helped fund a vertical program with training in malaria for the volunteers in the villages, accredited social health activists (ASHA) who when they receive this qualification are called FTDs, the Malaria Technical Supervisors (MTSs), as well as a coordinator of the National Vector Borne Disease Control Programme (hereafter VBDC), which stands for consultant since he is on a contract and not a government official) at the district level. The addition of this new program with new technologies and personnel raises questions about how both the program and these individuals can be integrated successfully into an existing health care bureaucracy. A major problem that it raises is that of communication because status barriers can create communication gaps (Hage, 1974 and 1980). Many of the recommendations in section four focus on the FTDs and the MTSs, how their roles can be expanded via capacity building, and eliminating various communication gaps, especially in the vertical hierarchy of the government health bureaucracy.

This need for an in-service training program is even more pressing for the newer programme of LQAS as introduced by the Liverpool School of Tropical Medicine with funding from the Department of International Development Fund (see Valadez and Devkota, 2011) because it provides more technical support, creating new organizational demands (see Devkota, Pradhan, and Valadez, 2011), especially as various recommendations are made about which problems to solve, as we have seen. These recommendations establish a new set of responsibilities for the various officials in the health care organization. Typically LQAS has not included in-service training programmes for the *users* of the information even though it involves

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[10] Bureaucracies are not the only type of organization despite the seminal work of Weber (1946). As Burns and Stalker (1961) indicate, besides bureaucracies there are also what they call organic organizations, which are innovative and adaptive to change. Hage (1980) has expanded this typology to include four types of organizations. As the developed and developing societies have evolved in the past three decades, new kinds of organizations have emerged, including the inter-organizational networks and hence more concern about complex delivery systems such as one finds in health care.

an extensive programme of training for *collectors and analyzers* of the data.[11] This insight helps explain why various levels of the hierarchy in the health care organization might not always appreciate the significance of LQAS for reducing the incidence and mortality associated with malaria. In particular, within the district health care system's programme in malaria in the Government of Odisha, two weak links of organizational responsiveness were manifested in the Health Workers, who supervise the FTDs at the sub-center level and the Medical Doctors in Charge at the sub-district level (called blocks in this context), as indicated in section three. *This leads to an important insight for the future applications of LQAS: In-service training of the existing health care personnel and capacity building which ideally should focus on the importance of problem solving should be included as part of its introduction.* In the third sub-section of the fourth section on recommendations (see 2D) this specific idea is discussed at greater length including some indications as to how such a training programme might be structured.

The Important Issue of Communication qua Learning

Another issue common in large bureaucratic organizations is the problem of communication (Hage, 1974). Communication typically consists of instructions that emerge from the rational planning at the federal level, the Government of India, are issued down the "chain of command" to use the term common in the armed services which are comparable to public bureaucracies, to the Governments of the States such as Odisha, and then on to the districts, sub-districts or blocks, then primary health centers, and sub-health centers, to continue with specific case of the Indian health care organization in Odisha. Leaving aside the problem of how these instructions are filtered by the various levels--the more the levels, the more the filtering--there is little upward communication about how general instructions have to be adapted to different conditions at the village level (think of differences in language and typography, the presence of tribes and insurgencies, and most importantly, the differential availability of resources, etc. and see section three on barriers to village acceptance). It is perhaps obvious that instructions are not the same as training and particularly training with the method of role-playing. Yet, the literature on developing countries (Hage and Finsterbusch, 1987) indicates that if one desires to change an organization, one needs to practice learning new rules and duties, especially if the switch is from following rules, such as checking whether or not malaria supplies exist, to problem solving about *why* they might be absent, to take a critical example from this pilot study and a persistent but common problem in India.

But the larger insight about the well-known fact of the absence of upward communication in bureaucracies is the failure of those higher in the "chain of command" in asking questions of those who below them. One simple practice, rare in bureaucracies, that encourages upward communication is for a supervisor to ask a subordinate for advice. When this occurs, the status distance is lessened and the subordinate is more likely to communicate issues upwards; thereafter the communication becomes two-way and paradoxically also begins to expand horizontally (Hage, 1974). The importance of horizontal communication is a central theme in the recommendations made in this report (see sub-section 2 in section four). More critically,

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[11] And by this I mean more than explaining how the program works. It has to include some modules on how to problem solve so as to handle the recommendations that are presented.

recommendation 2B indicates a subtle way that more upward vertical communication might be created. In other words, to make a bureaucracy a learning organization, a number of new communication channels have to be created, up as well as down and especially horizontally.

In this context, it is worth considering the impact of LQAS on communication channels within a large organization because this is one of its benefits and one that has, to our knowledge, not been advertised to the larger donor agencies. *In effect, in a large organization with many levels, LQAS "short-circuits" the communication channels by providing information feedback collected at the village level and then communicates this information not only to the immediate supervisory level but more importantly to three and even four or more levels within the hierarchy of decision-making in the health care organization.* In this instance, primarily to the District Malaria Officers (DMOs) and Chief District Health Officers (CDMOs) but also to the Health and Family Welfare Department of the Government of Odisha and even to the federal level of the Government of India. Reports of this more intensive technical support of LQAS have been made several times to the Health and Family Welfare Department and once to the federal level. In addition, the content of the communication not only concentrates on the performances as measured by the concrete indicators, e.g. amount of spraying, the use of long-laster impregnated nets, or the availability of various kinds of anti-malaria medicines such as artemisinin based combination therapy (ACT), but more and more, given the evolution of LQAS, on the various resistances at the village level that may explain why these preventive interventions and treatments are not happening. One implication of this--and it is important that this be appreciated--is that it establishes a new demand on government officials, namely that various levels of the hierarchy become problem solvers as we have already suggested. This is not easy without training because it means a shift in the organizational paradigm from performing routines to changing routines.[12]

Furthermore, it will take time before each of the levels in the status hierarchy learns this new responsibility since it requires moving from single loop thinking to double loop thinking, that is questioning the paradigm, especially the biological model for treating illness, that they are comfortable with (Agyris and Schoen, 1995), and at a more general level the bureaucratic model of checking lists rather than locating problems that have to be solved. We might add, there are comparable problems in the study of health care delivery in the developed countries, for instance understanding why sensible people smoke cigarettes, diabetics eat sugary foods, and the downtrodden have difficulty in avoiding alcohol and drugs. This highlights one of the critical issues in making LQAS more successful; it involves solving problems about why villagers do not spray properly or use their nets, (the second part of objective 3 above). In other words, the LQAS system for malaria necessitates thinking about public health issues as well as the causes of disease, inherently leading to a public health perspective. However this is not true with all health care problems. Immunization is an example that focuses strictly on causes but even there public

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[12] But as indicated in the third section, some of the individuals at various levels including the health volunteers are doing this, providing a wide opportunity for diffusing this practice throughout the organization as indicated in the fourth section. Also, this is one of the basic insights of the organic model as outlined by Burns and Stalker (1961) and is the wave of the future. In the third sub-section of the fourth section. some consideration is given to how the health care bureaucracy can gradually evolve towards an organic form or learning organization.

health issues exist when particular families resist having their children vaccinated for various reasons.

So far we have been describing general characteristics of bureaucracies. Now we need to qualify these by the special issues involved in the health organization of the Government of Odisha and of India. Four important differences have struck the research team. The first is that this health care organization offers a curious mixture of centralization and decentralization with some positions having enormous autonomy, specifically the Medical Officers in Charge (MOIC) at the sub-district (block) level. This has been true since the inception of the health care system. It reflects the professional autonomy model for the medical profession. Beyond this, the Government of India has been evolving gradually towards decentralization since the 1990s. Specifically, it has been attempting to provide more scope to the district and the sub-district levels. But along with this (see second sub-section in the third section) have emerged new issues that need to be researched (see third sub-section of section four).

One of the ways in which this new directive on decentralization has manifested itself is that disparate districts within the Government of Odisha have adopted distinctive policies relative to the handling of malaria. Furthermore, on the margins, small amounts of funding can be moved from one category of health care or even malaria control to another. The tolerance of different policies allows districts to experiment and learn, similar to the learning occurring in China because of the partial autonomy of the regions within that country with their separate sources of income.[13] But it is important to note that the Government of India specifies the level of training required for each position in the status hierarchy creating some issues for the districts that have high turnover and/or vacancies in their NVBDCP.[14] In other words, in some critical ways, the health care organization is still quite centralized. Also, the bulk of the funds for health care and how they will be spent are still dictated by the federal level. At the same time, the sum of 10,000 rupees has been allocated to separate Gaon Kalyan Samiti (i.e. village welfare committee) in the villages. But as is typical when money is delegated downwards, the responsibilities are also delegated downwards and these exceed the amount of money that is available creating tensions and in some cases reducing the effectiveness of the malaria programme (see section three). This is a new research issue that needs to be investigated perhaps in a PhD thesis, (see sub-section three in section four).

The second is the huge size of even the Health and Family Welfare Department of a single state such as Odisha, leaving aside the private work of the various NGOs or the presence of private hospitals and physicians. Since the magnitude of this is hard to grasp without data, at least for Americans, we report Table One for only one programme--the new NVBDCP and for only the two districts that we studied in the pilot study within the 30 districts in the Government

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[13] This flexibility in the Chinese system has not been appreciated by most Western observers who overemphasize the role of the Communist Party and is part of the reason for the rapid economic growth. It is Deng who instituted this kind of collective learning.

[14] We would recommend that the Government of India relax their restrictions and especially the overemphasis on science and math by creating one-year professional/technical degrees for some of the positions lower in the hierarchy but we appreciate that this is not an idea that would be even entertained.

of Odisha, which has a population of 41 million (census of 2001, see Odisha/55.NVBDCP.pdf), the number of health care workers at various status levels along with the average size of the population unit being served. It should be noted however that not all 30 districts with 314 sub-districts or blocks and 51,790 villages and hamlets other than the urban areas have high incidence of malaria. As noted in the beginning, Kandhamal is situated in a high malaria death rate zone.

Table One
The Number of Health Officials in the Malaria Programme
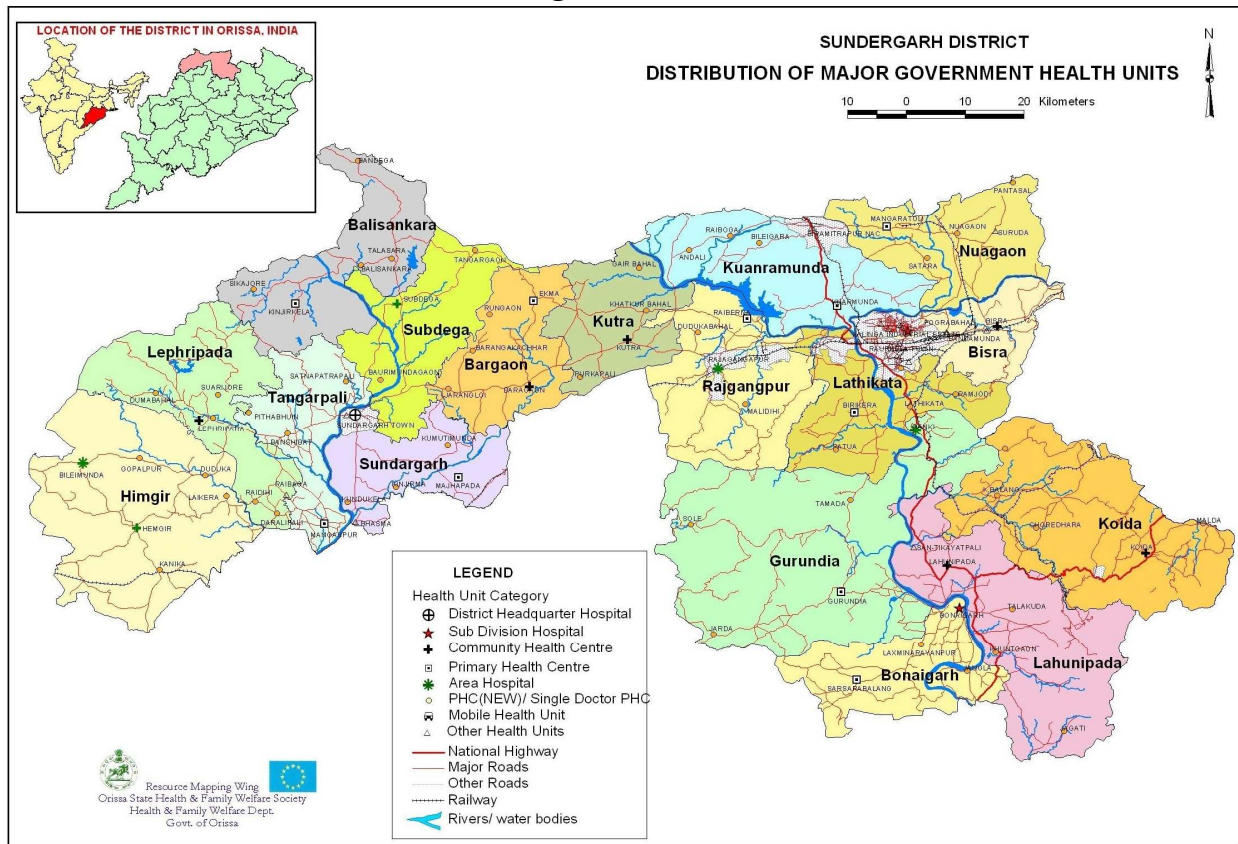**of the Government of Odisha by District and Level**

	Kandhamal District		*Sundargarth District*	
Bureaucratic Level	Number of Officials	Population of Unit	Number of Officials	Population of Unit
District Malaria Officer and staff[a]	1 DMO, I VBDC, 6 MTS	778,693	1 DMO, I VBDC, 9 MTS	2,001,471
Medical Office (CHC) in Charge[b]	12, one for each sub-district	On average, 100,000	17, one for each sub-district	On average, 100,000
Sector (Primary Health Centre)[c]	34	On average, 20000-25000	54	On average, 35,000- 40,000
Sub-center health Workers[d]	188- Health Worker (Male) 249 Health Worker (Female)	Two per 5,000 to 6,000	390 Health Workers (Male) 212 Health Worker (Female)	Two per 5,000 to 6,000
FTD[e] (volunteers)	1,234 for 4,000 villages	On average, 500 to 1,000[e]	2,380 for 1,742 villages	On average 800 to 1,100

a. Each MTS covers two blocks or sub-districts except for one person in Sundargarh.
b. CHC stands for Community Health Centre, in Sundargarth only 15 blocks involve LQAS. because of the low incidence (Annual Parasite Incidence or API) of malaria in two sub-districts, see Figures One and Two. Of the 96 physician positions in the hospitals and the primary health care centers, only 76 are filled in Kandhamal and of the 209 created for Sundargarh, only 156 are filled.
c. Medical personnel include one physician, one pharmicist, and one Multi-Programme Health Supervisor per primary health care center.
d. Considerable vacancies exist, in Kandhamal 45 Male & 34 Female positions are vacant, and in the case of Sundargarth, 37 males and 87 females.
e. Given the typography of forests and mountains in this district, the villages are scattered and vary in size. This presents special transportation problems for the Fever Treatment Depot Holders (FTDs) who provide anti-malarials.

