Saving the Children: Rescue Missions against Strong Undertow

‘If somebody has a political axe to grind, they will find a way to do it.’
Dr. Alfred Sommer, during the Albay Mother and Child Health Project (1987)

On July 30, 1986, in the lush, tropical Albay province in the of the Philippines’ Bicol region, fieldworkers with the Albay Mother and Child Health Project began a house-to-house health survey. Loaded with bags, clipboards, and other equipment, the workers negotiated a precarious walk along the narrow, rough dirt paths separating rice paddies. In the distance, the nearly perfect cone of Mount Mayon emitted a thin, tranquil wisp that gave no hint of the cataclysms of which the volcano is capable. Its most recent eruption, in 1984, had forced the displacement of thousands of villagers.

Ideals for a New Era

With more than half its population of nearly four million people living in poverty, Bicol was one of the Philippines’ poorest regions. Malnutrition was widespread there. The new survey was part of a two-week pilot study and practical training for the fieldworkers of the Albay Mother and Child Health Project, a research collaboration between the Johns Hopkins University, the Philippine Ministry of Health, and the Helen Keller International NGO. At all the houses they could reach, the fieldworkers interviewed mothers and gave all preschool children the standard vitamin A capsules that UNICEF has been distributing in developing countries since the 1970s to prevent or treat vitamin A deficiency [1]. For the previous fifteen years, UNICEF’s vitamin A distribution efforts had been having impressive results in Bangladesh and India.

Village leaders and authorities from the Ministry of Health had been informed before the survey of the upcoming field activities. In early June, Alfredo R. A. Bengzon, the Philippines’ Secretary of Health, had addressed the members of the Rural Health Units at the Daguisin-Dialogo Hall of the regional health office in Bicol’s largest
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town, Legaspi City. The project launch came at a time of excited optimism in the
Philippines. Corazon Aquino had been elected president on February 7, bringing to
a close two decades of the corrupt dictatorship of Ferdinand Marcos and replacing it
with ‘people power.’ (Indeed, Marcos had declared himself victor in the election, but
his own military revolted and threw its support behind Aquino. On February 25, US
military helicopters spirited Marcos and his family to Clark Air Force base and then
to exile in Hawaii.)

Speaking to Rural Health Unit personnel, Bengzon explained to that, in the past,
the main responsibilities of the Ministry of Health had been curative and preventive
services, plus the implementation of public health programs. Under his care, the min-
istry’s mission would broaden with a new emphasis on research. The work in Albay
province would realize the goals he envisioned:

If we just confine ourselves to taking care of people and forget about the necessity of research…
there is a certain sense of dissatisfaction – healthy dissatisfaction…(I)n the Ministry, for as long
as I’m there, research will be an integral hallmark of our tenure…as important as taking care of
people. . . . (My) second message is about health and disease (which) know no. . . geographic or
national boundaries. The fact that the project is being carried out in Albay is only an accident of
resource availability and allocation. . . . (T)he benefits or the lessons to be learned from this study
have international dimensions so that. . . what you people at the Rural Health Units will do. . . in
Albay will affect some child out there in Ethiopia or Mozambique or Brazil. . . (S)o you are really
not simply Ministry of Health workers, you are international workers. . . . (T)he work you are going
to do is probably far more important (for the) . . . lessons to be learned in the field of nutrition. . .
even in the field of medical and human physiology. . . (W)e are fortunate in health that we do not
have to contend with nationalities (or race). . . since the focus in health is the human being. . . (W)e
look at the things that go to his core: his health, his concern, his dignity and our responsibility to
help him attain a measure of meaningfulness as he goes through life. . . . (T)he success and failure
of any health care system eventually depends on mechanisms of the grass roots. . . . (P)eople who
go on a day-to-day basis dealing with mothers, children. . . people who visit homes, people who
make sure practices are carried out, people who make sure that follow-ups are made. . . . Never
underestimate the value of your work. . . . Godspeed and good luck [2].

An initial task for the project was to assess the extent and severity of vitamin A
deficiency in Albay province. Dr. Eva Santos, a Philippine ophthalmologist, examined
hundreds of children and found that more than 3% had night blindness, Bitot’s spots,
or corneal scars characteristic of vitamin A deficiency. Her findings confirmed what
many nutritionists had suspected: vitamin A deficiency was a serious problem among
Bicol’s preschool children. Furthermore, Santos and her colleagues believed, that
beyond the obvious, ‘(T)here must be. . . a much larger number of cases in which the
deficiency in vitamin A, without producing the eye disease, is the cause of a dimin-
ished resistance to infections, of general debility, and of malnutrition.’ This conflu-
ence of factors had been noted in Denmark more than six decades before [3], and it
was now the case in Bicol. Poverty was everywhere, child mortality rates were high,
and vitamin A deficiency was rampant.

In the two-week pilot start of the Albay Mother and Child Health Project, the
fieldwork done accomplished its goals: nearly five thousand preschool children in
forty barangays (the Philippines’ smallest administrative units; in effect, villages) received UNICEF’s vitamin A capsules. The need for the project was proven – vitamin A deficiency in the region was indeed widespread – and workers to carry out the project were trained. What they would conduct would be a full-scale trial of vitamin A supplementation in the barangays of the Bicol region (fig. 9.1). The question the project sought to answer was: would the health and survival of preschool children improve as a result of regular administration every four months of 200,000 IU vitamin A capsules?

Under the leadership of Alfred Sommer, then professor of ophthalmology at Johns Hopkins University and later, dean of its School of Public Health, and Dr. Florentino Solon, director of the Nutrition Center of the Philippines, a team of physicians and other scientists would conduct the large, placebo-controlled clinical trial (textbox 9–1). The project would be the culmination of more than two years’ planning involving much travel between the United States and the Philippines, negotiation of collaborative agreements, selection of a study site, and precise preparation of the research protocol. The protocol required independent review by ethical review boards at Johns Hopkins and in the Philippines to assure the protection of the people who would participate in the research.

