The Interdepartmental Committee on Nutrition for National Defense
Surveys: Lasting Impacts

Barbara A. Underwood
National Eye Institute, NIH, and WHO, Retired

ABSTRACT The Interdepartmental Committee on Nutrition for National Defense (ICNND) surveys provided previously unavailable representative information on the food and nutrition situations of military or civilian populations in 33 developing countries. Information on related social and economic conditions also were assessed. These data provided a framework for planning and follow-up programs to correct problems identified and to prevent them from recurring, such as fortification of salt with iodine and sugar with vitamin A. Educational materials specific to the nutrient content of local foods, dietary patterns, and availability within countries and cultures were also developed, such as food composition tables and dietary guidelines. In-country scientists were motivated to continue nutrition research, and, in several countries, institutes and departments of nutrition evolved. Impact was documented by improved nutritional status in several countries, although success is not always attributed directly to the impetus provided through the ICNND Surveys. Furthermore, the surveys and their leaders provided inspiration and role models for aspiring young nutritionists both within their own countries and internationally.


KEY WORDS: nutrition surveys ICNND nutrition profile food fortification iodine

Lasting impacts from the Interdepartmental Committee on Nutrition for National Defense (ICNND) surveys on national developments in nutrition are difficult to trace, because the links too frequently were not codified in publications with appropriate ascription. My attempt to summarize impacts, therefore, is based on my own experience and impressions gained in over 4 decades of exposure (1961 to present) to nutrition in developing countries. Where possible, I confirmed my conclusions by contacting individuals directly or indirectly involved with developments in some surveyed countries. My findings are summarized into 4 broad categories of information

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2 To whom correspondence should be addressed.

3 Abbreviations used: ICNND, Interdepartmental Committee on Nutrition for National Defense; IHN, Institute of Human Nutrition; INCAP, Institute of Nutrition of Central America and Panama; NCP, Nutrition Center of the Philippines; PL-480, Public Law 480; USAID, U.S. Agency for International Development.

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1959—Iran, Pakistan, Korea, Philippines, Turkey, Libya, Spain, and Peru—focused exclusively on the military, where numerous nutritional problems were revealed. The survey findings were reported to officials in these countries with emphasis on the adverse effect of malnutrition on performance by the troops. These nation-specific reports led to several, at least 5, Armed Forces internation conferences that drew together military personnel to consider needed training of officers in nutrition and military feeding (2–5). The military surveys and follow-up conferences sparked interest not only among the armed forces in the developing countries but also among those concerned for the civilian population’s well being and, in some countries, the U.S. Agency for International Development (USAID) mission directors, e.g., Pakistan and the Philippines, which subsequently led to collaborative nutrition projects supported through Public Law 480 C (PL480) funds (A. E. Schaefer, unpublished results). Furthermore, before establishing ICNND, military officers in the United States paid little attention to nutrition, but involvement of representatives of each of the armed forces on the committee stimulated interest. The increased awareness worldwide of the importance of nutrition, as well as fitness, to troop performance is likely traceable to the influence of early ICNND sponsored international armed forces conferences.

It was Frank B. Berry's [M.D., assistant secretary of Defense (Health and Medical) and chairman of the ICNND Committee] vision that surveys include the civilian population, as well as the military, to provide representative national baseline statistics. Such data were needed not only to assess the current health and the nutrition status of populations but also give countries a means for monitoring change and for evaluating programs (A. E. Schaefer, unpublished results). Dr. Berry's vision was realized in most surveys from the 1958 Ethiopia survey onward, with the exception of Peru and Taiwan. Evidence of nutritional deficiencies was frequently uncovered, especially among vulnerable groups of women, children, and the poor. In Chile, however, although nutritional problems were found, especially protein-energy malnutrition (PEM), which led to establishment of nutrition recovery centers (6), the survey of 1960 revealed high urinary excretion values for the B-complex vitamins. This surprised Arnold E. Schaefer, Ph.D., executive director, ICNND, who called for a reevaluation. The data were confirmed and, according to Antonio L. Arteaga, M.D., Department of Nutrition, Catholic University (7), these results documented the effectiveness of the fortification of bread with B-complex vitamins advocated in earlier years by the Chilean Nutrition Society. This early demonstration of a fortification program to successfully meet a nutrient need encouraged the Chilean government to fortify other food products as public health measures. Chile continues to have a vibrant food fortification program, including iron and ascorbic acid fortified milk for control of iron deficiency anemia in infant and child feeding (8).