Figure One

KANDHAMAL DISTRICT
DISTRIBUTION OF MAJOR GOVERNMENT HEALTH UNITS

10   0   10   20   Kilometers

N

LOCATION OF THE DISTRICT IN ORISSA, INDIA

LEGEND
Health Unit Category
⊕ District Headquarter Hospital
★ Sub Division Hospital
✚ Community Health Centre
⊡ Primary Health Centre
✳ Area Hospital
● PHC(NEW)/ Single Doctor PHC
🚐 Mobile Health Unit
○ Sub Centre
△ Other Health Units

━━━ National Highway
─── Major Roads
········· Railway
◄═══ Rivers/ water bodies

Resource Mapping Wing
Orissa State Health & Family Welfare Society
Health & Family Welfare Dept.
Govt. of Orissa

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Figure Two

Another way in which to appreciate the size of the health care organization is indicated on these maps, which present the location of each sub-district. The Medical Officer in Charge of the Block is responsible for the hospital as well as the community health centers or sectors within the block. The primary health center has a physician, a pharmacist and the Multi-Purpose Health Supervisors. Across these two levels and including those physicians assign to the hospitals, there are critical shortages as noted in footnote b to Table One. The other major set of vacancies are the Health Workers (male and female), who supervise the FTDs in the villages and are assigned to the sub-centers.

Not included in Table One are the various kinds of technical support above the district level including laboratory support (see Odisha/55.NVBDCP.pdf for a discussion of the strategy at the state level and the various kinds of malaria initiatives that it is taking). Also not shown are the positions above the NVBDCP project unit for malaria in the districts themselves, which are the Chief District Medical Officer (CDMO) and above him the Collector (chief operating officer) who coordinates all governmental services at the district level. Hopefully, this table conveys the size of the health care organization just for malaria control without discussing other health care issues.

Another distinctive difference is the incredible variety of languages and cultures, especially at the village level, our third observation. As already noted, Odisha has the official language of Odia, which has a number of dialects. At the village level, there are tribes that speak their own language, Kui, which does not have a script, or have their own culture with distinctive values. Pockets of Christianity (and we might add different kinds) also exist, posing still new issues in delivery malaria services to them but also opportunities for intervention and problem-solving. A particular difficult obstacle that creates turnover in some districts is the existence of Maoist insurgencies in parts of the state of Odisha which partially explains the human resource problems in Kandhamal.

Furthermore, this issue of different racial religious and ethnic differences is a generic problem that just recently within the past decade has become salient. As the United States is slowly learning, health care delivery requires recognizing cultural sensitivities and learning how to adapt to them. The communication with African-Americans has to be different from that with Hispanics, who in turn are divided into three major groups within the U.S.: Chicano, Porto Rican, and Cuban. These vary in terms of class (lower working, middle and upper middle for Hispanics respectively and somewhat roughly), education, and political values. The same problem exists for the health care organization of the Government of India and especially for the Government of Odisha with its high concentration of tribal villages in remote areas.

The fourth is the use of incentives to have people perform certain duties for the benefit of their health. For example, the State government in all districts of Odisha gives pregnant women 5,000 rupees if they complete a programme of pre-and post-natal care. Small sums (Rs 20.00/ per slide for a maximum of 10 slides collected in a month) are paid to the FTDs. When they accompany women to the hospital, they also receive a monetary reward. When they attend the monthly sector meeting, they are given another 100 rupees. Admittedly, since these women are volunteers, it is important that they be provided some income to maintain their participation in the health care system. Several of those interviewed felt that the FTDs should receive more incentives.

The partial decentralization of the decision-making in health care in general and in malaria in particular, the large size of the health care bureaucracy even within the districts, the disparate cultures and languages, and the use of financial incentives, especially those channeled through the Gaon Kalyan Samitis, are special characteristics that we must remember when devising recommendations. On the negative side, each of these distinctive characteristics can create certain kinds of communication problems. In particular, the large size makes horizontal communication between various levels even in the districts difficult. On the positive side, the partial decentralization of the decision-making in health care in general and in malaria in particular actually permits the use of experiments in studying how to resolve some of the issues regarding the implementation of the LQAS system and the amount of organizational responsiveness, our next topic.

The Learning Organization

At various points we have suggested some of the reasons as to why it is useful for health care bureaucracies to become learning organizations. This is a new and important perspective in

the study of organizations (Brown and Duguid, 1998; Cohen and Sproull, 1996; Connor and Prahalad, 1996). As we mentioned above the simple health care problems are resolved first, leaving much more difficult ones for later. The history of malaria is a good example of this. At first DDT was able to eradicate malaria in the 1950s but gradually in the 1980s it came back, demanding that the Government of India to create new programmes to treat this disease (Directorate of Health Services, Odisha, n.d.). The Vector Borne Disease Control Programmme added in 2003 is the latest attempt to develop quite a complex intervention system to reduce the morbidity and mortality of malaria in India. But, as suggested above, the addition of new personnel, new technologies and also we might add new objectives in tackling other diseases caused by insects necessitates changes in the duties of the health care officials. More critically, for this programme to be successful it has to rely on solving issues in public health--changing individual and collective behaviors--that seem in some instances quite intractable.[15] We provide some suggestions as to how to accomplish this in sub-section three of section four but with the caveat that these recommendations be tested in small-scale experiments.

In addition, in our discussion of the evolution of LQAS, we have highlighted how it has changed from the simple reporting of the scores to making recommendations about how to improve the scores. Ideally issues should be resolved with cultural sensitivities to the language, cultural and religious variations at the local level. This is particularly important in a large-scale health care organization such as the Health and Family Welfare Department of the Government of Odisha. The many differences in the tribal villages, the Christian enclaves, the practices of the Hindus during festivals require understanding a number of contingencies.

But more importantly, consistent with the learning organization perspective, we found a considerable amount of organizational learning occurring at the lower levels of the status hierarchy. This leads to another recommendation for the use of LQAS. *To maximize learning, it is better to disaggregate the data not only to the block level but to the sector(primary health center) and sub-sector or center level, to find differences in the performance that could lead to insights about how particular units have found novel solutions.*[16] In our pilot study, we found considerable differences between the centers and the sub-districts or blocks. Disaggregation would help facilitate the organizational learning that needs to occur. But when this is done, it is also important to control for how malaria incidence has changed over time--there are large swings--and the specific difficulty of combating malaria in certain zones, which can be roughly estimated by the differential death rate or the average parasite index (API) and how large is the proportion of the population that is tribal and last but hardly last the distribution of scarce resources. As we have already reported, the district of Kandhamal is in a zone with a very high death rate as well as a higher proportion of tribal villages. More difficult to measure is the obstacle created in this district by the combination of very rough roads and isolated hamlets, another characteristic of Kandhamal.

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[15] It is worth stressing the difference between individual, family, and village resistances to changing behavior patterns; they require quite disparate kinds of interventions. Furthermore, the creation of social capital in a village becomes a critical intervention tool for many kinds of health care problems (see Putman, 1992).

[16] Admittedly, given the methodology of small lot sampling, the confidence levels must expand at the lower levels.

Another reason why we believe that this perspective of a learning organization would be useful for the Government of Odisha and of India is the continual addition of more and more programmes such as the NVBDCP. Each new programme poses problems of how best to integrate it with other existing health care programmes, an issue that is discussed in the learning organization perspective (Grant 1996). And, as is indicated in the third section, this is an on-going issue with the NVBDCP presently. Furthermore, changes in developing societies are adding new health care problems that necessitate the addition of still more programmes. Consider the problem of growing pollution and lung diseases that accompany the extension of industrial areas (with highly polluting steel mills, aluminium plants, coal mining, etc.) as is happneing in Sundargarh.[17]

One reason for the addition of new health care programmes and/or the changes in their context is the constant growth in new medical knowledge as a consequence of an every expanding budget for medical research. Again, the creation of the NVBDCP represents the fruits of medical research and even basic scientific research leading to new insights about different kinds of malaria, disparate breeds of mosquitoes, diseases such Dengue fever, and new techniques of prevention and treatment. For example, the Institute of Research on Malaria in India is engaged in some extremely interesting experiments to solve some of the problems of village acceptance. Perhaps the most interesting consequence of the growth in medical knowledge is the appreciation of the growing complexity of health care problems, a fact that any official in the health care organization of the Government of India can readily appreciate. This growing complexity makes a learning organization perspective more and more attractive. How does one handle this growing complexity except by doing basic and applied research on these problems, finding solutions, experimenting with these solutions to determine under what conditions they work, as this pilot study is recommending (4b in section four)? The age of universal solutions such as the vaccine for small pox or the addition of sanitation and safe drinking water is over, which is not to say that in some areas of the world these safeguards are not still needed. Health care is now very contingent and will become even more so as increasingly it is appreciated that one must use customized solutions for individuals, families, and villages. This is, of course, why the movement of the Government of India towards more decentralization makes such eminent sense; it allows for the flexibility at the district and sub-district level to adapt to the specific contingencies of their populations and also to learn customized solutions to their health problems.

The world is changing rapidly, especially in India with its remarkable economic growth. To accommodate this change, we recommend that the Government of India adopt an evolutionary model of social change and create the conditions that encourage the various bureaucracies to become learning organizations so that they can adapt to local variations and solve problems. It is too difficult for even very bright planners to create detailed plans that handle all the complexities and allow for customized responses in various parts of the country. Our recommendations in section 4 are designed to facilitate this process. Finally,

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[17] Sundargarh is a good example of this problem. While we were conducting the pilot study, the Indian government closed a steel factory there because of the extensive pollution.

recommendation 5 provides an evolutionary example with the expansion of LQAS to other health care problems.

The Methodology

An important objective of this pilot study was to develop a set of methodological tools--design, instruments, and procedures--that could be easily applied to other situations, at minimum in the health care bureaucracy of the Government India and with appropriate adjustments to other developing countries as well, as outlined in the introduction. Specifically, the focus is on the creation of survey questionnaires and lists of questions for focus groups as well as on procedures that could broaden the understanding of the issues impacting negatively on the effectiveness of the LQAS system in reducing mortality due to malaria. As discussed in the theoretical framework, an important part of the research design is to recognize the multiple levels of the health bureaucracy, attempting to locate weak links where communication may break down. Another advantage of examining the different levels of the health care bureaucracy is to cross-check the accuracy of the information we obtained in the interviews.

In developing these instruments and procedures, this pilot study started with a series of constraints that required the research team to adapt and problem solve. The two critical constraints are: (1) the absence of time to develop all the instruments required (some seven) and (2) the sheer size of the Indian health bureaucracy which prevented us from being able to do all the individual interviews that were desired. Each of these constraints along with the compromises that they entailed requires some discussion. In future studies, one or more of these compromises may not be necessary and beyond this, some of our solutions are innovative and are worth further methodological research to assess their utility.

The Research Design: Initial and Final

The research design started with three assumptions. *First*, since LQAS was introduced in four districts, with one of these as a control district (Kandhamal) , the initial goal was to visit all four districts.[18] But since each district contains many sub-districts in which these techniques of malaria control are employed, e.g. 12 in Kandhamal and 15 in Sundargarh (see Table One), two sub-districts within each district, one scoring relatively high and one scoring relatively low in perceived responsiveness chosen by Devkota and Das in consultation with Dr. Pradhan, were to be selected. The advantages of contrasting Kandhamal and Sundargarh have already been suggested by the much higher malaria death rate in the former district as well as the differentials on some of the indicators as measured across time, e.g. the percent fever cases tested has reached almost 40% in Sundargarh in the percent of households properly sprayed in the last three months but actually declined somewhat in Kandhamal to less than 20% indicating some major problems in the skill level in this district (Pradhan, 2011.

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[18] Practically for this pilot study, the status of Kandhamal as a control no longer presented any problems since the third and the fourth rounds, the two rounds during the last year (January, 2011 through September, 2011) were collected in this district as well and they formed the basis of the questioning in all the interview schedules and focus group protocols.

Second, we wanted to conduct qualitative interviews with the five levels listed in Table One with particular attention to the top of the hierarchy, that is the District Malaria Office (hereafter DMO), the Officer in charge of the Vector Borne Disease Control Programme (hereafter VBDC), and the Medical Technical Supervisors (hereafter MTSs). Also, we desired to conduct interviews with most of the supervisory personnel in two sub-districts, that is the 2 Medical Officers in Charge (one for each sub-district), 2 Multi-Purpose Health Supervisors at the sector level (i.e. two sectors) and 4 Health Workers (both male and female, or two per sub-sector, and all the FTDs that work in all villages attached to one sub-center in each of the two blocks or sub-districts in the Kandhamal and Sundargarh districts.

Third, since all of the workers at the bottom level of the hierarchy are women as well as one half of the Health Workers, we felt it was critical that a woman be involved in the interviews with the female Health Workers to reduce whatever biases are created by male interviewers. Madeleine Hage because of her interest in the problem of women in developing countries and her experience in Africa volunteered to participate in the execution of the study.

Two of these assumptions had to be altered in the light of several constraints. The first constraint was time. The initial planning started in October, 2011 with the request that the Hages would travel in the month of December to conduct the pilot study. But scheduling of the trip in this month meant that there would only three weeks at maximum in the field since Devkota was to leave on the 22nd of December and the Hages could not leave until the 2nd of December because of prior commitments. Under these circumstances, it was impossible to visit four districts in some 20 days. Furthermore, one of the districts, which would have been ideal, was 18 hours from the capital city of Bhubaneswar. The compromise was to visit two districts and within each one sub-district/block that was relatively better and one that was relatively less good to try and highlight potential issues that were affecting the impact of LQAS. And as already reported, Kandhamal represents a much more difficult district in which to reduce malaria than Sundargarh because of the rough terrain, turnover in MTSs, and tribal villages.