Fig. 9.1. Field staff in the Albay Mother and Child Health Project, Philippines, in 1986. Photograph courtesy of Joanne Katz.
A paper, published in the May 1986 issue of the *Lancet*, reported the results of a clinical trial, the ‘Aceh Study,’ carried out by in Indonesia under the leadership of Dr. Alfred Sommer of Johns Hopkins and his Indonesian nutritionist colleague, Ignatius Tarwoito. As the Albay Mother and Child Health Project would attempt to do, the Indonesia study tested the efficacy of regular administration of 200,000 IU vitamin A capsules to improve the survival rate of preschool Indonesian children [4]. The trial had been conducted because recent field research in Indonesia had shown that children with night blindness and/or Bitot’s spots had a higher risk of dying than did children without these signs or symptoms [5]. This, in turn, had raised the question of whether provision of vitamin A to children in a community setting would improve their survival.

The Indonesia study, conducted from 1982 to 1984, involved nearly twenty-six thousand children from four hundred and fifty villages in the Aceh area at the northern tip of Sumatra. The results showed that the mortality rate of Indonesian village preschoolers who received vitamin A was 4.9 deaths per 1,000 children per year. The children who did not receive the treatment experienced a mortality rate of 7.3 deaths per 1,000. These findings suggested that vitamin A supplementation could reduce the mortality of preschool children by about one-third. While the results from Indonesia were provocative, further corroboration of these findings was needed in other populations. Hence, the Albay Mother and Child Health Project of 1986.

The study would be conducted under the oversight of an independent data and safety monitoring committee, which had authority to stop the trial immediately if its members noticed anything that could adversely affect participants’ safety [6]. Early termination could occur if interim results raised safety concerns, experimental treatment showed clear benefit, or both treatment and control groups reacted to the treatment in the same way. Another important element of the project was informed consent, which could be granted by a mother, father, or guardian. Potential participants had to be made aware of the study’s purpose, its procedures, and its possible risks and benefits. Unlike most of the earlier human trials such as those reviewed in previous chapters, participation in the Albay Mother and Child Health Project had to be voluntary [7].

**The Best Laid Plans. . .**

The best guidance for formulating health policy and specific treatment recommendations comes from large, community-based clinical trials, and these must be conducted
according to the highest scientific and ethical standards. Personnel at all levels, from top supervisors to fieldworkers to specialists in assessing the validity of data, must be either seasoned professionals or, for newcomers to this kind of work, rigorously trained.

Properly conceived and executed, large clinical trials are expensive to run, and appropriate sums must be allocated to data collection, treatment, and analysis of trial data. A reliable, genuinely useful, controlled clinical trial therefore calls for several elements:

- sufficient funding and organizational support,
- strong personal leadership,
- clear organization and well-planned logistics,
- carefully recruited and well-trained fieldworkers cooperate effectively under a common regimen of discipline,
- clear communications that promote full comprehension at all levels,
- sensitivity to the cultural standards, practices, fears, and history of the people participating as subjects, and
- acceptance of the study by the community.

Once data collection is completed, many questions must be asked in the process of scrutinizing the data and evaluating conclusions. Were the participants correctly identified each time they were visited? Were the placebo pills and treatment pills identical in appearance and taste so that participants did not know whether they were in the experimental or the control group? Were the study investigators and field workers kept unaware of the participants’ treatment/control assignments – in other words, was it a strictly double-blind trial? Did the participants actually take their pills? Did participants have access to, and possibly take, vitamin A from sources outside the study? Was the dropout rate the same in both treatment groups, and was it high enough to undermine the statistical validity of the study? Was the data entry accurate, or did any fieldworkers falsify their data?

The Albay Mother and Child Health Project began with a high profile in the local area. ‘The project was the biggest act in town’, Kate Burns remembered. An American nurse with several years’ experience in public health in Africa, Burns directed the field operations in Albay. She prominently advertised for positions in the project, screened and interviewed hundreds of applicants, and eventually hired nearly eighty local men and women to serve on the field teams and as office staff in the headquarters set up in Legaspi [8]. In the months before study’s launch, fieldworkers visited the villages in Albay province to number and map the houses.

The two-week pilot study went well. It showed that the fieldworkers were prepared to carry out the main project, which would involve forty thousand preschool children in two hundred fifty barangays in Albay province. A local sheet metal worker manufactured nearly thirty thousand black-and-white metal plates ‘like bicycle license plates’, Burns recalled, ‘stamped with the identification number for each house…’ The fieldworkers posted the plates on the houses of people who had agreed to participate.
But on Thursday morning, August 21, 1986, the residents of Bicol awakened to unwelcome news: Nelson Arao, a popular radio announcer, told his listeners that more than two dozen children in Albay had fallen ill with nausea, vomiting, and diarrhea after being given a vitamin A capsule [9]. The source of the news about widespread adverse reactions to vitamin A was Francis Burgos, a young physician who headed the Bicol chapter of the Medical Action Group, which had been founded in response to perceived human rights violations during the Marcos administration. Arao then broadcast a Medical Action Group statement from Bicol challenging that American researchers were using the children of Albay province ‘as guinea pigs’.

The Philippine Ministry of Health, for its part, was accused of ‘compromising the lives and health of our own children’ with their apparent ‘unshakable faith in foreign enterprise’. Hearing this, the Medical Action Group queried, ‘Must we wait until there are enough dead/disabled/sick children and mothers before we attempt to protect them?’ [10]. In response, officials at the Ministry of Health quickly announced a press conference the following day to explain the research project.

Local radio announcers, newspaper journalists, and other interested parties attended the Ministry of Health press conference, at which Eva Santos and other physicians with the ministry explained the purpose of the project. Someone harangued the gathering that the United States was dumping unwanted vitamin A capsules in the Philippines, since American children did not have xerophthalmia. Someone else charged that the Americans were giving away vitamin A capsules free now in order to stimulate future demand. One journalist questioned: Why was the project being paid for by the U.S. government? – which ignited murmurings in the crowd about ‘an international conspiracy’.