In Central America, the ICNND surveys in 6 countries in 1965 yielded abundant data on the prevalence of micronutrient deficiencies (9). Endemic goiter, for example, was identified as a regional public health problem, except in Guatemala. What accounted for the isolated exception? In the mid-1950s, the Institute of Nutrition of Central America and Panama (INCAP) had already identified, through surveys, a high prevalence of goiter, and, with leadership from Nevin S. Scrimshaw, M.D., Ph.D., director of INCAP, and Guillermo Arroyave, Ph.D., Division of Biology and Human Nutrition, INCAP, a national program of salt iodization was established in 1956. Ten years later, comparisons with ICNND survey data among the other 5 countries in the region showed that, in less than a decade, Guatemala had eradicated endemic goiter as a public health problem, whereas rates were high in the other countries without iodized salt. Positive documentation by ICNND of the Guatemala success accelerated plans for programs of salt iodization in the other 5 countries. Today, according to the International Council for Control of Iodine Deficiency Disorders (www.ICCIDD.com, accessed March 8, 2004) and the United Nations Standing Committee on Nutrition (10), the Americas have the lowest rate of iodine deficiency in the world, with the exception of China. Four decades (1965–2004) of monitoring the changing and progressively improving situation in the region was possible because of baseline information provided from the ICNND surveys.

**Framework for policy and for planning sustainable national public health nutrition programs**

For the first time in developing countries, ICNND surveys quantified the prominent nutritional problems of representative populations and likely reasons for them, including economic, agriculture, and sociocultural factors. This provided governments a solid basis for an integrated approach to their food and nutrition problems, i.e., a framework for formulating, implementing, and evaluating a broad range of possible remedial actions and policies based on maximizing use of their own resources.

In Central America, although a series of dietary, clinical, and biochemical studies were made by INCAP before the ICNND surveys, they were limited in scope and did not provide governments the representative information needed for national program planning. The ICNND regional surveys filled the gap. The most prominent nutritional problems identified were PEM, anemia, and deficiencies of iodine and vitamin A (9). The PEM problem stimulated further promotion of Incaparina, a child-feeding product made from local food sources and still available today. The salt iodization program described earlier solved the obvious goiter problem. The vitamin A problem was less clinically obvious, i.e., clinical eye signs of deficiency were rare except when combined with severe PEM. Yet both biochemical and dietary data from the surveys suggested subclinical deficiency, which, in animals lowered resistance to infections. Dr. Guillermo Arroyave and many others strongly believed the association applied to human populations as well, particularly children, and therefore a public health program for improving vitamin A nutriture was urgent. At INCAP, the challenge to correct the problem through fortifying all sugar in Guatemala with vitamin A was embraced (11). What a challenge that intervention proved to be! Dr. Arroyave and colleagues had to demonstrate the feasibility, the efficacy, and the effectiveness of fortified sugar in improving vitamin A nutriture. They had to convince government and industry that this could be an affordable public health program. They had to convince skeptical public health and nutrition professionals, including some international agencies, that they were not solving one problem (vitamin A deficiency) while aggravating another (dental caries). All this was accomplished (12). Today, the sugar vitamin A fortification program is ongoing in Guatemala, Honduras, El Salvador, and Nicaragua, reducing the prevalence of low serum retinol levels well below the deficiencies reported in the 1965 ICNND surveys. Currently, Costa Rica and the Dominican Republic are considering starting the program, as is the Philippines. In some African countries where the problem in endemic, such as Zambia, Tanzania, Uganda, and South Africa, sugar fortification programs are being implemented or governments are in the process of undertaking sugar fortification as national programs. India also has a pilot study under-
way. Population-based serum retinol, hence vitamin A nutrition, has improved where these programs have been effective and sustainable, a lasting impact traceable to the baseline information provided by ICNND surveys in Central America (Guillermo Arroyave and Omar Dary, unpublished results).

In the Philippines, follow-up among the civilian population to the ICNND military survey conducted in 1957 highlighted the prevalence of PEM among children and the need for a widespread approach for dealing with the problem within and outside of government. In 1959, at the request of Dr. Schaeffer, R. W. Engel, Ph.D., professor, Virginia Polytechnic Institute, agreed to work with the Philippine government in considering nutrition programs to follow up and to correct those problems identified. For a decade he performed this role as a consultant. Then in 1967, after a regional symposium on ICNND follow-up, the Philippine minister of health invited Dr. Engel to develop a plan of assistance, as chief of party, Nutrition Project, USAID, Manila, in support of food and nutrition activities. Over the succeeding 12 y, a highly successful, broad-based program was developed and implemented. The program drew heavily on experience using mothercraft centers that colleagues at Virginia Polytechnic Institute had implemented in Haiti. The targeted maternal child health program introduced innovative ways of replacing the free distribution of powdered milk, which went heavily into the black market. A corn-soy-milk blend was produced and made available only to 2nd or 3rd degree malnourished toddlers and infants identified through a weighing program administered largely through 2 nongovernmental agencies, CARE (Cooperative for American Relief Everywhere) and Catholic Relief Services. Skimmed milk and wheat flour donated through PL480 from USAID that previously was distributed to parochial schools, was incorporated into a “nutribun” at contracted commercial and school-run bakeries and distributed through a school-feeding program in the public school system (13). Those not malnourished paid the equivalent of about 2 U.S. cents per bun, and this money subsidized the program for children identified by weight as malnourished and the cost of CARE and Catholic Relief Services. nutritionists to run the program. This program served over 2 billion buns to a million school children in a decade and became a favored food for use in a decade and became a favored food for use in elementary schools 30 – 40 y ago. In fact, efforts to answer their interest in bringing back the nutribun, which is promoted by adults who were recipients of the nutribun while studying in elementary schools 30–40 y ago. In fact, efforts to answer their cry of “Why don’t you bring back the nutribun?” are being considered. The proposal is to fortify a popular bread, “pande- sal,” with vitamin A and iron fortified wheat flour baked into a product called “nutripan” with a potential for distribution in schools (F. Solon, unpublished results).

