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TRAINING OF PERSONNEL FOR PUBLIC HEALTH RESEARCH

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## TRAINING OF PERSONNEL FOR PUBLIC HEALTH RESEARCH\*

In 1975 a program of training in public health research was launched, leading to the award of the so-called Master of Science (Public Health). The purpose of this report is to furnish a brief description of the nature of this approach to public health research, the rationale for this training program, the objectives of the program, its organization and its achievements. It is believed that both the positive and negative aspects of this experiment may be useful in the planning of similar programs.

1. Background. The major factor in the origin of the program was the emergence in 1974 of a new interdisciplinary research group for the study of public health problems in the Department of Scientific Research of the Mexican Institute of Social Security (IMSS). This group realized the need to train personnel to conduct research programs in this field in the Institute itself and in other health sector institutions. Its emergence coincided with the establishment of a new Autonomous University for the Metropolitan area (UAM), specifically concerned with the training of university personnel at the graduate level interested in the analysis and solution of health problems. Both these institutional approaches coalesced in an agreement signed by the Director General of IMSS and the Rector of UAM in 1975, which led to the introduction of a Master of Science Program with special emphasis on Public Health. To the conduct of this program IMSS would contribute fellowships, laboratories, computer facilities and access to the social security system for the purposes of teaching and research. For its part UAM would provide the academic infrastructure through its regular academic staff or through the engagement of outside academic personnel as guest lecturers. In addition to these resources, a certain number of special academic personnel furnished by the Pan American Health Organization would also participate in the program.

On this basis the program was launched on 22 September 1975 for a projected period of two years.

2. Approach to Public Health Research. This approach was based on three primary assumptions.

2.1 Public health research was understood to mean those activities that, based on the application of scientific method, have as their objective the identification of the determining factors in health and sickness in specific human population groups in given historic and socio-economic contexts.

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2.2 Public health research is fundamentally pragmatic and must therefore seek to identify real problems that warrant priority consideration and preventive action, and must also be capable of correlating the results of research with action at the regulatory and operational levels.

2.3 Public health research requires an interdisciplinary approach and the adoption of modern techniques for the systematization, transfer, processing and analysis of data relating to the health of population groups.

3. Objectives of the Program. In the light of the above assumptions the personnel to be trained should have acquired, on the completion of the program, the following characteristics:

3.1 They should have acquired an interest in finding practical answers to the specific health problems of human population groups;

3.2 They should have developed an ability to analyze health problems;

3.3 They should be capable of developing theoretical approaches containing likely answers to the problems identified;

3.4 They should be able to implement operational systems that provide answers to the questions raised;

3.5 They should also be able to analyze the extent to which it is possible to integrate the results of their research with other operational systems in the health sector in the light of the political, social and administrative characteristics of such systems.

4. General Characteristics of the Educational Program. The program comprised a total of 228 credits. Two academic credits corresponded to one hour/week/month of academic studies; one practical credit was equivalent to one hour/week/month of practical work. Individual studies were concentrated on the three areas described in the annexed table and having the following general characteristics:

4.1 Theoretical analysis. The aim here was to provide the student with a theoretical frame of reference in the public health sector, including the social and demographic determining factors in health and illness, scientific method and ecology, the latter giving cohesion to these diverse areas of study. It comprised a total of 63 credits and the courses were held during the first four terms.

4.2 Technical analysis. This group of studies was conducted in parallel with the preceding group and its aim was to provide the student

with a methodological foundation for the analysis of data as a whole with special reference to health problems. It represented a total of 111 credits in the form of courses continuing throughout the six terms required to obtain the Master's degree.

4.3 Practical administration. These studies accounted for 54 credits and were held during the fifth and sixth terms of the program. Their purpose was to inform the student on the present situation in selected fields of public health, as well as impart the elements of health planning and some knowledge of systems of health information and epidemiological surveillance. Studies in this group included a seminar for discussion of graduate thesis programs.

A summary of the content of these courses is given in Annex 1.

5. Selection of Candidates. Students were required to devote their full time to the course. Applications were accepted from graduates with first degrees in medicine, biology, chemistry, social studies and the mathematical and computer fields, not more than 35 years old and fluent in English. In addition to these basic requirements interviews were held by a selection committee and aptitude tests were used. Preference was given to candidates proposed and supported by an institution and with some background in research.

6. Organization of the Program. Responsibility for the program fell on a coordinator, who was assisted by the regular academic staff and by research personnel from the Public Health Research Department. Together they defined the scope and content of each course. Towards the end of the first year there was increasing student participation in this function as well as in the design of the mechanics of the courses. In fact, all courses in practical administration, as well as mathematical and system models, were discussed and planned jointly by the guest professor and his students. In each course a student was made responsible for coordination between the teacher and the student group. Each professor was made responsible for course evaluation and, in most cases, the academic personnel discussed and made their evaluations in association with their students.