All six Legaspi broadcasters covered the Ministry of Health’s press conference, but the radio coverage was soon drowned out by reports and accusations from Francis Burgos and the Bicol Medical Action Group. Earlier in the day, Burgos and his associates had brought nearly twenty children with ‘toxic effects’ of vitamin A to the regional health office (textbox 9–2). A local pediatrician, Elma Cabrera, of the Albay Provincial Hospital, examined the children and found them all to be malnourished and showing signs of fever, chronic diarrhea, and upper respiratory infection – all symptoms unrelated to vitamin A toxicity (textbox 9–2). In fact, questions put to the parents revealed that most of the children already had these problems before being given vitamin A capsules [11]. But Cabrera’s medical evaluation was largely ignored, and radio stations continued for several days to denigrate the project.

Textbox 9–2. The side effects that can muddy the picture

Side effects following vitamin A supplementation (200,000 IU) are known to occur in about one to five percent of preschool children in developing countries. They consist of mild, transient headache and vomiting and diarrhea occurring within a twenty-four hours of the administration of a dose of vitamin A [12]. The local...
A week later, the Ministry of Health held a scientific symposium in which the scientific background and protocol for the project were presented to local physicians and health workers. More than eighty physicians from the Albay Medical Society attended, and at the end of the symposium, the society formally endorsed the Albay Mother and Child Health Project.

All the while, Burgos and other members of Bicol’s Medical Action Group picketed outside the Ministry of Health with signs reading ‘STOP U.S. VITAMIN A.’ They also took photographs of fieldworkers [1] – in some cases the same workers who had just been intimidated by Arao’s radio broadcast. One activist reportedly threatened the fieldworkers and urged them to resign [1, 14]. In addition, the fieldworkers were branded ‘anti-Philippine’ and ‘puppets of the Americans’ [6, 15].

In one barangay, a group of fieldworkers was intercepted, interrogated, and ordered to quit the project by members of the New People’s Army, the regular armed forces of the Communist Party of the Philippines [6]. According to one report, ‘the group’s alleged “saving factor” was a fieldworker’s membership in the militant League of Filipino Students in his college days’ [16]. The communists had questions: why were the Americans numbering houses and mapping Albay villages? The Drug Monitor, a newsletter published by the Health Action Information Network, reported that ‘the Bicol groups have expressed fears that the project could have doubled as an anti-insurgency plot of the government in collusion with American intelligence agents’ [17]. Frightened by threats of bodily harm, many fieldworkers feared for their safety...
and slept on the veranda of Kate Burns's rented house instead of returning home for the night [8].

Despite the formal support for the project from the Albay Medical Society, the Albay Hospital Association, the Albay Pediatric Society, the governor of Albay Province, and the Ministry of Health, the attacks on the project continued in the press and on the radio – largely fueled by Burgos and the Bicol Medical Action Group. Reports began to trickle back from the local Rural Health Units that mothers in the area were refusing vitamin A capsules for their children who had night blindness. Some mothers were questioning the safety of childhood immunizations against tetanus, diphtheria, and pertussis, asking whether the vaccines contained vitamin A [1]. On follow-up visits, fieldworkers began to find the metal house number plates they had posted torn down, tacked to conspicuous coconut palms, and marked with graffiti: R.I.P.

The number of Burgos children reported as having ‘side effects from vitamin A’ grew from two dozen to three dozen and finally, to sixty-five. On August 28, 1986, the news hit the capital when the Manila Times reported, ‘Dr. Francis Burgos, head of the Albay Medical Action Group (MAG), said the research project called ‘Albay Mother and Child Health Program’ will virtually categorize children below six years as ‘guinea pigs’’ [18]. Similar stories alleging that the project was ‘a conscious attempt to fool the people’ appeared in local papers [19]. On Saturday, August 30, after receiving further threats from the Bicol Medical Action Group of picketing, court injunctions, and lawsuits, Kate Burns and two colleagues from Johns Hopkins loaded all the computers and printers into project vehicles and drove from Legaspi to Manila. The office was closed, and the fieldworkers were sent home. The activities of the project were put on an indefinite hold.

The furor did not end there, however.

Ten days later, the local Naga City newspaper in the Bicol region ran a story headlined ‘Two Tots Died’ – that is, died after receiving vitamin A [14]. In mid-September, the Ministry of Health and the national Medical Action Group formed an independent commission in Manila to investigate the research project and conduct an inquiry into what had now grown to eighty-five alleged cases of side effects and two child deaths from vitamin A [6]. The Bicol Medical Action Group would not budge and gave no facts or names regarding the eighty-five alleged vitamin A-caused illnesses and deaths.

At the end of September, a collaboration of the Ministry of Health and the national Medical Action Group commission, which included three vitamin A specialists, released a report. The conclusions supported the safety of the UNICEF vitamin A capsules used in the Albay project and endorsed the importance of the research being conducted. Bicol’s Medical Action Group was not satisfied, of course. Not only did it reject the report; it also took the opportunity to re-invent itself.

In Bicol, the newly formed People’s Committee to Scrap Vitamin A Project [6] found allies. The leftist New Patriotic Alliance, which had supported Corazon Aquino in the
recent election, stepped into the fray. A political and not specifically health-oriented group, the New Patriotic Alliance saw the Albay Mother and Child Health Project as a manifestation of U.S. imperialism, since the project was funded by the U.S. Agency for International Development and the Ford Foundation [16]. Meanwhile, the agitation in Albay soon had unintended consequences for other programs. Catholic Relief Services, an international humanitarian agency, began to encounter resistance to its local community health efforts. The Ministry of Health was unable to move forward with implementation of the Tuberculosis Control Program in Albay, the last remaining province of the Philippines where the program was to be implemented [20].