Further evidence of lasting survey impacts in the Philippines was the heightened activity in nutrition, which attracted attention of the minister of agriculture who became chairman of the National Nutrition Council of the Philippines. This council has continued to provide guidance to the government to the present day. Also, the First Lady at the time, Imelda Marcos, became involved in establishing the Nutrition Center of the Philippines (NCP) with public funds supported from proceeds of franchise-operated duty-free shops, among other financial sources. Florentino Solon, M.D., who was instrumental in all these activities, and many more, was the first director of NCP, which he continues to lead. The NCP, under Dr. Solon’s direction, has evolved into a private nonstock, non-profit institution whose aim is to mobilize private sector efforts and resources to support government programs. National, regional, and international training in nutrition policy and nutrition education are among the programs NCP provided to students in the region (F. Solon, unpublished results).

Development of the exemplary Central America and Philippine nutrition programs are a legacy of the ICNND surveys and Dr. Shaeffer’s zeal to translate survey findings to national programs.

Dietary profiles as a resource for developing specific nutrition education materials

Before the surveys, few countries possessed specific representative information for developing their own nutrition education materials based on their own resources. Most relied upon texts and other materials provided from developed Western countries. The dietary profiles obtained in ICNND surveys included information on food habits and customs, food supply and seasonal variations, food procurement and distribution, and methods of food preservation, and preparation procedures. Adequacy of the amount and the nutrient content of food consumed was also obtained (14). This dietary information, previously lacking in most developing countries, was needed for modifying existing economic, agricultural, and food management policy. The food composition information gathered as part of the surveys was especially valuable for developing specific messages to improve the nutrition of populations based on local resources, food preference, and cultural considerations. Furthermore, survey staffs trained in dietary intake and food composition methodology were able to continue these activities in follow-up research projects and programs. Compilation of regional food composition tables for Central America (15), Asia (16), and Africa (17) were valuable lasting contributions stimulated by ICNND-sponsored activities.

An additional legacy of the surveys was the equipment and the supplies left behind, which were strategically placed in laboratories anticipated to use them for follow-up activities. In Pakistan, I observed how equipment, such as the simple Coleman Jr. spectrophotometer and photofluorometer, the pH meter, centrifuges, and electrophoresis apparatus, continued to be used in local laboratories far after the survey was completed. Methods from the survey manual that used these simple instruments allowed for continued evaluation, for example, of the nutrient content of Pakistani foods and biochemical assessments of civilian populations, not part of the military survey (18). Today, locally compiled food composition tables exist for several developing countries where surveys were conducted and form the basis for food guides, modeled after the U.S. food pyramid but specific to country culture and foods. I cannot provide irrefutable evidence for a direct link to the ICNND surveys, but I suspect that the origin of much of the information can be traced in part to interest, training, and follow-up research that emerged from an ICNND survey and the training and technical resources left in the country.

National nutrition institutes and departments of nutrition

Dr. Schaeffer and other survey leaders sought to build country-level institutions as a legacy of the ICNND surveys. The hope was that collaborative research would be the result. Often departments within academia were selected, as occurred in Bangladesh at Dacca University. PL480 funds were used to establish the Nutrition and Food Science Institute headed by Kamalludin Ahmad, Ph.D. Many research projects were carried out in the institute as follow-up to findings in the 1962–1964 East Pakistan (now Bangladesh) ICNND survey. The
long-term collaborations in which Irwin Rosenberg, M.D., Public Health Service, NIH, was instrumental, led eventually to construction of a new building by Dacca University, housing the Bangladesh Nutrition and Food Science Institute. Dr. Schaeffer lived to attend the dedication ceremony for the institute, which surely was a rewarding moment for him to see one of the lasting legacies of the East Pakistan survey (A. E. Schaeffer, unpublished results). Dr. Rosenberg also attended the opening ceremony and deserves recognition for the continuous support he provided to the development of the research and training activities at the institute, which today continues to do research relevant to the country and the region. Departments of nutrition and national nutrition institutes exist in several countries where ICNND surveys were conducted, e.g., Vietnam, Thailand, Chile, Philippines, for some examples. I am uncertain how many can trace their establishment to the stimulus provided by an ICNND survey but would suspect that the linkage is there for many.