The time constraints also impacted on the decisions about the methods for collecting data. Given the large number of interviews especially at the top and bottom of the hierarchy in the Indian health care bureaucracy, the decision was made to shift from interviews to focus groups with two key groups, the MTSs and the FTDs. Since the latter group involved all females, Madeleine Hage was asked to observe the non-verbal behavior of the women and to report what she thought was the meaning of silences and whether one or two women were dominating the conversation. This initial development of a schedule of non-verbal communication is contained in Appendix B.

A final and non-trivial constraint was the problem of multiple languages. Odisha speaks Odia (which has several dialects itself) rather than Hindi. Ideally one would prefer to have all instruments double-translated into Odia and back into English to check whether or not mistranslations had occurred. It was assumed that some instruments would be translated into Odia before the collection of data but this was not possible given the time constraints. Therefore, the translations were made *in situ* by the focus group leader for the FTDs in each district, who was usually the VBDC. Appendix A reports our final version of a useful set of instruments for this kind of study; it can be translated into the appropriate language and even dialects in advance

and back-translated to ensure correct translations.[19] In the case of other interviews, where we discovered language problems, a second person, usually a native speaker of Odia, translated the questions that either Hage asked into their native tongue. The pros and cons of this procedure are discussed below.

We would also argue that it is necessary even if expensive to use a complex research study in replicating this kind of research. As the problems to be solved to facilitate LQAS become more difficult, the only way in which progress will be made in implementing this technology is to have research teams that combine basic and applied research, theoretical and cultural knowledge, to say nothing about the need for the native language. Hopefully, the recommendations about how to facilitate the extension of LQAS to other areas of health within the Government of Odisha and the movement of the Health and Family Welfare Department towards a learning organization make the advantages of a complex research team apparent.

Research Instruments and Protocols

The development of a protocol for the focus groups and interview schedules were designed to collect qualitative information and not quantitative data. Our concern was with locating specific technical problems that appeared to reduce the responsiveness of key health care personnel to the reports from the LQAS system and specific cultural problems in the villages that made the use of various defenses against malaria less effective, (objectives 2 and 3). Qualitative studies are better at locating these kinds of problems but of course they are not good in providing percentages about the frequency of specific technical issues or cultural obstacles.

Again, the constraints noted above delayed the development of these qualitative instruments. Since Devkota was involved in the implementation of LQAS in five new districts during the month of November, this meant that coordination between him and Hage was difficult. Furthermore, the time difference between India and the U.S. made the scheduling of SKYPE calls complicated to say nothing about the fact that they were not possible from all parts of the districts in which Devkota was located. Therefore, the development of the interview instruments and the protocol for the focus groups could only be completed partially before the arrival of the Hages in Bhubaneswar. However, fortunately their development was aided by two kinds of input. Devkota was aware of many of the technical problems that were reducing the effectiveness of the LQAS system in the four districts and inserted many questions to verify what he understood these issues to be. And Hage was concerned with focusing on the kinds of solutions that were being attempted to solve these problems. Thus, we were able to quickly develop rough protocols and interview schedules. This is not to say that we did not exchange various drafts but only to indicate that we could never really discuss them in some detail.

Although the seven instruments (actually two were developed for the FTDs and two for the MTSs because some of the information desired relates to a specific individual) were not finished before the beginning of the interviews, we treated each block and its sector (primary health center and sub-sectors or centers as a learning experience and adjusted the interviews so

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[19] At the same time, we believe that some more improvements could be made now that we have had the advantages of preparing a report and learning about new issues.

that they became clearer and more understandable across time. For example, Madeleine Hage asked the first focus group of FTDs how much support they were getting from their family and community. This question not only produced some interesting insights but resulted in the women becoming much more open and at ease; therefore we added this question in the next three focus groups. Also, it became apparent that some of the interview schedules were too long, so they were shortened.

We found that six questions for the focus group of the women, the FTDs, took about 90 minutes, which was our upper limit. But to reduce the number of questions, we created another sheet of essentially factual questions that they filled out. We also discovered that the first few questions elicited much of the information that we desired under these circumstances. The final version of the seven instruments is contained in Appendix A, which have been edited by Madeleine Hage. This meets the requirement that this pilot study could be easily replicated if so desired by the Liverpool School of Tropical Medicine. But to ensure replicability, we next discuss our specific research procedures.

Research Procedures

As indicated at the beginning of this report, Dr. Pradhan called various Chief Health Officers in the two districts that were selected for the pilot study and asked for their cooperation. A key asset was the extensive interpersonal network of both Devkota and Das who knew many of the MTSs because they had worked with them in the field. But beyond this, both of them had developed a number of friendships, which obviously made a great deal of difference in obtaining cooperation in the focus groups and interviews within each district[20] Another help was the aid of the two VBDCs, Dinesh Praharaj in Kandhamal and Birat Pradhan in Sundargarh, who assisted in the coordination of all those who were to be interviewed either individually or in focus groups. We mention this because we had an extraordinary level of genuine cooperation that made this pilot study a most enjoyable experience at least for the senior author of this report and his wife. Also, it is important that if one wants to replicate this study in other districts or states of India, to say nothing about other countries, all of these same elements need be in place before a satisfactory research project can be launched.

Consistent with common courtesy, we began each visit to a district with an introduction to the Chief Medical Officer. In one district (Kandhamal) we also met the Collector, the Chief Executive Office of government administration at the district level, and in another (Sundargarh) the assistant director of the Institute for Research in Malaria. Both conversations introduced fresh and interesting perspectives on the Government of Odisha at the district level.

Given the practice of the Government of Odisha to provide inducements to secure compliance with various health care protocols, especially pre and post-natal care, inducements

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[20] For example, Devkota invited four of the MTS and the DVBC from the district of Sundargarh to visit him in his home in Nepal. Furthermore, and more critically, he attempts to remember some personal interest of each of the individuals with whom he works and continues to ask them about this each time he sees them or talks to them over the phone. Thus, he has created a strong personal network of relationships that was extremely important for the success of this pilot study.

were used to help facilitate the formation of the focus groups. The FTDs who participated in the four focus groups, one for each sub-section and two for each district, and filled out a questionnaire in addition were each paid 100 rupees. A very nice and elegant luncheon was arranged for the MTSs after their focus group in the district of Sundargarh. These kinds of inducements are important to replicate if this study is used in another district/state of the Government of India.

The procedure employed in the focus groups for the women is that two of the men, the facilitator, the VBDC, and another native speaker of Odia, led the focus discussion while another person translated for the Hages. The presence of two individuals to conduct the focus group is unusual but we found it compensated for the absence of a series of pilot studies to determine the best kind of wording for each question. In other words, the VBDC made the original translation and the second native speaker would amplify this and try another kind of wording. Another important procedure was the recording of the answers by two to three people as well as the use of a recorder to be sure that nothing was missed. In the final edition of the protocols and interview schedules contained in Appendix A we have used what we believe is the best wording for communicating. Finally, we employed what we thought were culturally sensitive procedures by having both the leader of the focus group discussion and one of the translators sit on the floor because the women were also sitting with their legs crossed.

A useful procedure was the inclusion of Madeleine Hage in the focus groups for the women. As mentioned above she added some questions that made them feel comfortable and her presence also changed the atmosphere of the focus group in a positive way. Finally, she began to develop a protocol for measuring non-verbal behavior of at least women in the focus groups, which is included in Appendix B. *It is our recommendation that in countries such as India, when women and especially those of low status are involved in focus groups, a woman be assigned to measure the non-verbal behavior of the participants.* An important research topic is to begin to assemble a non-verbal measuring instrument. To our knowledge, this is a methodological innovation but one that requires more research.

It had been hoped that most of the interviews and the focus group with the MTSs could be conducted in English. But unfortunately, both Hages had trouble understanding Indian English and likewise the respondents had difficulty understanding American English. Hence, most of the interviews involved both a translator and another person besides the Hages' recording the information obtained. These multiple codings of data were cross-classified and in the case of the focus groups checked with the recordings made. Finally, a conference was held involving Das, Devkota, and Hage to be sure that we all agreed that this was what we had heard. Because of scheduling difficulties, one of the Medical Officers in Charge of a sub-district or block in Kandhamal could not be interviewed as intended and therefore was interviewed later by telephone by Das.

Two unusual procedures were used in the process. Devkota who has vast ground-level knowledge of the health care performances as measured by LQAS would challenge some of the responses of various officials when they seemed not consistent with known data. This tactic occurred more in the second district and especially with the Health Workers because he felt that he was receiving pro-forma answers based on the desire to please and not on a knowledge based

on the facts. In some cases, the official being interviewed would admit that he had overstated the level. In other instances, it became obvious that the official did not know. This procedure identifies one major weak link in the health care hierarchy: Health Workers (male and female) (see section three). This is, of course, consistent with the concerns of the State of Odisha about weak supervisory support.

Another unusual procedure used by Hage consisted in asking whenever a problem-- whether organizational or at the village level--was identified, if a specific solution might resolve the issue. While it would appear difficult to duplicate this procedure in future studies, in fact, many of the suggestions revolved around requesting that individuals ask questions or suggesting more training of various kinds (see recommendations 2B and 3B in section four). Thus, if this study were to be replicated, this procedure could be used. However, beyond this, the whole thrust of this qualitative research was not only to identify issues but locate potential solutions. To this end, all of the questionnaires as well as the focus groups involved questions asking the participants for their feedback and suggestions for improvement. This is the advantage of qualitative data collection; it provides a wide-latitude for feedback as long as one recognizes that if mentioned only once, it is not certain that the suggestion is a good one. But altogether, asking the participants if certain interventions might solve the problem do help the health care organization to evolve towards a problem-solving mode of thought, which is a desirable end in itself.

Research Findings in the Pilot Study

In measuring the responsiveness of the organization towards solving problems identified by LQAS, it is important to understand what are the main problems that have to be resolved as part of the evolution of LQAS. Some of these were mentioned in the recommendations made in the Devkota, Pradhan, and Valadez (2011) report prepared for the districts and the state of Odisha; these recommendations were largely repeated but with more detail in the last report that includes four waves of data collection (Pradhan, 2011). The three major ones are the skill level of the FTDs, the lack of acceptance of spraying especially in the tribal villages, and the supply of long lasting nets and anti-malarials. The latter is more of an issue to be resolved at the levels of the Government of Odisha and the Government of India level although we do have some suggestions about sharing resources (see recommendation 2C and 3C). The other two problems are more within the purview of the districts themselves.

The last report available (Pradhan, 2011), provided data about the skill levels of the FTDs. We have already noted the relatively low levels of fever cases tested and also told their results, with Kandhamal at below 20% and Sundargarh below 40%. Likewise, there are also skill issues with the correct dosage for treatment of P falciparum, the most deadly form of malaria. In most of the interviews and the focus group of the MTSs, questions were asked about the knowledge and skill level of the FTDs independent of this data. By contrasting the answers to these questions and the LQAS findings, we are able to detect communication problems in the vertical hierarchy. For example, some of the Health Workers reported that all of the FTDs had high skill levels. This suggests that they were not properly supervising the FTDs, which is one of their main responsibilities (admittedly they cover multiple health problems including safe

motherhood and child protection). *One organizational issue, the kind of supervision of the Health Worker (male and female) therefore needs to be solved.*

More subtle but equally informative were the differential responses of the two focus groups of MTSs, one for Kandhamal and another for Sundargarh. In the latter district, the MTS reported considerable differences in the skill levels of the FTDs between their two blocks (most had two blocks except for one individual). This indicates that any recommendation about skill level has to be targeted to recognize this difference. In contrast, the MTSs in Kandhamal did not make this kind of distinction. In part, this may reflect that Kandhamal in general has a lower level. But in part, it may also be a consequence of the large turnover in MTSs in this district, making them less knowledgeable. In contrast, in Sundargarh, all of them have been with the programme since its inception and therefore were capable of a much more detailed analysis of the FTDs. *Another organizational issue, the turnover in MTSs, therefore needs to be solved.*

The evolution of the malaria control programme

The advantages of a learning organization perspective become apparent when we begin to analyze the data and report the findings. In particular, it led to two important conclusions: *(1) the implementation of the LQAS is a process that is still unfolding and may not be completed for several more years; and (2) a surprising amount of progress had been made in problem-solving, speaking to both objectives 2 and 3, that is organizational responsiveness and village acceptance.* Relative to the first point, we have indicated that only some movement has been made on some of the specific indicators measured by LQAS for malaria. For example, the percent of households is still less than 50, the target for the fourth round of data collection in all districts (Prendhan, 2011). In contrast, considerable progress has been made in the percentage of children protected either by nets or spraying and the percentage of fever cases tested for malaria combined with the results being provided to the patient has also increased.

Unfortunately, many officials, and understandably so, thought that once the training was completed in the first round, the eradication of malaria would proceed rapidly. Perhaps this assumption was made in part because proponents of the programme ignored the amount of time needed to implement a new area of health care intervention. New programmes take time before everyone has learned their new duties and responsibilities--one reason why above we recommended that the training for LQAS involve the consumers of the data as well as those who collect and analyze the data--and why a learning organization perspective is so helpful. It encourages a more modest expectation. Although it is difficult to generalize, on the basis of Hage's experience in examining the processes of organizational change, it typically may take five years.[21] Furthermore, in the case of malaria, as noted at the outset, it is not just a question of the organizational issues but also the resistances of the villagers. Two kinds of learning and problem solving are necessary before the programme can be completely successful.

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[21] The problems of implementation are particularly large when moving from one kind of an organization such as a non-government organization, which are in the field generally small, to another kind such as large health care organization and from one culture to another.

Relative to the second point and shifting to the focus of this pilot study, *the exciting general research finding is that gradually organizational learning is occurring in both districts.* The implementation process is gathering speed as various officials at different levels begin to respond to the research findings of LQAS and attempt to solve the problems as indicated in the recommendations of the MTSs even if, as yet, it does not always manifest itself in the specific indicators reported above. When the first round of reports were made, many of the top health officials found it difficult to believe the results. By the time of the third round, they had become more familiar with the way in which the specific indicators were measured and began to develop concrete actions to handle some of the reasons for why the results were less than expected.[22]

But this is not the only indication of problem solving, however important it is, because it represents organizational responsiveness. In some respects what is much more interesting are either the individual initiatives being taken or the range of ideas about potential solutions to problems from various members of the health organization. What is particularly striking about this finding is that problem solving is scattered across all levels of the health care organization and in both districts. In response to complaints about the lack of attention to malaria in the monthly district meetings, the District Malaria Officer in one district adopted a new strategy, requesting that the many health topics be rotated in the block meetings so that malaria receive more attention and his counterpart in the other district requested that the topic of malaria be discussed first.