The pendulum continued to swing. In the optimistic direction, further meetings were held during fall 1986 to negotiate a new beginning for the research project. A joint press release, issued by the Ministry of Health, the national Medical Action Group, and the Independent Investigation Committee, stated that the Albay Mother and Child Health Project was safe and important and should be implemented, with coordination at the local level with the Ministry of Health and local groups. The Bicol arm of the Medical Action Group abruptly pulled out of the planning and threatened further agitation.

In the pessimistic direction, the scientists involved concurred that continuation would be futile. Alfred Sommer and his Johns Hopkins colleagues knew the time had come to quit. ‘We agonized over this’, a rueful Sommer told a Philippine reporter. ‘It shows you can’t always cover all your bases. There’s nothing we can think of that we can do in the future or that we would have done differently. If somebody has a political axe to grind, they will find a way to do it’ [21]. (More besides scientific misperceptions and political agendas have obstructed the implementation of vitamin A supplementation efforts. Ideology too has impeded progress; see below on India’s Dr. Colothur Gopalan.)

The planners of the Albay Mother and Child Health Project overestimated their preparedness in one of the essentials: community acceptance of the study. Their understanding of the Albay community had been incomplete, and the endorsement and cooperation of national and regional officials were perhaps misleading indexes of community support. They were blindsided by the actions of a disgruntled young physician and his anti-American sentiments; Francis Burgos skillfully used the media as his soap box [22]. Moreover, the influence of communism was gaining strength in the Philippines in the mid-1980s, particularly in Bicol province. Bicol has been particularly problematic in the recent history of the Philippines (textbox 9–3).

Textbox 9–3. Problematic Bicol

Though ideal from a scientific standpoint for a research project, Albay province offered a most inhospitable political environment. The province was ripe for the activities of the Communist Party and its rebel New People’s Army of the Philippines. In the mid-1980s, the Communist Party controlled or influenced about 20% of the
More than a year after the Albay project had been shuttered, a former project staff member wrote to Kate Burns’s colleague, Keith West:

I had been one of the enumerators of your Albay Mother and Child Health Project here in the Philippines. I wrote to tell you . . . that ‘maybe’ the trouble that led to the ruin of the project was indeed a blessing in disguise. Almost all of the project barangays . . . are very critical now, being totally infiltrated by the communists. Some of the barangays are now rebel camps. Our lives could have been endangered had the project continued. I am not happy that many kids are going blind around here. I daily see children with xerophthalmia, and just last month, a boy, totally blind died of a disease which can be . . . caused by lack of vitamin A. But the situation in our country is beyond control. Violence and criminality instantly soared sky-high. There’s no use trying to help save children when anywhere unjust killings happen daily. We don’t know what would happen to the
children had they been helped by the project, and, maybe live for a few more years, then what? We simply don't know [27].

**Getting It Right and on the International Agenda**

In late 1987, Sommer and his Johns Hopkins colleagues established new ties for a controlled research trial to test the approach that had made the Indonesian Aceh Study successful (textbox 9–1). This time the points of contact were Dr. Ram Prasad Pokhrel, director of the Nepal Eye Hospital and the head of the National Society for the Prevention of Blindness, and Nepal’s Ministry of Health. The ground in the flatlands below the Himalayas was well prepared for a large-scale vitamin A study designed along the lines of the aborted effort in the Philippines. Pokhrel and his colleague Larry Brilliant had conducted the Nepal Blindness Survey a few years earlier and found that vitamin A deficiency was indeed common in Nepal [28].

With Pokhrel, Sommer and West assembled a team to conduct a large, community-based trial of vitamin A supplementation in a rural, lowland region of southern Nepal known as the Terai. The area is part of the Ganges River floodplain that extends across northern India and runs through Bangladesh. Again, preparation for the study was painstaking, and nearly two years were devoted to the basic essentials: having the protocols reviewed and approved by ethical review committees in Nepal and the United States; hiring and training fieldworkers; establishing a data management center; and building communications with village leaders. The office equipment purchased for the Albay project was taken out of storage in the Philippines and transported to Nepal. More than fifty local workers were hired to enumerate the houses and follow the thousands of children who would be involved in the study. And as for local acceptance – one example is a man who owned a sugar mill. Upon learning that the study’s aim was to improve child survival, he became keen to assist the project because his young son had recently died. The mill owner’s support took the practical form of office space for the project and electricity generated at the mill.

The research project was officially launched at a ceremony held on May 27, 1989. Officials from the Ministry of Health, local dignitaries, and health personnel attended and were photographed flanking a large metal sign with a logo of the project and lettering in English and Nepali (fig. 9.2). A Hindu priest blessed the project before the participants, who were gathered in a large tent. But the formalities had hardly begun when the sky turned a strange yellow hue, signaling the advance of a huge windstorm from the west. The tent whipped around and then collapsed. Loudspeakers and folding chairs went flying. The participants ran for shelter through the rain torrent that followed. The large metal placard came crashing down, though nobody was injured. ‘We thought the storm was a terrible sign,’ Sommer later reminisced, ‘but the local people were happy, as it had been dry, and the storm indicated that the monsoon
rains were now coming’ [29]. In this instance, a rainstorm boded well, though such was not always the case (Textbox 9–4).