#### 7. Evaluation of Program

7.1 Twenty students initiated the program, of whom 15 passed all the courses. Of the latter, 10 are physicians, 2 chemists, 1 a biologist, 1 an actuary and 1 a mathematician.

7.2 From the standpoint of the curriculum, the total number of credits laid down for programs for Master's degrees by the National Association of Universities and Institutions of Higher Education (a total of 120 to 200 credits) is considered to have been exceeded.

7.3 Of the total number of credits awarded 87% were for academic studies and only 13% for practical studies. The program is considered to have laid heavy emphasis on academic instruction of the traditional pattern and to have been proportionately weak in its practical content. Assuming each of the courses achieved its specific objective, 28% of these contributed to the development of skills in theoretical analysis, 49% to skills in technical analysis and only 23% to skills bearing directly on the understanding and analysis of specific health problems. The main emphasis was therefore on the acquisition of knowledge and techniques in the processing and statistical analysis of data.

7.4 It might well have been expected that the subjects covered in theoretical analysis would have enabled students to develop their ability to construct conceptual frameworks as possible answers to problems. The main emphasis, however, in these courses was on a critique of currents and techniques of social research and on the acquisition of a general understanding of scientific methodology. The contribution of such unifying disciplines as human ecology was therefore proportionately weak.

7.5 The mere serialization of subject matter in the fields of theoretical and technical analysis did not necessarily ensure an integrated approach.

7.6 In the field of practical administration the students were given general information on selected fields of public health. They were, however, provided with no specific opportunities to make any very serious use of conceptual, methodological and technological tools for the solution of specific problems in a realistic operational context.

7.7 No opportunities were provided that would have enabled students to prepare their theses in the context of the public health research group. As a result they had to move to other institutions where they performed the following functions:

-- Applied research and health planning	6
-- Practical functions in the health sector	3
-- Repetition of the functions they had previously performed in the health sector (practical level)	3
-- Planning and supervision of undergraduate medical education	1
-- Change to other activity outside the health sector	1
-- Study of another profession	1

It can therefore be said that, in face of uncertainties in labor market policy, six of the fifteen graduates are likely, within eight months of the completion of the program, to be able to find employment in public health research and planning. The true value of the program will emerge to the extent that the scientific contributions of its graduates become apparent and indicate that they possess the qualities needed to formulate realistic solutions with a preventive emphasis.

7.8 The experiment of cooperation between university and health sector institution was satisfactory, among other reasons, because it provided for the complementary deployment of human and material resources. As a result, graduates from the program were better able to adapt to external realities, the research problems selected bore more closely on the priority problems of the health sector and the practical units of the program, in both conceptual and methodological terms, laid increasing emphasis on preventive and interdisciplinary action.

MASTER OF SCIENCE (PUBLIC HEALTH)

LIST OF CREDITS BY TERM, AREA, SUBJECT AND TYPE

TERM	THEORETICAL ANALYSIS	CREDITS		TECHNICAL ANALYSIS	CREDITS		PRACTICAL ADMINISTRATION	CREDITS	
		A	P		A	P		A	P
1	Sociology I Public Health Theory	8		Statistics I	12				
		4		Systems	12				
2	Sociology II Scientific Methodology	8		Statistics II	12				
		4							
3	Sociology III Scientific Methodology	8	3	Statistics III	12				
		4		Data Processing	8	2			
4	Scientific Methodology Ecology Demography	4		Statistics IV	12	4			
		12		Techniques of Social Research					
		8			8				
5 & 6				Epidemiological Methods	10	5	Gastroenteritis	4	4
				Models	2		Nutrition	4	4
				Systems and Public Health	8	4	Mental Health	4	2
							Malaria	2	
							Epidemiological Surveillance	6	2
							Tuberculosis	4	2
							Health Planning	2	
							Zoonoses	4	4
							Information Systems	8	4
							Seminar on Thesis	6	6
TOTAL		60	3		96	15		38	16

GRAND TOTAL = 228 CREDITS

ANNEX 1

SUMMARY OF CONTENT OF COURSES

1. THEORETICAL ANALYSIS

1.1 Sociology I. Academic credits = 8

- "Objective" conceptions of social relations
- "Subjective" conceptions of social relations
- Synthetic conceptions of social relations
- Dialectical conceptions of social relations

1.2 Public health theory. Academic credits = 4

- Philosophy of public health
- Population dynamics and health
- Ecology and health
- Status of public health in Mexico
- Planning of public health
- Public health research

1.3 Sociology II. Academic credits = 8

- Alienation
- Religion
- Status and social stratification.