Some individuals are, of course, better problem solvers, than others. One of the Medical Officers in Charge had several suggestions for improving the acceptance of spraying by the villages:
- ✓ Extend the discussion of health topics with the FTDs from one day to two because of the many topics at the ASHA sector meeting;
- ✓ Involve the Gaon Kalyan Samiti and local leaders in gaining acceptance of spraying;
- ✓ Add a lab facility for reading the blood slides to the Sector level so that the results are obtained more quickly.

Since the MTSs present the reports, they are a key indicator of the amount of problem solving that occurs because they are supposed to make recommendations for improving performance. Here are some of the concrete steps taken by the MTSs in one district after the third report:
- ➢ 15 days advanced warning for spraying was provided via the sub-district (block) administration;
- ➢ The poor performing villages were prioritized for a more focused intervention;[23]

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[22] The measurement standard is quite stringent. For example, if spraying was not done in the kitchen or the shrine within the house, then the house is coded as not sprayed.

[23] Unfortunately, we did not have the time to determine whether the procedures advocated by Center for Disease Control, the United States of America, about the placement of the nets within 50 meters of rivers are   followed. In other words, it is not the case that all houses in the same village have to have nets.

> ➢ Attempts were made to engage other organizations that dealt with the villages to increase acceptance of spraying;
> ➢ The FTDs and the Health Workers were monitored to improve their skill levels.

Above we suggested that in general the Health Workers are performing their duties in a perfunctory way. But one of them had a number of interesting suggestions for improving performance:

- Expand the educational programme of the MTSs to include the use of trucks with loud speakers announcing the time and day for spraying and also add a street drama to capture their interest;
- Provide the Health Workers with motorcycles so that they can increase the frequency of their visits to the FTDs;
- Increase the incentives for each blood slide made and the use of the rapid diagnostic tests so that the FTDs are more motivated by the malaria programme.

These three examples indicate how rich is the thinking of some individuals and suggest that if quality work circles, one form of group problem solving, were organized with any of these status groups, whether the Medical Officers in Charge, the MTSs, or the Health Workers, many solutions for even intractable problems might be developed.

But contrary to what one might think, problem solving was also occurring at the opposite end of the status hierarchy: *a few of the FTDs are learning how to convince the villagers to do their mud plastering before spraying occurs.* Also, some of the villagers are observing that the FTDs can cure malaria better than either the quacks or the Bula Doctor, which means that learning is occurring in the villages as well despite the many cultural barriers to spraying that exist. Together, these processes are resulting in increased trust in the FTDs, which is a necessary step before there is more village acceptance of spraying, particularly in the tribal villages. *These processes also demonstrate how slow the implementation process of LQAS must be and why: It requires a number of different members of the health care organization to learn their new responsibilities and discover what are the best strategies for solving the specific problems such as turnover, lack of vertical communication (see below), and village resistance to spraying.*

Learning how to problem solve as evidenced by the FTDs is especially striking and an optimistic sign for the future. Many officials in the bureaucracy questioned the wisdom of having them provide diagnostic tests and preparing blood slides because they did not have much education. Some of those who were interviewed commented on the low levels of education of the FTDs. While it is true, as we have indicated, that skill levels must be increased, this is quite different from *their capacity to problem solve.* In other words, because of cultural biases that exist in India with its long caste history, the FTDs have been underrated by those officials who doubted their ability to become an important component in the health care delivery system.

One of the more exciting findings that emerged in three of the four focus groups with the FTDs is their reporting about the growing trust the villagers have in their abilities. The building of trust has many implications for gradually ensuring that an entire village is sprayed and in all rooms (there still is a tendency not to allow spraying in the shrine of the house) and that everyone uses long lasting nets when available. In some villages, where the people believe that spraying causes the growth of bedbugs, trusting the FTD becomes a strong imperative.

Furthermore, the villagers' growing trust of the FTDs has implications for other health programmes besides malaria. These findings relative to problem solving and trust underscore the importance of examining all levels of the status hierarchy in a large health organization, especially the front line.

This problem solving so far has not impacted on all the indicators measured in the malaria control programme but in some instances the effects are striking. For example, the percentage of children covered by nets or spray had an average increase 10% per period between November, 2009 and November, 2010 but grew by 24% in the last period in Sundargarh (Pradhan, 2011). In Kandhamal, there was little change between the first and third data collection point but the percentage grew by 30% in the last period. This is indicative of the kind of learning processes that organizations have to engage in before one can expect good results in LQAS. But the differences across blocks and although the data is not available, probably across Sector (primary health centers) to say nothing about Sub-Sectors or centers indicates how important it is to have disaggregated data where possible so that problem solvers can be identified and their solutions transferred across units horizontally (see recommendations 2A and 4A).

Given this generally positive movement on several indicators, one might well reason that no further intervention is necessary and that gradually by the end of five years, the programme will be functioning effectively. It is difficult to estimate how long this evolutionary process will take, although five years seems reasonable. But it is worth reporting the remaining issues both at the organizational and the village level as unearthed in the pilot study and suggest remedies for them to be tried on an experimental basis. Our objective is to accelerate the implementation process and also to recognize that some of the issues are quite intractable but still need to be confronted if at all possible.

So far we have placed the accent on the positive. We now shift our analysis to what are some of the remaining issues that the district health organizations have to respond to including the skill level of the FTDS and the resistance to spraying in the villages. Interestingly enough the FTDs recognize that their skill level is not as high as it should be and want to receive more training. In particular, we want to identify what we perceive to be examples of blockages that appear to be retarding organizational responsiveness to reports on the indicators discussed above. This is the more important charge given to this pilot study by the Liverpool School of Tropical Medicine.

The research findings are divided into three sub-sections: organizational responsiveness, village acceptance; and research issues not adequately examined because of the short time involved or because they emerged in the process of collecting data, some of which have been noted above. In the first sub-section we provide the issues discussed by several different levels of the status hierarchy starting with the critically important Medical Office in Charge of the Sub-district (block). Defying logic but maintaining a parallelism with the objectives listed in the introduction, the sub-sections start with objective number 2. In fact, objective one, reviewing the various documents has been integrated in the text above.

Objective Number Two: Issues affecting organizational responsiveness

More problematic are the engagement of the Medical Officers in Charge at the sub-district or block level and the performance of the Health Workers who supervise the FTDs. These are the weaker links in the status hierarchy and yet both positions are vital for the success of LQAS, especially for responding to problems about the skill level of the FTDs. We need to understand what is affecting their engagement in the malaria control programme. The reasons for lack of responsiveness are quite different between these two positions. For the Medical Officers in Charge, one major blockage is an overload of work coupled with lack of contact with the MTSs. For many of the Health Workers it appears to be not changing their role from that of the bureaucrat to the role of teacher, a tendency to simply follow the letter of the bureaucratic rule rather than the spirit. Furthermore, it is important to recognize that there are exceptions, especially among the Medical Officers in Charge (we interviewed four). Some of the recommendations in section four (see 2B and 3A) attempt to strengthen the responsiveness of both positions in the hierarchy by increasing the amount of vertical communication related to the skill levels of the FTDs.

In a pilot study designed to develop solutions as well as to report problems, it is useful to examine the status hierarchy to determine if there are structural opportunities that can provide the basis for solving some of the problems. We perceive two potential opportunities for facilitating the evolution of the NVBDCP towards a problem solving learning organization: the positions of the MTSs and of the Multi-Purpose Health Supervisors.

To provide some feeling for these different positions, we report their duties:

The *Medical Officer in Charge of the Block,* (N = 4), as can be seen in Table One, is a key member of the status hierarchy. If the organization is to become more responsive, they must in some way become involved in the problem solving. Their duties include handling a large volume of both in and out-patients at the hospital located at the sub-district and across a number of illness areas including pre and post-natal care and delivery. The importance of safe motherhood and child protection cannot be overemphasized because India has some of the highest rates of maternal and child mortality in the BRIC countries (Brazil, Russia, India and China). The Government of India has made this its number one objective. Therefore, understandably, recommendations about more attention to malaria have to be evaluated in this context. In addition, besides malaria some of the other diseases common in this area are tuberculosis and leprosy. Despite the large patient load at the hospitals, which are located at each sub-district (see Figures One and Two for the location of sub-district or division hospitals and other kinds of health facilities) in which they are in charge, these doctors have to spend a considerable amount of time in administration. In some instances, it reaches almost one-half of their time expenditure. As noted above and this is especially true in Kandhamal, there is a shortage of physicians and of health workers in the block as well (see footnotes b and d in Table One). These shortages make recommendations about the Medical Officer in Charge of the Block assuming more duties largely out of the question, although one recommendation about a small additional duty is made in 3B as a way of gaining more village acceptance has been included.

The *Health Workers(male and female)* (N = 9) like the Medical Officer in Charge of the Block have multiple tasks. Among other kinds of health problems that they supervise in addition to malaria are pregnancy tests, the dispensing of birth control pills and condoms, and perhaps

most critically safe delivery. We have already commented on the tendency for many of them to simply check the supply rather than provide demonstrations. Ideally, the Health Workers could also be teaching the FTDs about how to take a blood sample and to fill out the M1 reporting form. In fact, several of them mentioned this as one way of improving the skill level. Their reports of how many visits per month they make to verify the work of the FTDs in malaria is at discrepancy with the reports of the latter in the focus groups of FTDs, who report far fewer visits. The lack of teaching and demonstration then becomes a weak link that has to be strengthened, if the skill level of the FTDs, which everyone acknowledges is a problem, is to be improved. One of the Health Workers did mention a bureaucratic problem, namely the large number forms that had to be filled out. This is not an unusual issue in bureaucracies; the forms takes precedence over the time needed to perform the duties.

The *Medical Technical Supervisors (MTSs)* (N = 12 in two focus groups, one for each district) provide a critical element in the intervention of LQAS. Their three main responsibilities are collecting and analyzing the LQAS data, making recommendations for solutions to the problems observed, and conducting several different kinds of education programmes: capacity building of the FTDs, behavior change communication and using various media to educate the people. Above, we provided a number of examples of the kind of problem solving that the MTSs attempt. However, the MTSs lack power and prestige within the status hierarchy because they are contractual employees hired by the Government of Odisha. In contrast, most of the other positions are civil servant positions with lifetime guarantees of employment. One unfortunate consequence of this is that there is considerable turnover in the MTSs, especially in Kandhamal, as they leave to seek permanent civil service positions (one of the very best just announced his departure during our pilot study). As we have already noted, this turnover is an issue that needs to be addressed for increased organizational responsiveness. Some of the recommendations recognize this structural problem and attempt to speak to it in subtle ways. In recommendation 2B, we suggest how the MTSs might enhance their position within the programme as well as open some vertical channels of communication and in 3B we report how we think the reorientation of the MTS role can help facilitate village acceptance.

The *Multi-Purpose Health Supervisors (MPHS)* (N = 4, one for each primary health center or Sector) are the supervisors of the Health Workers (male and female) and also the coordinators of the monthly meetings and the topics discussed. The topics discussed in the monthly meetings cover as one would suspect the major kinds of health problems that are treated by the FTDs including maternal and child health, leprosy, diarrhea, birth and death, and mother protection. Some of them questioned whether it was possible to have skill demonstrations in the monthly meetings because of the large number of topics, an idea also echoed above. They reported that the Medical Officers in Charge did not always attend these meetings, an issue that has to be recognized when considering recommendations about how these meetings might be reorganized. In general, these supervisors displayed much more knowledge about conditions in the villages than the Health Workers (male and female), one reason why we select them to be involved in the strengthening of the skill level of the FTDs. And since it is their responsibility to supervise the Health Workers, it would appear that this might be the best way of reorientating the supervision of the latter. But the Multi-Purpose Health Supervisors are strategic for another reason. The Medical Officers in Charge of the Block, are as we have observed, overloaded and thus it appears more likely that the Multi-Purpose Health Supervisors could more easily have

their duties expanded to do more training and supervision especially as it is part of their job description as long as they keep the Medical Officers in Charge informed of what they are doing. Together this would open strong vertical communication links and lead, in our opinion, to more organizational responsiveness.

Objective Number Three: Issues impacting on village acceptance

So far, we have not discussed what is the first line of defense in the battle against malaria, namely the work of the FTDs. It should be emphasized that the FTDs are volunteers and do not receive any salary as such, only payments for doing blood slides, attending the monthly Sector conference, accompanying women to the hospital for birth, and other specific duties. We have already observed the general problem of increasing their skill level and on the positive side their growing capacity to problem solve together with their increasing acceptance because of the growing trust of the villagers in their capabilities. The discussion of our focus groups with the FTDs (N = 4) is placed here because of the vital connection between these two ideas, namely by increasing the capacity of the FTDs one also gains not only more competence but trust from the villagers.

Since the skill level has been such a frequently discussed issue, we thought it was desirable to measure when the FTDs received their training. Most of them had received their training when LQAS was first introduced. Thus, the problem of skill level may be more the absence of refresher training, a recommendation that we make in the next section.

In our focus groups, the FTDs indicated various additional problems. One was mentioned above, namely the absence of visits from the Health Workers. It might be useful to start with their somewhat complex list of duties:
1. Visiting the village two or three times per week;
2. Registering pregnant women and accompanying them to the hospital for delivery;
3. Attending sector meetings, one day a month as well as other meetings (immunization, Village Health and Nutrition Day, and meetings of the Gaon Kalyan Samiti);
4. Referring complicated cases to the hospital (located at the sub-district or block level);
5. Referring and treating tuberculosis cases;
6. Organizing Information, Education Communication meetings;
7. And last but not least malaria and fever case treatment.

This long list makes more concrete the overload of health care in the system, relative to the work of the Medical Officers in Charge as well as the Multi-Purpose Health Supervisors and the Health Workers. Achieving balance is a very difficult issue but is partially addressed in the recommendations, especially those regarding the future evolution of LQAS and of the Health and Family Welfare Department of the Government of Odisha (see recommendation 5). In the questionnaires that were distributed to the FTDs, we asked them how many patient cases in these various morbidities they saw in the past month (November, the end of the malaria season). Generally malaria ranked second in the case load.

A number of structural blockages were identified in the focus groups of the FTDs that need to be dealt with. In Kandhamal, the long and barely passable roads, the dispersion of the

population in small hamlets and the absence of bicycles make visits difficult. Another blockage to good health care is their absence from the village when they accompany cases to the hospital for either birth complications or other medical issues. Sometimes, the FTDs are absent as much as 10 days.