Textbox 9–4. An unsparing act of God

Sudan and Harvard University scientists had established a large vitamin A trial in the area of Khartoum. The study villages were located in five rural councils: Abu Dileig, Rifi Shamal, Rifi Genoub, and El Jaeli in Khartoum Province and Abu Haraz in El Gezira Province. The trial commenced in June 1988, but two months later, disaster struck the region in the form of unprecedented rains and flooding in Khartoum and surroundings areas [30]. A record 210 mm (8.25 inches) of rain fell within twenty-four hours, leading first to massive ground flooding and then to more flooding from the River Nile [31]. Upstream, dams could not restrain the waters of the Blue Nile swollen by rainfall in the Ethiopian highlands. More than six hundred of the region’s villages disappeared completely, and some one-hundred thousand unbaked-clay houses were reduced to rubble [32]. One and a half million people were left without food or shelter [33]. The government declared a six-month month national State of Emergency [34]. Agencies and NGOs such
After an initial setback in the form of a disruption in fuel supplies for the project vehicles, the study got off to a strong start, with nearly thirty thousand children participating and the strong support of the community. From there, it proceeded much as the Albay Mother and Child Health Project should have, over a period of sixteen months, yielding ample and reliable results. In 1991, West, Pokhrel, Sommer, and colleagues published the Nepal study in the *Lancet* demonstrating that giving vitamin A supplements, 200,000 IU, every four months to preschool children reduced mortality by 30% [40].

The Nepal study corroborated the findings of the Aceh Study conducted in Indonesia (textbox 9–1), confirming the validity of a model that could be adapted for clinical trials in other regions where vitamin A deficiency was problematic. Even before the Nepal trial concluded, scientists elsewhere were hoping to repeat the success of the Aceh Study by conducting more trials in Indonesia, and well as in India, Ghana, and Sudan. Four additional studies from Asia showed that providing preschool children with vitamin A reduced child mortality [41]. One study conducted by scientists at India’s internationally renowned Aravind Eye Hospital in Madurai showed that giving a community’s preschool children weekly doses of vitamin A reduced child deaths by 54% [42].

Another study carried out in 1987 in Tanzania tested the effectiveness of treating children with measles with vitamin A and found a pronounced reduction in the severity of cases and occurrence of measles-caused deaths [43]. The Tanzania study was the first to corroborate the findings of the London pediatrician Joseph Ellison...
more than a half century before (chapter 7). Ellison’s findings were confirmed once again by studies carried out in 1987 in South Africa [44]. With the results of many large trials the value of vitamin A to children exposed to measles finally won acceptance in the international health community. The World Health Organization and UNICEF issued a joint statement recommending high-dose vitamin A supplementation for all children diagnosed with measles who lived in communities where vitamin A deficiency was a recognized problem or where the proportion of children who died from measles was 1% or more [45].

In September 1990, at the World Summit for Children held at the United Nations in New York City, representatives from one hundred fifty-one countries endorsed the ‘World Declaration for the Survival, Protection, and Development of Children’. The declaration recognized that an estimated forty thousand children were dying each day from malnutrition and disease. A Plan of Action that emerged from the summit set as its goal a worldwide one-third reduction of the death rate of children under age five. The plan also called for the ‘virtual elimination of vitamin A deficiency and its consequences, including blindness’ [46]. A policy conference, ‘Ending Hidden Hunger’, was held the next year in Montreal; representatives of more than fifty governments made a commitment to an intensive effort to fight micronutrient malnutrition.

Even with the accumulated results of many large trials, ambitious goals set, and commitments made, the need for scientific confirmation of the efficacy of vitamin A persisted. In 1992, the University of Toronto convened an international group of scientists to evaluate the studies that had been done and determine an overall assessment of the effect on morbidity and mortality in young children of vitamin A supplementation.

For a comprehensive answer to the question, ‘Does vitamin A supplementation affect child mortality?’ the group conducted a meta-analysis – a statistical technique that combines and integrates a collection of analytic results for the purpose of arriving at a single set of overarching conclusions. The meta-analysis, combining results from eight trials conducted in Ghana, India, Indonesia, Nepal, and Sudan, yielded the conclusion that vitamin A supplementation reduced child mortality by 23% [47]. A separate meta-analysis conducted by scientists at Harvard reached an even more persuasive conclusion: vitamin A supplementation reduced by 30% the overall mortality of a community’s preschool children [48].

**External Obstructions**

Despite the international health organizations’ proclamation that supplementary vitamin A went far in reducing child mortality, reinforced by incontrovertible statistical confirmation from meta-analyses, local forces in communities where vitamin A deficiency was taking a high toll could still obstruct the distribution of this sorely needed nutrient. In Guatemala, the vitamin A sugar fortification program that was enacted
into law in 1974 (after much wrangling; chapter 8) proceeded smoothly from 1988 on until 1997, that is, when the price of sugar suddenly spiked a full 10%. Vitamin A deficiency had dropped significantly until then [49], but the jump in the sugar price nearly brought sugar fortification to a crashing halt. The Guatemalan government responded by dismantling the law mandating sugar fortification. On January 7, 1988, Vice President Luis Asturias announced an executive order that halted vitamin A supplementation in Guatemala.

In response, UNICEF and the Institute of Nutrition of Central America and Panama (INCAP) issued a warning that stopping the vitamin A fortification program would have adverse consequences for Guatemala, where 80% of the populace was living in poverty on vitamin A-poor diets [50]. The Guatemalan Committee for the Blind and the Deaf and private citizens as well, joined with UNICEF and INCAP to protest the government’s decision. But the government’s reaction to mounting criticism was to retrench: Asturias and his ministers held a press conference to restate the plan to rescind Guatemala’s vitamin A fortification law. They offered a tentative consolation, however: many months would pass, they said, before children became blind. In the interim, some other measures to provide vitamin A might be put in place.

To the sugar industry, the notion of ‘other measures’ had an alarming ring: repeal of sugar fortification could do Guatemala’s sugar producers no good. So a spokesman for the Guatemalan Association of Sugar Refiners – which in the past had vociferously opposed the use of sugar as the vehicle for delivering vitamin A – now reiterated the health institutions’ warning that ceasing to fortify sugar would have adverse consequences for low-income Guatemalans. To bring his point home, the spokesman asserted that sugar offered the most cost-efficient means of assuring that the poor of Guatemala would have adequate vitamin A in their diets.