1.4 Scientific Methodology I. Academic credits = 4

Seminar on the Philosophy of Science

- Concept of the hypothesis
- Concept of the model
- Concept of law
- Concept of theory

1.5 Sociology III. Academic credits = 8; Practical credits = 3

- Sociological perspectives on social problems: social pathology, social disorganization; conflicts of values; deviate conduct.
- Practical field study: Identification and presentation of a sociological problem.

1.6 Scientific methodology II. Academic credits = 4

- Introduction to the ontological and epistemological treatment of the structure of designs in research.



1.7 Scientific Methodology III. Academic credits = 4

- Identification and treatment of points of reference in different research designs.

1.8 Ecology. Academic credits = 12

- Principles and basic concepts of ecology: ecosystem; energy and productivity; ecological organization.
- Application of ecological concepts: "holistic" approach; study of ecological impact; applications.
- Human ecology and health: population, environment and human interactions.

1.9 Demography. Academic credits = 8

- Introduction to population study
- Demographic history in Latin America
- Elementary concepts of demographic analysis
- Mortality
- Fertility
- Migration
- Human resources
- Main currents of demographic thought
- Population policies

2. TECHNICAL ANALYSIS

2.1 Statistics I. Academic credits = 12

- Series
- Area of probability
- Aleatory variables
- Descriptive statistics
- Estimates

2.2 Systems. Academic credits = 12

- History and philosophy of systems
- Basic concepts
- Formulation of the problem
- Models
- Verification of models; introduction and control of solutions.

2.3 Statistics II. Academic credits = 12

- Statistical hypothesis
- Hypothetical proofs
- Variance analysis
- Non-parametric methods

2.4 Data Processing. Academic credits = 8; practical credits = 2

- Historical background
- Anatomy of a modern computer system
- Concept of algorism
- Introduction to Fortran IV

2.5 Statistics III. Academic credits = 12

- Regression model
- Various types of regression
- Correlation

2.6 Statistics IV. Academic credits = 12; practical credits = 4

- Experiments and experimental design
- Sampling
- Survey techniques
- Practical handling of statistical packages in a computer

2.7 Techniques of social research. Academic credits = 8

- Sociological surveys: design, analysis and interpretation
- Participating observation
- Other sociological research techniques

2.8 Epidemiological Method. Academic credits = 10; practical credits = 5

- Introduction to epidemiology
- Descriptive epidemiology
- Analytical epidemiology: analysis of retrospective studies; analysis of prospective studies; experiments; cost-benefit analysis. Simulation exercises.

2.9 Models. Academic credits = 2

- Concept of the model
- Iconic models
- Deterministic models
- Probabilistic models

2.10 Systems and Public Health. Academic credits = 8; practical credits = 4

- Critical path method in the administration of health projects: planning, programming, identification of critical activities, Gantt charts, applications, probabilistic approach.

### 3. PRACTICAL ADMINISTRATION

#### 3.1 Gastroenteritis. Academic credits = 4; practical credits = 4

- Clinical, bacteriological and anatomicopathological aspects of acute forms of infectious gastroenteritis
- Epidemiology of enteric diseases
- Shigellosis
- Salmonellosis
- Infections with Escherichia
- Surveillance

#### 3.2 Nutrition. Academic credits = 4

- Cellular composition and metabolism
- Obtaining, digesting and absorbing nutriment
- Restrictive nutriment
- Nutritional balance
- Recommended forms of nutrition
- Growth and development
- The nutritional process in the pregnant woman and its relationship to fetal nutrition
- Breast feeding and its impact on fertility
- The nutritional process at the level of the child

#### 3.3 Mental Health. Academic credits = 4; practical credits = 2

- Introduction: operational definitions
- Primary, secondary and tertiary prevention in psychiatry
- Drug addiction; alcoholism
- Prostitution
- Psychoses
- Neuroses
- The public and private structure of the mental health movement in Mexico

#### 3.4 Malaria. Academic credits = 2

- Epidemiology: plasmodes; anophelines; the human population; the ecology of malaria.
- Methods of combating malaria in relation to the vectors, the parasite and human population groups.

#### 3.5 Epidemiological surveillance. Academic credits = 6 Practical credits = 2

- Concept of epidemiological surveillance
- Research into the evaluation of systems of epidemiological surveillance in the health sector: IMSS, ISSSTE, SSA.