The problems of village acceptance enumerated throughout this report and in the interviews include:
> The mud plastering over the spray during religious festivals that occur at the height of the malaria season (October);
> The unwillingness to allow spraying in the kitchen or the room dedicated to worship;
> The unwillingness to allow spraying on certain days because of religious significance;
> The distrust of the kind of spray that is used;
> The belief that the spray causes the growth of bedbugs;
> Unwillingness to return from work for the spraying;
> Unwillingness to remove particular objects (e.g. sacred objects) during spraying.
> The lack of trust in the healing capabilities of the FTDs;
> The distrust of the anti-malaria drugs;
> The absence of supplies at critical moments leading to a decline in trust;
> Sometimes general caste people do not allow the spray squad if they include members that are from scheduled castes

We have probably missed some but as is clear, trust is a central issue but the causes of distrust are multiple and varied. In other words, solving the problem of village acceptance requires a multi-pronged attack and will not be easy.

Objective Number Four: New research issues

In many discussions among member of the research team, one of the recurrent themes is the lack of belief in the effectiveness of LQAS among health care officials. Part of the reason for this is that the amount of effort currently being applied in this specific intervention relative to the form of capacity building and various attempts to resolve issues in the field has not been related to the general decline in morbidity of fever cases and of mortality from malaria. Until the extra effort implied by the Liverpool Tropical School of Medicine's particular version of LQAS is tested vs. other versions in the field, there will always be skeptics and doubters. Given the power of the new drugs, artemisinin based (ACT), deaths may decline regardless of any effort to measure the extent of spraying or the use of nets and thus morbidity of fever cases becomes a more important indicator of the impact of organizational responsiveness and village acceptance of the malaria control programme.

The data reported above indicates that there are considerable differences between the sub-districts or blocks and even the primary health centers. One implication of differential learning is disparate performance. At minimum it is a measure of differential effort. The MTSs in Sundargarh, for example, reported that there were quite striking disparities in their respective blocks (most of them have two). This provides another rich opportunity to study at the block as well as the center and sub-center level the consequences of differential effort and also disparate levels of skill of the FTDs for treating malaria fever. The recommendation for this kind of

disaggregated longitudinal research is found in a sub-section of objective four in the recommendations, which follow.

Another research issue that emerged in the pilot study was the critical role of the Gaon Kalyan Samiti, which provide funds for various activities associated with health. Some disperse money for spraying and others do not.[24] They are also the source of funds for the blood slides collected by the FTDs. Some pay on time and others do not. Nor need we mention the problem of "kick-backs" in some cases. This presents a number of interesting research problems about which of these Gaon Kalyan Samiti work to support the malaria programme and why and those that do not and why not. Some of our recommendations below attempt to encourage more support from for the malaria programme but this remains to be seen whether they are effective. Therefore, the continued importance of conducting experiments with each of the following recommendations to determine their relative benefits and costs.

Recommendations

As noted in the introduction objectives 2 and 3 asked not only for the identification of issues but potential solutions as well. Consistent with the discussion of issues in the previous section, the recommendations are organized in the same way. Recommendations listed in 2 are designed primarily but not exclusively to increase organizational responsiveness while those listed in 3 impact more on village acceptance. Both attempt to increase organizational learning in the broadest sense of this term and encourage the evolution of the health section of the Department of Health and Family Welfare in this direction. Sub-section 4 contains the recommendations for research projects and doctoral theses requested in the contract for this consultancy. Recommendation 4A proposes an extremely important project that would measure in a semi-experimental longitudinal research design the relative impact of alternative models of LQAS. For those stakeholders concerned about additional issues noted in the introduction, an objective, number 5, has been added. Its purpose is to indicate how to plan for the evolution of knowledge in both the Government of Odisha and the Liverpool Tropical School of Medicine so that donor agencies can obtain more impact with their investments. This recommendation is complex and has a number of components. It addresses the larger issue of how to institutionalize LQAS and increase its legitimacy both for developing countries and the developed ones. It also tries to deal with the large, intractable problem observed in section three and at multiple levels of this health care organization of how to maintain the correct balance between disparate health problems and achieve integration between the health care programmes, all of them worthy. Finally, recommendation 5 along with the recommendations in sub-section 4 provides an orderly method for developing the basic and applied knowledge for LQAS.

A very important, underlying principle in this report is that to be of any value, a recommendation should meet multiple objectives *precisely* since issues are complex and in various ways interrelated and because there are multiple stakeholders. In Table Two, the multiple objectives of each recommendation in section 2 are listed so that their merit can be

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[24] Our original intent had been to study these local health councils such as these but given the difficulties of developing the questionnaires and the protocols for the focus groups, this objective was lost sight of. In any case, there was not adequate time to really explore this issue.

assessed. And Table Three provides the hypothesized benefits of each recommendation in section 3. This is not to say that there are not also potential costs to each recommendation, which are briefly addressed below and before recommendation 4, or that the benefits will necessarily be realized. Therefore, a constant refrain in these recommendations is that they should be tried on an experimental basis and then evaluated as to whether the benefits accrue and the costs are reasonable, consistent with the practices for organizational change in developing countries (Hage and Finsterbusch, 1987). In particular, see recommendation 4B. We have tried to avoid making recommendations that cost large sums of money or the hiring of personnel recognizing the resource constraints of the Government of India and the of the Government of Odisha even with the rapid economic growth of the economy.

Although there are seven major recommendations in sub-sections 2 and 3 not counting the many variations within some of them, there are still three common themes that allow the reader to maintain a cognitive map about the thrust of our thinking. These major themes are: (1) the transfer of best practices across parts of the health care organization at the same status level; (2) capacity building and of various kinds; and (3) sharing of resources. Each of these recommendations creates new channels of communication, both horizontal and vertical, within the health care organization and emphasizes communication *qua* learning as emphasized in the theoretical framework. Furthermore, these recommendations contain a basic strategy of focusing primarily on the MTSs and Multi-Purpose Health Supervisors for increasing organizational responsiveness and the FTDs and the MTSs for village acceptance. Together, they mean an expansion, in particular of the role of the MTS, a potential cost that is discussed after the seven recommendations are presented.

Objective Number Two: For organizational responsiveness

Recommendation 2A Peer transfer of solutions

We start with the striking finding about various individuals including some of the women in the villages engaging in problem solving. This provides *a golden opportunity* for increasing the amount of organizational learning. These individuals and their solutions can be used to train peers at the same level, first within the same district and then across districts, respecting the importance of status in a large health care organization. This transfer of "best practices" has the following advantages (see Table Two), it:
1. Facilitates the implementation process, speeding it up;
2. Provides non-material incentives via recognition for the problem-solvers, especially in a health care organization where the salary levels are low;
3. Increases the capacity of their peers and perhaps most importantly subtly educates them to the idea of problem solving;
4. Creates horizontal communication channels that can then be exploited for other purposes such as the sharing of solutions and even of resources;
5. Builds the learning organization capable of adapting to societal change.

Above we provided many examples that exist on different levels. Four stand out as being particularly important. The first is the transfer of knowledge from the FTDs who have been able to convince their villagers *not* to plaster with mud their walls after they have been sprayed but to

do it before the festivals to those FTDS who have not been able to do so, so far. The second is transferring the tactics employed by MTSs in Sundargarh to the MTSs in the other three districts in convincing other organizations or civil society in the villages to support spraying. This idea is discussed in recommendation 2B along with various ideas about building the capacity of the MTSs to do exactly this. The fourth, not mentioned previously, is the custom of the District Malarial Officer when a death is caused by malaria occurs in a village to send a rapid deployment team to spray the village. This seems a marvelous way of educating the villagers to the importance of the spray and also to the seriousness with which the health department takes malaria and death. It presents an opportunity to build trust and to educate the villagers in the importance of following the procedures advocated by the FTDs.

The key point about this recommendation is that it provides the Liverpool School of Tropical Medicine with a strategy of relatively easily being to increase the organizational learning in its various LQAS sites. Each time a problem solver is identified, they can be asked to educate the others at the same level about their solution and receive recognition. This in itself should encourage more problem solving and an increase in the speed of implementation.

Recommendation 2B Engaging the Medical Officers in Charge of the Block and the Health Care Workers (male and female)

As observed in the previous section, the weak links in the organizational hierarchy tend to be the two key positions of the Medical Officer in Charge and the Health Care Workers who are supervising the FTDs. In the theoretical framework, we emphasized how important vertical communication is in a health care organization and therefore it is essential that these channels be opened as much as possible. But an important obstacle is that both positions have a wide range of responsibilities of which malaria is only one. The issue is to how to increase the attention to malaria without necessarily impairing other health care problems, one reason why in the previous section we indicated some of the disease problems common in these areas to ascertain the relative importance of malaria. Indeed, this provides a guideline for determining how much effort should be spent on malaria; it should be related to the case load, which of course will vary by the season of the year. Also, as we indicated in the previous section, safe motherhood and child protection are important and understandably legitimate concerns of the Government of India and we do not want to retract from this emphasis.

The complaints of some Medical Officers in Charge about not seeing the MTSs provides *a silver opportunity* for increasing organizational responsiveness but this communication across status barriers has to be handled appropriately. Given the status differences between the permanent government officials and contractual staff such as the VBDC and the MTSs, we suggest that the latter contact the District Malaria Officer and ask permission to contact the Chief District Medical Officer (CDMO) to ask the latter for permission to establish a reporting channel with the Medical Officers in Charge of the Block, explaining that some of them have not received reports and are unaware of their activities in the sub-district. Various reasons exist about why this kind of reporting is difficult but regardless establishing a form of relative quick communication begins to engage the Medical Officers in Charge without consuming too much of their time and allows for a fruitful dialogue about strategies relative to solving problems in their

sub-district. Since some of them have complained, it provides, as we have argued, a wonderful opportunity to create a vertical channel of communication.

What are the topics of conversation that the MTSs should discuss with the Medical Officers in Charge? The most important is to ask them when and how often they would like to be called when the MTS is in the field collecting data. The Medical Officers in Charge, some of whom are new because of turnover and some of whom do not always attend the monthly conferences when reports are made, acknowledged in their interviews that they did not know results from the fourth round for their sub-district. Establishing quick communication requires some creativity because the internet coverage does not exist in all areas of these two districts so various arrangements have to be made about calling on certain days at certain times or establishing e-mail communication. But this extra effort is worth it because it allows the MTSs to discuss and receive permission to take various kinds of corrective actions relative to the various problems such as the skill levels of the FTDs and the participation of the Health Workers (male and female)(see below), who are nominally under the jurisdiction of the Medical Officer in Charge, to say nothing about the issues involved in village acceptance.

Another strategy for engaging the Medical Officers in Charge besides the one proposed in recommendation 2D, which only applies at the beginning of the implementation of LQAS into a health care organization, is building the capacity of this pivotal position in the relevance of a public health model and adopting various strategies to reduce the obstacles that prevent individuals and whole villages from living a healthy life. One strategy is to change the recruitment procedures and attempt to select physicians who have had more training in public health and also have an actual interest in this approach to solving health care problems. This may not be realistic given the difficulties of recruiting physicians into the more remote sub-districts in Odisha. Another strategy is to provide one or two week courses in specific public health problems to a group of Medical Officers in Charge within a district. In this context, the method of role-playing in problem solving should be introduced. Examples of how various sub-districts and districts have solved particular kinds of health care obstacles would be suggestive and a way of educating the Medical Officer in Charge into this kind of thinking. In this context, one might even experiment with the introduction of group problem solving techniques at the end of the course to see if as a group they can develop new ideas about how to increase organizational responsiveness and village acceptance.

Table Two
Recommendations and Their Benefits
for Organizational Responsiveness

Number	Advantages for Organizational Responsiveness			
	Implementation Speed	Non-material Incentives	Capacity Building	Communication
2A peer transfer of solutions				
2B engaging health officers				

2C sharing resources				
2D train health officers in LQAS prior to introduction				

The other weak link in the vertical chain of command is the Health Workers (male and female) attached to the Sub-Centers. Most do not visit their FTDs enough or actually teach them correct procedures when they do, based both on their own reports (when they indicate that all the FTDs have high skill per our analysis above) and those of the FTDs in the focus groups. Above, we suggested that the Multi-Purpose Health Supervisor might provide a solution to this problem, if his/her role is changed slightly to teaching the Health Workers how to teach the FTDs. This would have to be authorized by the District Medical Officer and the Chief District Medical Officer. The recommended procedure is to have the Medical Officers in Charge of the Block instruct their Multi-Purpose Health Supervisors to visit at least one village each week with a Health Worker (male or female) and observe how they teach and encourage them to ask questions. It may be necessary to actually train the Multi-Programme Health Supervisors in how to teach as well. A variation on this theme would be for the Medical Officers in Charge to authorize the MTSs to do this as well. The objective would be to try and reach two villages each week with training in situ, once with a Multi-Purpose Health Supervisor and once with a MTS. It is assumed that if two individuals attend together they will motivate each other to be more engaged. Gradually as more and more villages are covered, new insights will be gained on what additional kinds of training may be necessary to improve the performance of the FTDs.

The objective here is to attempt to engage the Health Workers more by shifting the description of their duties from supervision to training. While admittedly this is presently what they should be accomplishing, questions remain as how to reinforce this capacity. Supervision implies simply checking supplies or the filling of the M1 forms rather than teaching, which is the critical function that is missing. Also, we believe, although this assumption needs to be tested, that all three positions--Multi-Purpose Health Supervisors, Health Workers (male and female) and MTSs--will find teaching to be more rewarding and interesting. Implied in this suggestion is the belief that this kind of training is best one on one for teaching skill levels rather than knowledge. It is not an accident that and when the FTDs have two individuals focusing on their teaching, they will learn more and become more motivated themselves. In other words, they recognize that they are being taken seriously, an important objective to be achieved in interventions and especially in India given the assumptions about these health volunteers with little education, as we have already noted.

One might ask why this intensive approach to training of the FTDs? Some have advocated the use of the monthly meetings as a way of educating the FTDs but it is our opinion that this will not work. There are very good reasons why the FTDs have high knowledge levels but not skill levels; the former can be taught in a group situation while the latter cannot. Teaching a skill is best modeled after the coaching of an athlete, learning the skill requires a one on one relationship for observation and correction of errors. Demonstrations in a group setting are ineffective for this.