The issue brought human rights advocates, labor unions, and civic organizations together with the sugar magnates in opposition to dismantling the vitamin A-sugar fortification program. In addition, four congressmen and a private citizen filed a legal suit before the Constitutional Court claiming government’s executive decision was unconstitutional: a law enacted at the will of the Legislature could not be overturned by executive order [50]. Government lawyers were given forty-eight hours to submit their briefs in opposition to the petition. After two tense days, the government backed down and resolved the crisis by means of announcing that the price of sugar would be returned to its 1997 pre-spike level, and mandatory fortification of sugar with vitamin A would continue.

Guatemala’s vitamin A sugar fortification program survived subsequent scares. As in many other countries, sugar production in Guatemala is a highly protected domestic industry: the price of sugar on the international market, influenced mainly by competing supplies from such countries as Brazil and Cuba and demand from China and India, is usually lower than on the domestic market. In 2000, the international market price of sugar hit historic lows, creating a lucrative possibility for particularly enterprising Guatemalan sugar dealers who could purchase sugar cheaply on the
international market and sell it within Guatemala for a much higher price – as long as the government agreed. Under Alfonso Portillo, the president who came into power in 2000, the Ministry of Economy gave the nod to this scheme and permitted the importation of cheap Cuban sugar. Predictably, protests greeted this decision, citing the likely loss of thousands of jobs in the domestic sugar industry. Furthermore, scientists with INCAP, personnel in public health institutions, and managers within the sugar industry itself reminded the government that all sugar in the country had to be fortified with vitamin A. Again, a nod from the government: the Ministry of Health reassured the public that the imported sugar would be fortified [51].

But the ministry had a surprise in store for the Guatemalan people. In September 2000, health minister Mario Bolaños denounced the country’s sugar producers, declaring that they were not complying with national standards for vitamin A fortification of sugar [52]. The motive behind such allegations was to deflect criticism from the government's decision to allow sugar imports. But tests of the local product found that more than 80% had vitamin A concentrations that met the standards, and even those samples that fell short showed evidence of some fortification. (Under a collaborative external monitoring system established in 1995 and run by UNICEF, INCAP, and Guatemala's Ministry of Education, school children bring a sample of sugar from home to the public schools, where it is analyzed for its vitamin A concentration.) Omar Dary, a Guatemalan-born scientist who specializes in micronutrients and has worked throughout the developing world, remarked, ‘Continued vigilance and monitoring are critical for any fortification program, because you cannot assume that business and government will do the right thing’ [53].

**Much Accomplished, More to Do**

In light of the strong scientific evidence for vitamin A supplementation in reducing preschool child mortality, WHO and UNICEF increased their efforts starting in the late 1990s to strengthen national vitamin A supplementation programs. Through national programs in more than one hundred developing countries, children received vitamin A capsules every six months [54]. Tracking of various countries’ programs by UNICEF has encouraged increased emphasis on child health and survival in developing countries. On September 8, 2000, one hundred eighty-nine UN member states adopted what was called the Millennium Declaration, with clear, time-bound goals for development. Millennium Development Goal Number Four has been of particular interest. It calls for a two-thirds reduction of under-age-five child mortality worldwide by 2015. An ambitious goal! To meet it will require a significant increase the coverage of vitamin A supplementation programs. In 2003 the programs altogether were reaching only 55% of the target population in developing countries [55].

Despite the progress made by public health programs initiated during the last half century, some ten million children are still dying each year in developing countries,
mostly of preventable causes [56]. More than 60% of those who die at age five and younger – the so-called ‘under-five’ deaths – could have been saved by implementation of a few known and proven interventions. Some one hundred twenty-five million preschool children around the globe are vitamin A-deficient – most of them living in southern Asia, Southeast Asia, and sub-Saharan Africa (fig. 9.3).

Vitamin A supplementation is a scientifically proven and practically tested means of improving child survival, and scientists affiliated with the World Bank and other organizations have found vitamin A supplementation to be one of the most cost-effective health interventions to reduce child mortality [57]. Economists who met in 2004 at the Copenhagen Consensus endorsed vitamin A supplementation as one of the best strategies to improve global well-being [58]. In the short 1998–2001 span alone, vitamin A supplementation prevented one million child deaths according to UNICEF [59]. Such countries as Indonesia and Vietnam, which have achieved high coverage with vitamin A supplementation, have noted a virtual disappearance of hospital admissions of children with night blindness, Bitot’s spots, corneal ulceration and keratomalacia [60]. Vitamin A supplementation with 200,000 IU every four to six months has been shown to reduce the appearance of new cases of xerophthalmia among preschool children by 60–90% [61].

Fig. 9.3. Global distribution of vitamin A deficiency, defined by percent of children with low serum vitamin A levels (VAD) and with clinical signs/symptoms of vitamin A deficiency (X).
But under-five child deaths persist at high rates even though this need not be the case, and nowhere is the problem worse than in India. With nearly two million under-five child deaths per year, India ranks at the top of all nations’ under-five mortality [62]. India therefore figures prominently in any effort to reach the Millennium Development Goals. Shown on a map, India’s share of global under-five deaths is rivaled only by that of sub-Saharan Africa (fig. 9.4). Compared with its immediate neighbors, India has made relatively little progress in mitigating child mortality since 1980 [63].
Bangladesh and Nepal, where under-five child death rates used to be even worse than India’s, have long since surpassed India on the same measure [64]. The same holds true for comparisons with other neighbors on the Indian subcontinent. Analysts of health trends and the effectiveness of public health interventions have charted this discrepancy: while under-five child mortality fell in Bangladesh by 4.1%, India achieved only a 2.7% reduction [65]. Given that nations of the subcontinent have similar histories, cultures, and institutions, the contrast in reduction of child mortality may be a result of differences in implementation of child survival strategies.