The Manual for Nutrition Surveys, both edition 1 in 1957 (1) and edition 2 in 1964 (14) and the set of 100 slides of clinical nutrition deficiency signs deserve special recognition among ICNND’s lasting impacts, especially among academic departments and institutions in nutrition. Indeed, the slides and the manual for Nutrition Surveys remain classic references valued in libraries and collections of nutritionists concerned with nutritional assessment. The manual contains an amazing amount of specific information on survey methodology, including sample forms for collection of data, precise directions on amounts of chemicals and supplies needed, standard biochemical and food analysis methods, suggested values for interpretation of biochemical levels of nutrients in blood and urine, and much more. And, what the manual provided was supplemented by the slide set, both invaluable as training material. They were the survey “bible” for many others and me through the 1960s and beyond. For example, immediately after completion of my doctoral studies in 1962, I went to Lahore, West Pakistan, for the University of Maryland Medical School with the responsibility to establish nutrition research in the newly constructed International Center for Medical Research and Training. All the equipment and the supplies to fill the empty laboratories had to be ordered and shipped from the United States. The manual was invaluable for this purpose and subsequently, together with the slide set, for training staff and for conducting field nutrition assessments and research. Later, while teaching international students laboratory assessment methodology at Columbia University, precision obtainable using the manual’s methodology, which used simple equipment, was compared with methods that required more sophisticated (and expensive) equipment. The comparisons were important to demonstrate that these students could achieve much when they returned to their countries without acquiring expensive sophisticated equipment that would be difficult to maintain where technical assistance was lacking, even though most wanted access to the latest technology for prestige more than necessity. Under Dr. Sebrell’s leadership, many of these students participated in an ICNND-like survey of the Dominican Republic, where they put into practice the survey methodology they learned at Institute of Human Nutrition (IHN), much of which centered in the slide set and Manual for Nutrition Surveys (19).

Professional development of individuals

My first exposure to the ICNND occurred in 1959 while studying at the IHN at Columbia University. Dr. Sebrell, at the request of C. G. King, Ph.D., Columbia University, established the IHN in 1957 as a graduate program with an interdisciplinary, international emphasis, one of the pioneer programs of its kind in the United States. Dr. Sebrell had considerable experience in conducting surveys abroad after World War II while he was with the U.S. Public Health Service. He was an early adviser to Dr. Berry, because the ICNND Committee was established at the time he was director of NIH, and he continued to be a consultant for most of the time the committee existed and surveys were in progress (20). It is not surprising then that the ICNND manual, slide set, and reports were textbook material in the curriculum of the IHN. Nor is it surprising that as students we were exposed to frequent lectures from leaders of the surveys, such as Dr. Schaeffer; William Darby, M.D., Vanderbilt University School of Medicine; Grace Goldsmith, M.D., Tulane University School of Medicine; William Pearson, Ph.D., Vanderbilt University; Edwin Bridgeforth, Vanderbilt University; Calvin Woodruff, M.D., director Nutrition Laboratory, American University Beirut; Dr. Scrimshaw; and others who frequently visited to consult with Dr. Sebrell as they passed through New York. I was fortunate in 1961 to do doctoral study field work in Jerusalem, Jordan, at the Augusta Victoria Hospital Pediatric Ward directed by Amin Majaj, M.D., who 1 year later joined Dr. Darby and W. J. McGanity, M.D., Texas Medical Center, in the Jordanian ICNND survey. My biological specimens were processed in the laboratory at the American University in Beirut directed by Dr. Woodruff 1 year after the Lebanese ICNND survey. The enthusiasm and the dedication of these visitors and associates to IHN provided inspiration and insight to U.S. students hopeful of a career in international nutrition and foreign students seeking to broaden their understanding of the complexity of nutritional problems and solutions appropriate for their countries. My own career of over 40 years in international nutrition is associated with the encouraging and stimulating academic atmosphere where international nutrition concerns were stressed. Undoubtedly, I am only one example of many whose early professional development bears a defining moment and lasting impact attributable to the ICNND and its leaders who served as our role models and mentors.

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LITERATURE CITED


15. INCAP-ICNND Food Composition Table for Use in Latin America, June 1961, pp. 143. Institute Nutrition for Central America, and Panama, Guatemala.