Recommendation 2C Sharing Resources

If the existing problem solving represents a *golden* opportunity, and the complaints of the Medical Officers in Charge of the Block about the reporting of the MTS a *silver* opportunity, the *bronze* opportunity is embodied by the way in which certain resources are distributed by the Government of Odisha and presumably also by the Government of India. Above, we have suggested that the motivation of the Health Care Workers (male and female) is critical for improving the skill level of the FTDs. We suggest that one motorbike be given to each Sub-Center to be used by the Health Workers so that they can make more visits to each of the villages that they are responsible for. This would be a "material" non-material reward. We would also encourage the Health Workers to loan this bike to the FTD when they have visit a hamlet that is a considerable distance.

By spreading these kinds of resources among a particular group it encourages that group to work more closely together as they arrange how and when to share. In other words, this would be a process of negotiation among them and should encourage cooperative behavior. If the Government of Odisha could not afford one motorbike per sub-center, then it might allocate them so that sub-Centers could share a bike. Sharing also facilitates a group spirit or the building of social capital by reducing the complaints about some receiving these resources and others not.

Recommendation 2D Train Health Care Officials in LQAS before its Introduction

In the theoretical framework, we recommended that because the evolution of LQAS as it has moved from simply reporting the facts about the percentage of fever cases correctly to making recommendations about how to improve this indicator, for example, the top echelons be trained not just in LQAS--as they are presently with an orientation session--but in how to problem solve. Much of the argument in the theoretical framework centers on the assumption that the present version of LQAS has established new demands for the Chief District Medical Officer, the District Malaria Officer, the VBDC, and especially the Medical Officers in Charge of the Block to find solutions to the problems presented to them in the reports of the MTSs. As has already been suggested, this kind of training should include role-playing in problem solving and contain a number of examples of concrete issues that have been discovered that affect organizational responsiveness and village acceptance as well as some of the solutions that have been tried with varying degrees of success. Again, this is a kind of capacity building but one that is related directly to the objectives of the LQAS, solving problems so that the malaria control programme is effective. Furthermore, the advantage of this kind of capacity building is that it is generalizable, that is it encourages the kind of thinking that is needed if the health care bureaucracy is to become a learning organization.

Since the current intervention of the Liverpool School of Tropical Medicine has just been expanded from the four original districts to another five in the months of April and May, 2011, an opportunity exists for a natural experiment. We proposed that in the month of January, 2012 such a training session be conducted in two of the new five districts matched as closely as possible with the other three districts on the about four contingency factors: average parasite incidence (API), proportion of the population living in tribal villages, the difficulty of travel within the district, and the availability of supplies (particularly nets). Then, in the course of the next few years, the Liverpool School of Tropical Medicine could study if the two districts that

received training in problem solving became organizational responsive more quickly and were able to increase village acceptance more quickly. Again, this speaks to the additional demand that research projects be recommended and concerns about how to institutionalize LQAS quickly.

Objective Number Three: For village acceptance

In the introduction of the section on recommendations, we argued that the key to village acceptance revolved around the effectiveness of the FTDs and the MTSs. In the case of the former and as we have already argued the building of trust in the FTD helps solve a number of problems in the village. The more they are trusted, the more the village will accept their recommendations about spraying, about treatment for malaria and we might add other kinds of health interventions, and as a consequence the better the health of the village. Therefore, in many ways, the following recommendations are various themes on building this trust via capacity building and problem solving.

But the FTD is not the only key person. Another critical actor is the MTS. He or she represents the "eyes and ears" about what are the various obstacles that reduce village acceptance. MTSs must become an ally of the FTDs in reducing the resistance to spraying in particular. But again, it is important to build their capacity to become what we would call investigative reporters, one of the foci of the recommendations in 3B.

Recommendation 3A Peer transfer of solutions

In our general discussion of the research findings in the previous section, we reported what we feel is the single most exciting finding, namely that some of the FTDs have been successful in convincing some of the villagers to apply the mud plastering before spraying. How this was done and whether it depends upon the special qualities of a specific woman needs to be investigated by the MTSs (see next set of recommendations) but regardless, FTDs from different areas need to be brought together so that they can lean more from each other about what strategies to employ with the villagers so that they can spray all of each house and all of the homes in the village when the teams arrive.   As can be observed in Table Three, peer transfer of solutions acts to build village acceptance via a variety of mechanisms: *it calls attention to the good problem solvers, providing a non-material incentive, it increases their capacity at problem solving and is another important channel of horizontal communication.*

Since the FTDs have so much of the personal knowledge of everyone that lives in their villages, it would be useful to conduct an experiment in the use of quality work circles, essentially a problem solving group technique but adapted to the cultural traditions of this part of India, to see if their thinking together can develop new kinds of solutions and arguments to use.

Recommendation 3B Capacity Building of the FTDs and the MTSs

It should be emphasized that consistent with the evolution of LQAS, considerable efforts are being made to increase the capacity of both the FTDs and the MTSs. Here are our recommendation focuses on the *expansion* of their areas of expertise rather than just improving

the skill levels of the FTDs and the knowledge levels of the MTSs. In the focus groups with the FTDs, several of them requested additional training and of particular kinds. One focus group wanted training in how to discern the differences in kinds of fever. This would appear to be a diagnostic indicator of some importance because it would quickly impact on the villager's trust in the competency of the FTD, which is related to the acceptance of their recommendations about spraying. The more the Government of Odisha invests in improving the skill levels of the FTDs in various health care problems, the more benefits it will receive in the reduction of morbidities and mortalities and we might add lower costs as well. These volunteers know their communities and can solve many health problems much more easily than they can be solved in a hospital, which is some distance away, as we have observed in Figures One and Two.

Quite a different kind of capacity building of the FTD is training a competent replacement for handling malaria when the FTD is gone to the sub-district hospital with a patient. We recommend that the husband be trained to do this. In the question that was added by Madeleine Hage to make the FTDs feel more comfortable, how much support they received from their husbands, they reported that indeed they did get support. In fact, one observes a considerable amount of change in the definition of the traditional roles of male and female, with the husband cooking and taking care of the children. Thus, it seems logical that the husband be trained in the use of the rapid diagnostic tests and the taking of blood slides.[25] It has the advantage of keeping all the equipment and supplies in the same location and also maintaining the idea of a single place for the villagers with fever to visit. It also means that the husband and wife are sharing the experience of treating at least the malaria cases in the village. An additional benefit might be that the villagers would more easily accept the opinion of a male about spraying than a female so that it could provide some extra gains in village acceptance. A small-scale experiment of training the husbands as substitutes in their wife's absence this should be conducted to ascertain which benefits emerge.

Table Three
Recommendations and Their Benefits
for Village Acceptance

Advantages for Village Acceptance

Number	Non-material Incentives	Capacity Building	Trust of FTD	Communication
3A peer transfer				
3B capacity building				
3C sharing resources				

Concerning the problem of the skill level of the FTDs relative to malaria, we have suggested that training be done one-on-one with a team consisting of either the Multi-Purpose

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[25] Babu Ram Devkota developed this idea.

Health Supervisor and the Health Worker (male and female) or the MTS and the Health Worker (male and female). But this approach may not be approved by the Medical Officer in Charge or there may be other reasons why this recommendation is not feasible. Therefore, several other suggestions can be made for improving the skill level of the FTDs. The easiest but perhaps the least effective is to provide a refresher course periodically. The major limitation of this recommendation is that unless it includes extensive role-playing and is conducted in small groups, it is likely to only impact on the knowledge and not the skill level.

Quite a different approach is to target those FTDs and even blocks that are reported below par. For example, the FTDs in Sundargarh stated there were considerable differences between the skill levels of their two blocks. In this instance, it might be worth to consider assigning all the MTSs in the district and borrowing the MTSs from other districts within a reasonable distance to do intensive training for one day with those individuals who need to have their skill levels increased. The objective would be to create enough small groups of FTDs so that a one-on-one training could be accomplished. The objective would also be to complete this training in all blocks below par in a specific day. Then, particularly if MTSs have been borrowed, the MTSs from Sundargarh would repay this donation of time by providing reciprocal training in other districts. In this way the Government of Odisha could increase its skill level in the four districts in a relatively short time period. Of course, this would be done outside the period when data collection for LQAS is occurring.

As noted in the training discussion of the team of an MTS with a Health Worker (male and female), one cannot necessarily assume that MTSs know how to teach even though they have a college degree. Indeed, this very well may incapacitate them as regards teaching relatively uneducated women and in particular if they are in located in some of the enclaves involving tribal groups or Christian faiths. We do not know if there is educational research in India on the cultural sensitivities involved in teaching women of scheduled castes or lower social class but if there is not, then it would be wise to conduct some experiments in teaching FTDs with various methods to determine what is most viable, recognizing that there may be cultural differences even in the same block.

Given the key importance of the MTSs in making recommendations as to how LQAS findings can be improved, their capacity to make recommendations and also to find solutions, should be expanded. We believe, although this is another assumption that needs to be tested, that building their capacity would be an important non-material reward and would perhaps begin to solve some of the turnover problems in those districts that are particularly difficult to work in such as Kandhamal How might this be done? One kind of training would be in investigative reporting, that is trying to ask questions to determine what are some of the underlying factors that explain why a particular Gaon Kalyan Samiti is supportive and another is not or what are the various techniques that might obtain more interest on the part of the local political elite. Clearly these are key elements in gaining acceptance of spraying and of the FTDs, and they appeared in the recommendations of various interviewees about how to solve some of the problems associated with village acceptance.

The point of this kind of investigative reporting is that it would help the MTSs to develop more robust recommendations that contain the seeds of solutions. It should be remembered that

in general, bureaucrats that are not problem solvers do not like to receive problems to solve unless they are accompanied by some suggested solutions. Another kind of training that would help the MTSs develop practical solutions is to give them training in the various ways of mobilizing communities and building civil society. Above, we recommended the transfer of knowledge between the MTSs in one district to another but this is not enough. Since most of the MTS have degrees in science and not social science, they need training in the latter fields to enhance their effectiveness. In particular, the training should emphasize those aspects of social science that can be helpful in locating solutions to the various problems involved in organizational responsiveness and village acceptance (see Table Three).

One of the important reasons for attempting to create a vertical channel of communication between the MTSs and the Medical Officers in Charge of the Block is because at certain key moments the latter can lend effective support to the former. For example, if there is a village meeting about spraying the Medical Officer, who has a great deal of prestige, can appear and advocate the importance of spraying in preventing malaria fevers. He may also be helpful in obtaining more support from the political leadership. Our thinking is that the time of the Medical Officers in Charge is a scarce resource because they are overloaded with patient care and administration but everyone must recognize that at key moments, they can become critical with relative small costs in their time. Still another reason for the importance of this channel is that the Medical Officers in Charge need to know the various solutions as well as problems in so far as these might be implemented by the MTSs, such as training of the FTSs, building civil society, etc. Ideally the Medical Officers in Charge should begin to perceive the MTS as the key problem solver rather than just a problem reporter. This may be too ambitious but it does address a number of issues including providing non-material rewards so as to reduce their turnover.

Recommendation 3C Sharing Resources

Above, we mentioned the sharing of means of transportation among the MTS. The same principle applied to those sub-centers where there are bicycles for all the FTDs.   They should be asked to loan some to the FTDs in other sub-centers that do not have them, especially to those in areas where the population is quite dispersed as in Kandhamal. An important implication is that the FTDs in a sub-center were all share one or two bikes, which means they will have to arrange how the bike is loaned and on what days, encouraging another form of interaction. One possibility is that several would be kept at the sub-center to be used when necessary. It is our observation of the four focus groups of the FTDs that we observed that there is already a great deal of camaraderie among these women and therefore this kind of arrangement is feasible. Another recommendation is that one FTD of each Sub-Center be appointed the FTD coordinator, giving her the responsibility of scheduling the use of the bicycles. This would provide a motivation/inspirational element for the FTDs.[26]

The same principle applies to shortages of rapid diagnostic tests and anti-malarias. Ideally if all the sub-centers were connected by the Internet and the supplies were tabulated in a spread-sheet of Excel, any sub-center would know if another had a surplus of a particular item,

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[26] This has proved to be very successful in Nepal where Devkota used this method.

whether rapid diagnostic test or ACT. The principle of loans would again apply so that when new supplies come in, what has been borrowed would be replaced. This should reduce fears about a particular sub-district suddenly finding itself short.

Costs of these Recommendations

Before preceding to recommendations four and five, it is worth considering how much these recommendations cost. It may not be apparent from the above seven recommendations, but some attempt has been made to minimize costs. Not only is the Health and Welfare Department attempting to handle a large number of issues in a rational way, but its resources are stretched to the limit. It is therefore incumbent on any consultancy to provide at least some realistic cost estimate. An accurate assessment of costs could be obtained from the small-scale experiments that have been advocated as part of the strategy of implementing these recommendations, see recommendation 4B.

The transfer of best practices and of equipment/supplies (recommendations, 2A, 2C, 3A, and 3C) involves minimal costs of time. Presumably the best method would be to assemble all the members of a particular status category, e.g. the Medical Officers in Charge of a Block, the Multi-Purpose Health Supervisors, or Health Workers (male and female) at either the State or District or sub-District headquarters depending upon the numbers of individuals involved. At the same time, this convening of everyone in the same status category can produce some additional benefits. It might lead to a free-flowing sharing of ideas about how to solve problems and help develop an esprit de corps among the members.

Most of the costs implied involved are capacity building costs and in the instance of the MTS, an expansion of their role, which in turn means less time for the kinds of educational programmes (Information, Education Communication or IEC and Behavior Change Communication or BCC) that they presently participate in. But we believe that their spending more time in the training of the FTDs with the Health Workers, in doing investigative reporting on the real reasons for resistance, attempting to build civil society, and finding other kinds of solutions to the problems of village acceptance would be a much better use of their time.

Admittedly, the purchase of bikes for the FTDs does represent a small cost, especially if our recommendation is accepted only one or two be purchased for each sub-Center and that they are shared. And even if this specific addition in equipment if not decided, we still recommend the procedure of sharing of resources that can be easily shared as a way of both reducing costs and expanding cooperation.

Not all the recommendations necessarily cost more except in the short term. In particular, while recommendation 2D involves the cost of a week of training for the three status levels of Medical Officers in Charge of the Block, the Multi-Purpose Health Supervisors and the Health Supervisors, the gains achieved by training in problem solving before the introduction of LQAS may actually result in considerable savings if in fact, the organization becomes a learning organization more quickly and the problems of village acceptance are tackled more effectively. The research design is again a quasi-experimental one that contrasts and compares the rate in the decline of morbidity and mortality of malaria when these three status levels are trained before the

introduction of LQAS in contrast to the present procedures. If there is a faster reduction in the cases of malaria, then the estimation of the cost-benefit ratio could be done with any of several economic techniques.