The low coverage of India’s vitamin A supplementation program may account for that country’s relative failure in reducing child mortality [64]. The India National Family Health Survey, which was conducted in 2005–2006, showed that the vitamin A supplementation program had 20% coverage among preschool children [64]. Nepal and Bangladesh, meanwhile, have managed to deliver vitamin A supplements to 85 to 90% of their preschool children. India, however, continues to experience a high incidence among children of night blindness, Bitot’s spots, and blindness resulting from corneal ulceration and keratomalacia [66]. (According to the National Nutrition Monitoring Bureau, 0.7% of children in India under five years of age have Bitot’s spots [67]; WHO defines vitamin A deficiency as a public health problem when the rate of Bitot’s spots exceeds 0.5% [68].)

What has made the vitamin A deficiency situation in India so intractable? The probable answer is lack of national leadership in public health and nutrition, leading to inadequate coverage in vitamin A supplementation. There is a close correlation between high vitamin A deficiency, high under-five mortality, and deep poverty [69]. Sadly, this confluence of ills describes much of India.

The strongest index of poverty in India is landlessness: more than 40% of rural Indian families own no agricultural land [70]. With sixty million landless households, India has a greater landless population than any other country [71]. And of those households who do own some land, two hundred fifty million own less than 0.2 hectares (one-half acre). Many landless families survive mainly on cereals and only have one main meal a day [72]. But most rural land reforms in India have been quite weak and ineffective. Landless peasants have risen up in protest as part of a Janadeshe (people’s verdict) movement. In October 2007, some twenty-five thousand landless farmers – some wearing plastic bags as shoes – marched six hundred kilometers from the central Indian city of Gwalior to New Delhi to demand land [73].

Landlessness and poverty are not the only obstacles to improving the vitamin A status of Indian children. Ideology too stands in the way. One of India’s most influential nutritionists, Dr. Colothur Gopalan, has long been instrumentally opposed to vitamin A supplementation and vitamin A fortification of foods. As director of the Nutrition Foundation of India, Gopalan commands attention when he urges that ‘public-minded citizens must ensure the scrapping of the massive-dose vitamin A prophylaxis approach. This will not only avoid the considerable unnecessary expenditure which the government is incurring on the programme but more importantly,
will save our children from undesirable side effects. He argues that child mortality in developing countries should be reduced through the elimination of poverty (this argument has been tested before; textbox 9–5). Instead of vitamin A supplementation or fortification, Gopalan recommends that children eat more fruit and vegetables [74].

Umesh Kapil, a pediatrician who practices in Delhi, is one of Gopalan's followers. A Calcutta newspaper has quoted him as using arguments quite like Gopalan's against vitamin A supplementation. Kapil, too, would eradicate the problem only at the roots and suspects that opportunists are at work behind vitamin supplementation. ‘[W]e must look to our farmers, not to pharmaceutical companies, to protect the health of our children. The main solution to vitamin A deficiency should not be drug-based, but food-based...’ and ‘...the issue of vitamin A has commercial overtones’ [75].

The grim situation of India's landless peasants, most of whom subsist on less than the equivalent of one US dollar a day, makes advisories such as 'eliminate poverty' and 'eat more fruits and vegetables' seem either curiously naïve or cynical. In the context of India's poverty, landlessness, and child mortality, they seem little more than pathetic emulations of Marie Antoinette's infamous (and unproven), 'Let them eat cake'.

Textbox 9–5. The grand detour

Recent history had some hard lessons to teach the benevolent experimenters, agencies, and nongovernmental organizations which, in the 1980s, would introduce supplementation and food fortification to eradicate vitamin A deficiency and the dire health effects it caused. The experience of Spain offered a case in point. In some areas of Spain, the micronutrient iodine was severely lacking and causing an array of disorders very different from those caused by vitamin A deficiency but comparably damaging.

Dietary iodine is essential for normal function of thyroid hormones, and problems that can result from a lack of it include severe mental retardation ('cretinism'), impaired physical development (particularly of the brain), increased infant mortality, hypothyroidism, and goiter (enlargement of the thyroid gland) [76]. Iodine deficiency is a function of local presence of iodine in water, plants, and food. Mountainous regions and large river deltas are particularly prone to provide inadequate natural iodine, so populations in such terrain are especially vulnerable to iodine-deficiency disorders. Since the early part of the twentieth century, salt fortified with iodine (widely familiar as iodized salt) has been the primary strategy for preventing iodine deficiency. Iodized salt has been adopted almost worldwide.

During the mid-1900s, one of Spain's most influential physicians was Gregorio Maraño (1887–1960). As head of the Institute of Endocrinological Research and chair of Endocrinology at the University of Madrid, Maraño was well acquainted
with the problems of goiter and cretinism which were widespread across many parts of Spain. In 1921, King Alfonso XIII created a Goiter Commission and appointed Marañón the head it, and in the following year, Marañón accompanied the king on a visit to Las Hurdes, a mountainous region in west central Spain with an extremely high prevalence of goiter and cretinism. Marañón urged the king to promote economic development in the area. He applauded the road construction, educational programs, and agricultural projects that soon began in the area, but he did not urge the iodization of salt [77]. The human suffering in Las Hurdes also caught the attention of filmmaker Luis Buñuel in his 1933 documentary, Tierra sin Pan (Land without Bread), which was immediately banned by the Franco administration [78].

Marañón was convinced that economic development and improved diet would eradicate goiter and cretinism in Spain, including in places like Las Hurdes. Iodized salt was seen as too specific; the general problems underlying iodine deficiency would persist. What was needed to remedy the problem was the eradication of poverty itself, and with it, malnutrition. Marañón's was a philosophy of All or Nothing. Economic development was the only means to reduce poverty, disease, inbreeding, poor diet, and iodine deficiency [79]. He remained opposed to the iodization of salt until his death in 1960.

Heinrich Hunziger, a Swiss endocrinologist and proponent of iodized salt in Switzerland, referred to Marañón's high idealism as ‘the Grand Detour’ [80]. Hunziger showed that economic development alone did not lead to the eradication of iodine deficiency. Marañón was the most respected and influential endocrinologist in Spain, and, as noted by the historian Renate Fernandez, '(H)is prestige in the Spanish system of seniority and hierarchy may have insulated him from challenges by Spanish colleagues’ [77].

In the years after Marañón's death, the Franco regime's restriction of medical information contributed to inaction with regard to iodine deficiency. The inertia lasted long past the Generalissimo's death in 1975. Iodized salt finally became available in Spain in 1981, but its use was not widespread and not compulsory [81]. Finally, in 1985, the European Thyroid Association published a study of endemic goiter in the countries of Europe, with results showing a shocking prevalence – a full 86% – of goiter in schoolchildren in Las Hurdes. This was the highest goiter rate in all Europe [82]. Marañón's ‘Grand Detour’ of economic development failed miserably: more than sixty years later, most of the children of Las Hurdes were still suffering from iodine deficiency. The resulting sickness and death that could have been prevented with the simple intervention of iodized salt in Spain is not known. The toll in terms of diminished capacity and human life was probably staggering. As for Marañón's lofty aspirations for his country, their echo still reverberates today in India and has the same harmful consequences.
Although increasing the consumption of vitamin A-rich foods may seem to be a reasonable solution, in reality, it is much more difficult for preschool children in poor families – even those families that hold some land – to meet the requirements for vitamin A through diet alone. Animal source foods that are rich in vitamin A, such as liver, eggs, cheese, and butter, are often beyond the reach of poor families. In the India National Family Health Survey, mothers were asked whether their children had consumed any vitamin A-rich foods (liver, fish, egg, dark green leafy vegetables, pumpkin, carrots, yellow or orange sweet potatoes, ripe mango, papaya, cantaloupe, and jackfruit) within the last twenty-four hours. (Twenty-four hour dietary recall is accepted as a valid dietary assessment method and is commonly used in nutrition surveys.) The results showed that more than 40% of children ages twelve months to thirty-five months did not receive any vitamin A-rich foods during the day preceding the interview [83]. Less than 8% of the children had received an egg. The national survey demonstrates that young children have a low consumption of vitamin A-rich fruit and vegetables and explains why vitamin A deficiency remains a deeply rooted public health problem in India.

Another critical factor that makes it difficult for preschool children to meet their dietary requirements for vitamin A through fruit and vegetables alone is that the bioavailability of vitamin A from fruit and vegetables is not high. (Bioavailability refers to the proportion of a nutrient contained in food that is actually absorbed by the body. For example, spinach leaves contains a certain concentration of vitamin A, but when spinach is eaten, not all its vitamin A is absorbed in the digestion process. In fact, the proportion absorbed is much lower.) In the early 1990s, studies conducted by Saskia de Pee, Clive West, and Muhilal in Indonesia showed that the bioavailability of vitamin A from fruit and vegetables is lower than was once believed [84]. The Institute of Medicine subsequently revised its guidelines regarding the bioavailability of vitamin A in fruit and vegetables [85]. The low bioavailability of vitamin A from vegetables has been corroborated by rigorous dietary studies in humans [86]. A young child between ages one year and three would need to eat eight servings of dark green leafy vegetables per day in order to meet the Recommended Dietary Allowance for vitamin A [87]. The problem of the low bioavailability of vitamin A in plant foods has brought the sobering reality of ‘the virtual impossibility for most poor, young children to meet their vitamin A requirements through vegetable and fruit intake alone’ [88]. The low bioavailability of vitamin A from plant foods explains, in part, the presence of vitamin A deficiency among children living amid ample supplies of dark green leafy vegetables and other plant sources of vitamin A.

In other words, the fight goes on. There have been many successes, but not enough. UNICEF continues to distribute more than five hundred million vitamin A capsules each year in developing countries and has saved the lives of millions of children since beginning its vitamin A program. But the challenges to total eradication of vitamin
A deficiency persist, largely as manmade ones. Donor fatigue has become a factor, and political obstacles still undermine efforts to improve child survival. So millions of children still suffer the effects of deficiency in the form of blindness, severe infections, and, for some, death. Efforts to lift completely the shadow of death cast by vitamin A deficiency – by now proven to be feasible and economical – in some places still entail struggle against intractable opposition. The victims who continue to suffer under the shadow are mainly the children.

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39 The senior investigators did not respond to multiple e-mails and voice messages from the author requesting an opportunity to discuss details of their study in the Sudan.


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65 Murray (2007).


78 The film was a disturbing portrait of peasants living in perpetual hunger in the rugged Sierra de Gata and featured close-ups of cretins, dwarves, and women with large goiters deforming their necks. The Franco regime censored the film, but Buñuel hoped that Marañon, in his prestigious position, could help procure authorization for distribution. During a private screening, however, Marañon was repulsed, and he reprimanded Buñuel for showing ‘ugly things.’ ‘Why don’t you show something nice,’ the doctor suggested, ‘like folk dances?’ From Buñuel, L. (1984) My last sigh. New York, Random House, 141.
85 Food and Nutrition Board, Institute of Medicine (2001). According to these guidelines, the vitamin A bioavailability is 12:1 for β-carotene from vegetables and fruits (12 μg β-carotene = 1 retinol activity equivalent (RAE) and 24:1 for other provitamin A carotenoids (24 μg α-carotene or β-cryptoxanthin = 1 RAE).

The Recommended Dietary Allowance (RDA) of vitamin A for children, aged one to three years is 300 μg RAE/day. Using the conversion factors of the Institute of Medicine (12:1 for β-carotene and 24:1 for α-carotene and β-cryptoxanthin), the child would need to eat 64 grams of dark green leafy vegetables per day, or about four servings, given a portion size of 15 grams. However, the conversion factor is probably closer to 24:1 for dark green leafy vegetables [Tang, 2005; Khan, 2007], in which case a child who need to consume eight 15 gram servings of dark green leafy vegetables per day.

West (2008), 385.