Objective Number Four: For research projects

Although not listed as a separate objective, the desire was that this pilot study would generate publishable papers. In this third section, four sets of recommendations are made to meet this additional objective of the Liverpool School of Tropical Medicine. These topics are not mutually exclusive and interrelate in various ways since they are designed to build applied knowledge in how to make LQAS more effective.

Recommendation 4A Testing the Effectiveness of Alternative Models for LQAS

The *first* and most important research recommendation is to study the impact of varying levels of effort and of difficulty (as measured by the terrain, presence of an insurgency, difficulty of the roads, etc.) at the most disaggregated level in all districts within the state of Odisha where LQAS has been introduced. The intent is to contrast and compare alternative models of LQAS. Ideally this should be done at the Center level but not enough villages may be available given the sampling frame. If not, then the sub-district or block level can be used. A variation on this theme would be to collect additional data when the LQAS data is being collected within sub-centers that have quite disparate levels of FTDs skills and determine how much of an impact this has on the various indicators. As we have already indicated the differences between the skill level of the blocks in Sundargarh as reported by the MTSs in that district provide a natural experiment for determining how important skill level is in improving the percentages on the various indicators in the malaria control programme.

The research design is a variation on quasi-experimental design called an interrupted time series for the period of 2000 through 2011. Since the first wave of data collection occurred at the end of 2010, normally one would simply take two years prior, that is 2007 but given the quite strong fluctuations in malaria deaths--it was almost as high in 2010 as 2004—one needs a much longer time period to dampen these oscillations. Ideally one would like to predict these macro variations at least at the state level. It could be rainfall is one of the major explanations. If so, then this could be used as control and not such a long time period would be necessary. If there are striking differences between districts depending upon which LQAS method is employed, this would be a publishable paper and in a major journal such as <u>Social Science and Health</u>. Positive findings for the simple idea that with more effort one obtains more positive results would resolve any lingering doubts about its legitimacy in the Government of Odisha.   However, because the fruits of the Liverpool School of Tropical Medicine intervention are only now beginning to be observed at the block level on some of the indicators as we have already observed, this research effort may be premature. *The hypothesis would be that over time, the more extended training and effort to solve problems contained in the Liverpool School of Tropical Medicine's version of LQAS should more and more create a difference with those that are not expanding as much effort and do not have a version of a learning organization designed to resolve issues both within the organization and at the village level.*

It might be observed that this kind of research is not only testing for the efficacy of a specific model of LQAS but also value of the organizational learning model. In this instance, one would like to relate the amount of problem solving to changes in the performances as has been done elsewhere.[27]for the idea that if health care organizations become learning organizations then the real progress is made in improving the health of poor people in the developing world. This is why an evolutionary model is so useful.

The findings of this pilot study should at minimum be included in revisions of the March, 2011 report (Valadez and Devkota, 2011b). And if there is some variation between primary health centers in the two districts, then at in-depth case studies should be included to indicate how the patterns are obscuring interesting internal variation, assuming our inferences are correct. Again, this would be a publishable paper. An important implication of differences between primary health centers would be further evidence that the process of LQAS requires more time to reach maturity.

A corollary is that in the future, when results at the most disaggregated level possible with the available data on malaria morbidity and mortality are disparate with some high and some low, it would be useful to use the instruments in Appendix A to determine what the special reasons are for this. Perhaps only several focus groups would be necessary to explain the variation rather them conducting an exact replication of this pilot study. Also, recommendation 3B, which argues for expanding the capacity of the MTSs to become investigative reporters, might be able to provide the kind of detail necessary to explain differences across the sub-center levels.

Recommendation 4B Testing the Effectiveness of Various Recommendations in this Report

A second avenue of publishable papers is a series of field experiments to test if any of these recommendations should be adopted. Each time an experiment is conducted in a limited area such as a Sector (primary health center) or even better sub-sector or center, data should be collected on the impact of the experiment on the various objectives suggested in Table Two. Given the number of major recommendations including variations on a theme, this can lead to a whole programme of applied research that would be relevant world wide even if the data is only collected in India because it is raising fundamental questions that to our knowledge have not so far been raised. After the experiment, the participants should be asked to provide their criticisms of the recommendation just as is suggested in Hage and Finsterbush (1989), which provides a model for how this is accomplished, so that the intervention can be improved. *Again, this is another variation on establishing a learning organization.* Then on the basis of this experience another reiteration in different sub-center or primary health center should be tried until one finds the exact intervention that appears to work well. It should also be anticipated that one needs to adapt slightly each intervention for each district. How and why provide interesting material for publishable papers. The topic of cultural sensitivities is an important one in health care delivery in the United States as already noted. Given the incredible variations in even one district such as Kandhamal, this becomes an important topic for applied research.

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Recommendation 4C Potential PhD Theses

Shifting to possible topics for PhD theses as a third pathway to publishable papers, several can be suggested that emerge from major issues raised in the pilot study, which have been mentioned. These could not be confronted in our research given the short time span. One of the most interesting is the variation in complaints from the FTDs about the support that they are receiving from the Gaon Kalyan Samiti. Some pay on time and others do not. Some are supportive in other ways, e.g. in encouraging spraying. Trying to understand why and how this interacts with the culture of the village can provide many insights for policy makers attempting to encourage the use of sprays and nets to stop malaria. One might hazard a guess that these interact in specific ways with the dominant religion and/or tribal culture. At the most fundamental level these health welfare counsels are potential mechanisms for building social capital, that is a supportive environment within the village where everyone tries to help everyone else. For this reason, in recommendation 3B MTSs have been encouraged to start collecting data on the a base line then conduct experiments to ascertain which methods are the more productive for gaining their support in the fight against malaria.

As indicated above, the golden opportunity presented by individual problem solver poses another and quite fascinating PhD research topic, namely why do some individuals and not others tackle issues. Is it a consequence of their individual backgrounds or life experiences (see Hage and Powers, 1992)? Or do they have stronger concerns about the delivery of health care (see Hage, 1980)? The problem of the adaptive personality is a nice counter-balance to the learning organization and the two together provide policy makers with a powerful model for organizational change. But beyond this, an implication of a number of the recommendations, especially 2A, 3A, and 3D is that most individuals can become problem solvers, if they are given opportunities to learn this mode of thinking and placed in the correct environment that encourages it, one of the reasons why quality work circles have been suggested. This is another kind of hypothesis that should be tested.

Recommendation 4D Evolution in Decision-making in a Health Care Bureaucracy

Finally, a fourth topic for research that was part of the original model but had to be dropped because of the length of the questionnaires and the lack of communication between India and the U.S. is the characteristics of the health bureaucracy. In particular, the pattern of decision-making and the precise combination of centralization and decentralization of decision-making in the health care organization of the Government of Odisha (Hage, 1980) needs to be established in much more detail than the somewhat simplistic discussion in the theoretical framework. Again, an evolutionary model about how developing world bureaucratic organizations gradually shift towards greater decentralization and the problems that this can cause would be an important contribution to the organizational literature. The same kinds of research questions can should be posed as was suggested above in trying to understand differences between sub-centers or primary health centers: Is this evolutionary process unfolding faster in some districts of the Government of Odisha than others and why (and by implication in some states of India rather than others)? As noted above, districts have adopted different policies in response to this partial decentralization. Again, the important research question is to explain

why if possible. Beyond this there are other characteristics of bureaucracy, such as the formalization of rules and the status hierarchy that should be included in the research study because they place limits on the latitude of action at the local level.

These four sets of papers and dissertation topics are not all that can be done to further research on the applied problems of implementing LQAS. Also, important are those issues that relate to the institutionalization of LQAS via a proposal for the gradual evolution of both the Health and Family Welfare Department of the Government of Odisha and the development of new projects for the Liverpool School of Tropical Medicine, our next topic.

Objective Number Five: For facilitating the evolution of LQAS

As indicated in the introduction, once in the field, it became apparent that various stake-holders had some additional--and relevant--objectives that this pilot should address: (1) the relative efficacy of alternative models of LQAS; and (2) how to institutionalize LQAS within the health care organization of the Government of Odisha. The first additional objective necessitates a separate research project but one that we have spoken to not only specifically in recommendation 4A but elsewhere in this report. Furthermore, we have cautioned that because the process of implementation of LQAS in the four districts in which it has been introduced has not been completed, significant differences may not have had a chance to emerge, one reason the vision of this project has focused on the learning organization and the importance of solving problems via the creation of new channels of communication. Even the most intensive LQAS model will not produce declines in the morbidity and mortality of malaria unless organizational problems are resolved and obstacles in the village are overcome. The recognition of this obvious fact is why the evaluation method of LQAS has itself evolved towards making recommendations about how to improve the results that are obtained. The seven recommendations above, which take the next necessary step to address some of the underlying issues that prevent effectiveness above, are all designed to continue this evolutionary process so that the differences between LQAS models become greater with time. Furthermore, this additional research calls attention to the importance of measuring the swings in death rates that are a consequence of macro factors about which little can be done as well as the identification of micro contingencies within primary health centers and sub-districts or blocks that impact on the obtainment of the desired objectives. Furthermore, built-in to the various research projects, especially 4B, is the need to construct an applied knowledge base for how to improve organizational responsiveness and village acceptance.

But turning to the second additional objective, the issue of how to institutionalize LQAS, we propose a plan for the orderly expansion of this evaluation method to other areas of medicine to accomplish not only this larger objective of institutionalization but the following other desirata:
- ✓ Achieving balance among competing and worthy health care programmes;
- ✓ Increasing the integration across health care programmes;
- ✓ Conserving health care resources.

All of these objectives are met, we believe, by continuing to add programmes in LQAS within the existing health care organization. Specifically, we recommend that in 2012, a LQAS programmed in safe motherhood and child protection be added in the four districts of

Sundargarh, Mayubhanj, Nabrangpur and Kandhamal where this model of the malaria control programme was first introduced in 2009 and then extended to the five new districts that have been added in April and May of 2013, that is two years later than their first exposure to LQAS. The selection of safe motherhood and child protection fits within the priorities of the Government of India and also with the logical concerns of the Medical Officers in Charge of the Block, which administer the hospital. By providing LQAS reports on these two new objectives, one is more likely to obtain their involvement in the use of LQAS in other health care problems.

One of the great advantages of the introduction of LQAS in these new areas of health where it already exists is that one achieves considerable economies of scale in the training and ultimately in the problem solving. The recommendation would be that the same MTSs be used to collect this data in months other than when they are collecting data on the malaria control programme. Since they know the villages they could more easily detect the obstacles that might be preventing the effectiveness of the new LQAS programme. Furthermore, the implementation phrase should be quicker because of the prior experience with LQAS. Then in another two years, another area selected on the basis of the rank in case load on a yearly basis, e.g. Tuberculosis, should be added as well. The consequence would be steady growth in the variety of health care areas that would be covered. This would be mean, however, converting the positions of the District Malaria Officer and the VBDC into new positions that would be called the District Evaluation Officer and the LQAS Supervisor. Furthermore, some of the obstacles that impact on malaria might also be related to other kinds of health care problems in the villages. Resources thus would be conserved with this expansion.

Above, we observed that a major issue is how to achieve balance between the four top ranking kinds of health care problems at the local level. If all of these are being measured by the same LQAS methods and the data is being collected by the same MTSs, then the proper balance is more likely. It would be hoped that some synergies would be created as well. Certainly as the various members of the health hierarchy became adept at solving problems and the organization learns, it should result in a considerable impact on the general health of the blocks within the districts.

A critical part of the learning organization is conducting the applied research on the relative costs and benefits of particular recommendations contained in this report (recommendation 4B) and by extension to solutions developed in the future for the new kinds of problems created by the addition of a LQAS programme in safe motherhood and child protection. *By creating a feedback mechanism about what works and what does not work and then diffusing this information at the appropriate status levels, the districts in the state of Odisha would became an experimental laboratory writ large that benefit the whole world.* The key point is that the learning is systematic and connected to problem solving. With this growth in basic and applied knowledge, health care organizations in developing countries can considerably accelerate their evolution. In this way, the Government of Odisha could become a model for the world.

Expanding the scope of the LQAS and at the same time constructing a clear-cut feedback mechanism about how organizations can learn permits the Liverpool School of Tropical Medicine to plan an orderly growth in knowledge and in programmes. It also provides a long

term vision for funding-raising and the reduction in morbidity and mortality in the poorest parts of the world.

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Appendix A Research Instruments and Protocols

**Questionnaire for both the District Medical Officer (DMO)
and the Vector Born Disease Programme Consultant (VBDC)**

Let us start with you asking you a few questions about your duties and responsibilities.

1. What are your overall responsibilities as DMO/ VBDC?

2. How much time do you allocate for each of these activities? Can you estimate a percentage on a monthly basis?

Percent

Visits to the field
Meetings
Administration
Teaching

3. What was your reaction when the idea of LQAS was first communicated to you by NVBDCP?

 (Probe about whether they thought it was worth the extra cost and effort.)

4. How many rounds of LQAS happened during your tenure as DMO/VBD?

5. Were you in this position (DMO/VBD) in November 2009, when the first reports were made? If so what was your reaction? (*If not present then, ask about which report, second or third at which he was present.)*

6. What was your overall reaction when you saw the results for August, 2011, that is the fourth \wave of data collection?

(Probe: pleased with progress or disappointed?)

7. For each of the indicators that were measured in August 2011, I want to ask you whether it is reasonable, low or high?

Indicators	Reasonable	Very low estimation	High estimation
Use of LLIN			
Use of IRS			
Drugs with FTD			
RDT with FTD			
Childern >5 protected either by LLIN or IRS			
Knowledge of ASHA			
Skill of ASHA in RDT and BS			
Skill of ASHA in filling up of formats			

8. Do you do you have any suggestions or plans to improve a particular indicator?

Indicators	Plan for improvement
Use of LLIN	
Use of IRS	
Drugs with FTD	
RDT with FTD	
Childern >5 protected either by LLIN or IRS	
Knowledge of ASHA	
Skill of ASHA in RDT and BS	
Skill of ASHA in filling up of formats	

9. We also think that that the FTD sector meetings are underutilized by malaria programme? Do you agree?   If yes, do you have any suggestions to improve this event?

How and what should be the important issues that could be addressed in this forum?

10. I understand you have been integrating data collections in routine work; how would find this approach?
What have the MTS been doing at the community level during this integration round?

Are there any other important activities that you feel that should be part of the integration round? What were they?

11. Did you present the data/findings in *the third meeting, January, 2011 (if present.)*

Round-3(January 2011)

Level	No of times	Reaction of participants
State		
District		
Block		
Sector		

Round-4(September 2011)

Level	No of times	Reaction of participants

State		
District		
Block		
Sector		

12. When you received the fourth report in August 2011, did you take any remedial measures to improve the situation in the key indicators?

13. What is your general feeling about whether LQAS is helping the malaria programme?

(Please provide a reason for your comment)

14. Do you have any suggestions on how LQAS results could be utilized more effectively in making decisions?

15. How has been the support of state NVBDCP in carrying out LQAS in your districts?

16. What are the benefits that you have been observing by having two rounds of LQAS annually?

What is your evaluation of the reactions/experiences of MTS with using LQAS?

Thank you for your time and answers

Questionnaire for Medical Officer In-charge (MOI/C)

We would like to start with a few questions about your duties and responsibilities.

1. What are your overall responsibilities as a MOIC?

2. How much time do you allocate for each of these activities? Can you estimate a percentage on a monthly basis?

- Curative

-Preventive

-Meeting:

-Administrative

3. What were the four most important areas of health care in terms of case load did you see during the month of November?

4. In the last month, how many times did you attend each of these meetings:

- Subcenters and other health facility

- Sector meetings

- FTDs

- District level monthly meeting

- CHC-level meetings

- MIS meeting

- Others; specify

5.   What are the topics generally discussed in the following two meetings:

- Monthly district level meeting

- Monthly CHC level meeting

6. Is malaria always discussed in the monthly CHC and district meeting? Who reports on the malaria in the following meetings?

District:

CHC:

7. We have been told, that the topic of malaria is not given priority in ASHA sector meeting? Do you agree? How could this be addressed? Please give your suggestions for increasing the focs on malaria at these meetings in the future?

8.   What benefit is the malaria programme getting from the MTSs? How often do they report their progress at the block? Do they feel comfortable in presenting their problems to you?

9. In general how many sector meetings have the MTS attended in the last two months?

10. Outside of the period when LQAS data is being collected how many FTDS get supportive supervision from MTS in one month?

11. From LQAS survey we have observed that the knowledge of FTDs regarding malaria is quite good but their skill level (doing RDTs, preparing slides and filling forms) is generally poor? Do you agree? How could this be improved?

12. We are told supplies of anti-malarials such as RDTs are insufficient ? How could this be improved in the future?

13. Proper IRS spraying has been observed to be poor, what do you perceive are the major reasons. What are your suggestions for improvement?

14. Please also explain the mode of follow-up and supervision of the IRS programme during IRS rounds. Has engaging GKS in IRS support in recent years been effective? Please comment.

15. How much support are you getting from the district for resolving the problems in managing malaria control programme in your block?

16. How could the district help you to meet your expectations for managing the malaria control programme in a better way?

17. Are your aware of LQAS results in your block? Have you attended any meetings where LQAS results were presented?

18. Did you have any comments about LQAS findings?

19. Do you have any suggestions to improve the malaria control programme in your block.

Thank you for your time and answers.

Questionnaire for the Multi-Purpose Health Supervisor (MPHS)

1. As I understand you convene FTD sector meetings once a month; What are the topics generally discussed in a meeting?

2. What is the average length of time spent on malarial issues in the discussion (in hours)?

3. Who are other staff members who are generally engaged in facilitating FTD sector meetings?

4. What is your opinion regarding the skill of FTDs in doing RDT, preparing slides and filling M1 Register?

5. How can the FTD's skill in above areas be improved?

6. Is it possible to carry out practical demonstration at FTD sector meetings? If so how, if not what are the specific reasons...

7. Supplies of RDTs and antimalarials at FTD level (at subcenter level as well) were found to be very poor; do you have any suggestion to address this issue at the local level; if it is not a problem at the local level where does the problems lie? Please explain...

8. You also provide supervision support to the spraying programme; what is your view regarding the coverage and quality (proper spray) of spraying in your area?

9. We know from LQAS that the proper coverage of IRS spraying in general is poor; what is the underlying problem with it?

10. Do you have any suggestion as to how to improve the coverage of IRS in your sector areas?

11. Would it be helpful if you had an opportunity to receive training on how to lead a group discussion problem solving ?

Any other suggestions

Thank you for your time and comments

Questionnaire for the Health Worker (Male and Female)

1. How often do you see/visit the FTDs that you supervise in their communities?

2. When you visit, what kind of technical support do you provide them ? (What are your priority areas)

3. How competent are the FTDs in providing malarial services in their communities in these two areas: knowledge and skill level?

Knowledge:

Skills such as doing RDTS, preparing slides, filling out M1 forms:

We have observed in general, that FDTS's skill in doing RDTs, preparing slides and filling out M1 forms is very poor? Do you agree?

4. How adequate are the supplies of antimalarials and RDTs at each of these locations:

Subcenter:

FTD community level:

How could this be improved?

5. We have been told that malarial topics at the FTD sector meetings are seldom discussed. Why is that? Can it be changed? How....? Your suggestions:

 6. What are the obstacles or problems that you face in your work? Do you have any suggestions as to how these might be handled?

Thank you for your time and comments

Protocol for the Focus Group for the FTDs

Introduction: This village is the critical link in trying to reduce malaria and to improve the general health of the people in your community. It has come to our attention that we do not know enough about the situation in your villages and we would like to better understand the kinds of problems and obstacles that you face and perhaps discover some ways in which the National Vector Borne Programme can be more helpful to you. First, we are asking you to fill out a short survey that has a list of descriptive questions about your job. Second, we would like to have a group discussion of the kinds of problems and obstacles that you face and some potential solutions.

Personnel:

VBDC: Main facilitator

Baburam Devtoka and one MTS: Translators for Professor Jerry Hage

Hemant Das: Recorder

Professor Madeline Hage: Observer of non-verbal communication

Venue: One of the subcenter

Questions for Discussion:
1.What are the things that you do as a FTD (probe: both services related to malaria and other activities)?
(*How much time you spend in a day/week for each activity, What should be ideal hours of time you feel should be spent in a day for each activity*)

2.How frequently (monthly) you are supervised by the SC to help for your malarial work?
(*Focus on follow up supervision , replenish anti malarial, RDT, helping in documentation*, List the persons/authorities ,designation) who visited you during last month. Note all supervision visits as reported by FTD and verify using FTD Register, How helpful were those supervision visits.

3.We know you attend sector meeting once a month, can you   tell us how long   the meeting takes place? (please mentioned in hours, get recommendation for both to improve the length of the discussion and quality)

4. Are you getting support from your family on your work?

5.What kind of support you have been getting from GKS or Panchayat in doing you
     malaria work? In future what kind of support would you like from GKS?

6.List/share some of the areas in which you faced problems in delivering malarial services. Were you able to resolve those problems? How?

7. Do you have any suggestions that you could have to improve malarial service work at your community?

Thank you for your time.

Questionnaire for the FTDs

*Please write your name*_____

1. How long have you been working as an FTD?:

Please Tick	< 2 Yr.	2 – 5 Yrs.	> 5 Yrs

2. When did you receive 3 days Basic Malaria Training?

Please Tick	3 Days Basic Malaria Training			
	1 year ago	2 yrs. Ago	3 yrs. ago	Training not received

3. In what areas of health including malaria related have you received training during the last year?

	Please Tick
Maternal health and child health	
Safe motherhood	
Family planning	
Nutrition	
Immunization	
TB	
Malaria	
Control of Diarrhoeal Diseases(CDD)	
HIV/AIDS	
Others; Specify	
Others; Specify	
Others; Specify	
Others; Specify	
Others; Specify	

4. How many people did you see (either they came to you or you visited them) for their health problems in the last four weeks? Below is a list of common reasons.

Reason for visiting	No of people
Maternal health and child health	
Safe motherhood	
Family planning	
Nutrition	
Immunization	
TB	
Malaria	
Control of Diarrhoeal Diseases(CDD)	
HIV/AIDS	
Others; Specify	
Others; Specify	
Others; Specify	
Others; Specify	
Others; Specify	

5. How many fever cases did you see in the past four weeks? Please indicate the number of times RDT was done and the number of times a slide was prepared.

No of fever cases observed	RDT done	Slide prepared

6. Do you currently have the following items with you for distribution?

RDT   Yes   No   If yes, how many _____

ACT	Yes	No	If yes, how many _____
CQ	Yes	No	If yes, how many _____
PQ	Yes	No	If yes, how many _____
M1 Register	Yes	No	If yes, how many _____

Thank you for your time.

Protocol for Focus Group with the MTSs

Introduction: My name is _____ . We are working with National Vector Bone Disease Control Programme (NVBDCP). We want to learn from you how you perceive the project is operating so that steps can be taken to improve the malaria control programme. This focus group will take about 90 minutes. All of the information that you provide will be kept confidential. Do you agree to talk to us? (if the respondents say "no", thank them and end the interview). Thank you.

1. What are your duties as a malaria technical supervisor?

(Probe: When did you start integrating LQAS data collection with your routine work?)

(Probe: What are the two major activities you generally do when in a community after collecting data?)

2. During the past year, how much time did you spent in each of these activities?

Percent

Getting the data for LQAS
Training FTDs or Health Workers
IEC and BEC training

3. Between the third and the fourth round, do you think that the effectiveness of the malaria control programme at community level had improved? Why are the reasons for this?

4. How capable are the FTDs in each of the following activities. If there are differences across the two blocks for which you are responsible, please indicate this.

	Percent very good	Percent very good	Percent good	Percent good	Percent poor	Percent poor
	Block 1	Block 2	Block 1	Block 2	Block 1	Block 2
Doing RDT						
Preparing slides						
Treating malaria cases						
Filling M1 Forms						

Be sure to record the names of each block that is below a certain percentage.

5. How useful has been LQAS training for your job?

6. How could the training be improved to make you more effective?

(probe for particular topics such as community mobilization, how to teach, background on civil society, etc.)

7. Aside from LQAS training, what support has LSTM provided to you that has helped you perform your job more effectively?

8. What additional kinds of support should LSTM be providing you?

(probe for specific needs)

Above, we asked you if you had noticed any improvement between the third and the fourth waves of LQAS data collection. Now we would like to ask you more specific questions regarding the third report, which was made in January, 2011.

9. Were you involved in preparing this LQAS report?

10. Have you shared the results? If Yes- Where?

- District level:
- Block:
- Sector meeting:
- Shared to Health worker male and female of SC:

11. What were the reactions when you provided the results?

- District level:
- Block:
- Sector meeting:
- Health worker male and female of SC

12. Did you make any recommendations at that time to increase the percentage of the villages that were using IRS and ITN?

13. If so, what were they?   At what level?

- Districts (CDMOs, DMOs and VBDC)

- Block (MOIC)

- Sector meeting:

- Subcenter:

14. Before making any recommendations did you consult with anyone about strategy and tactics? What are their positions (*if only names are given*)?

(Probe: Did you consult with the MO-I/C, VBD and DMOs when making decisions about recommendations to improve the malaria control programme?)

15. Did any decision maker act on your recommendations or decided to implement some change to increase the percentage of the villages using IRS and ITN?

- Districts (CDMOs, DMOs and VBDC)

- Block (MOIC)

- Sector meeting:

- Subcenter:

16. What have been the consequences of these actions? **(Check to see if this agrees with the answer above.)**

17. Do you have any insights about why some villages continue to fail to use IRS and/or ITN?

18. During the past two years, how often you have attended sector meetings ? Have you been provided time to deliver messages to FTDs about malaria?

If yes, What were the issues discussed ?

19 . During the past two years, how often have you traveled to villages in your Blocks (sub-district)? Which ones? Why these?

20. Besides the LQAS survey have you visited any villages?

If yes, How often?   In which blocks?

21. In what way LQAS has helped you in your work? Can you list some benefits ?

22. Can you list some of the major difficulties you encountered in doing LQAS.

23. Do you have any suggestions on how LQAS results could be used to make better recommendations for programme improvement in malaria control?

Thank you for your time and cooperation

Questionnaire for Malaria Technical Supervisors

Name of interviewee:	_____
Age:	_____ years
District:	_____
Blocks	_____
Position:	_____

| Experience in that position: _____ years |
| Name of Interviewer: _____ |

1. When did you got your basic LQAS training? Date:

2. How long was your training?

3. Were you also trained on hand tabulation, analyzing results and using the results for programme improvement?   When?   For how long?

Date: Duration:

4. Have you had the LQAS refresher training?   When?   For how long?

Date: Duration:

Thank you for your time and cooperation

Appendix B The Start of a Log on Non-verbal Observations

Observations about non-verbal behavior
at the meeting with FTDs on Dec. 15, 2011

This might help extrapolating about other group behavior.

1.Out of the 8 FTDs present, two were very vocal, three were somewhat vocal, two little and one did not say anything.

2. The two most vocal ones were sitting in front of Birat and in the middle of the circle. This has tended to be the case in the other groups. It might therefore be good to systematically pay attention to the sides.

3. The group gave the impression that they were deferring to these two, one in particular whose face was very expressive.

4. There was a lot of **giggling** in the group, which I interpreted as meaning that they had an understanding of the question, shared knowledge about a situation, they knew what the answer was but hesitated in giving it. Girls tend to giggle when they have a sense of sharing something with a few friends, not wanting to tell others what it is, yet at the same time indicating, with their laughter, that they know something. So giggling is a paradoxical behavior, both of being secretive and drawing attention to one's secretiveness. The secret is there for the retrieving.

There was actually one very long silence and a second less long one a little later. So, what did this mean? That they did not want to express any criticism about anyone, the HWs in particular, or the program? Or did it mean that they were not able to perform all the services that they are supposed to perform in their communities and did not want to admit it? In the absence of a common language, I am totally unable to give an answer.

At one point I saw anger on the faces and heard anger in the voices of the two most vocal ones but all seemed to be in agreement. No one dissented. For this reason, I would be in favor of according much attention to the vocal members of an ASHA group but also think that it might be useful to announce at the end of the focus group that you will be there for an other hour and that you would be happy if anyone wished to come forward and talk to you more in detail and offer comments. For it is clear that the ASHA groups I have observed – some more than others- exhibit solidarity. By announcing that anyone can come and talk to you after the meeting, you might encourage the least vocal ones to come forth and say things they did not dare say because of peer pressure.