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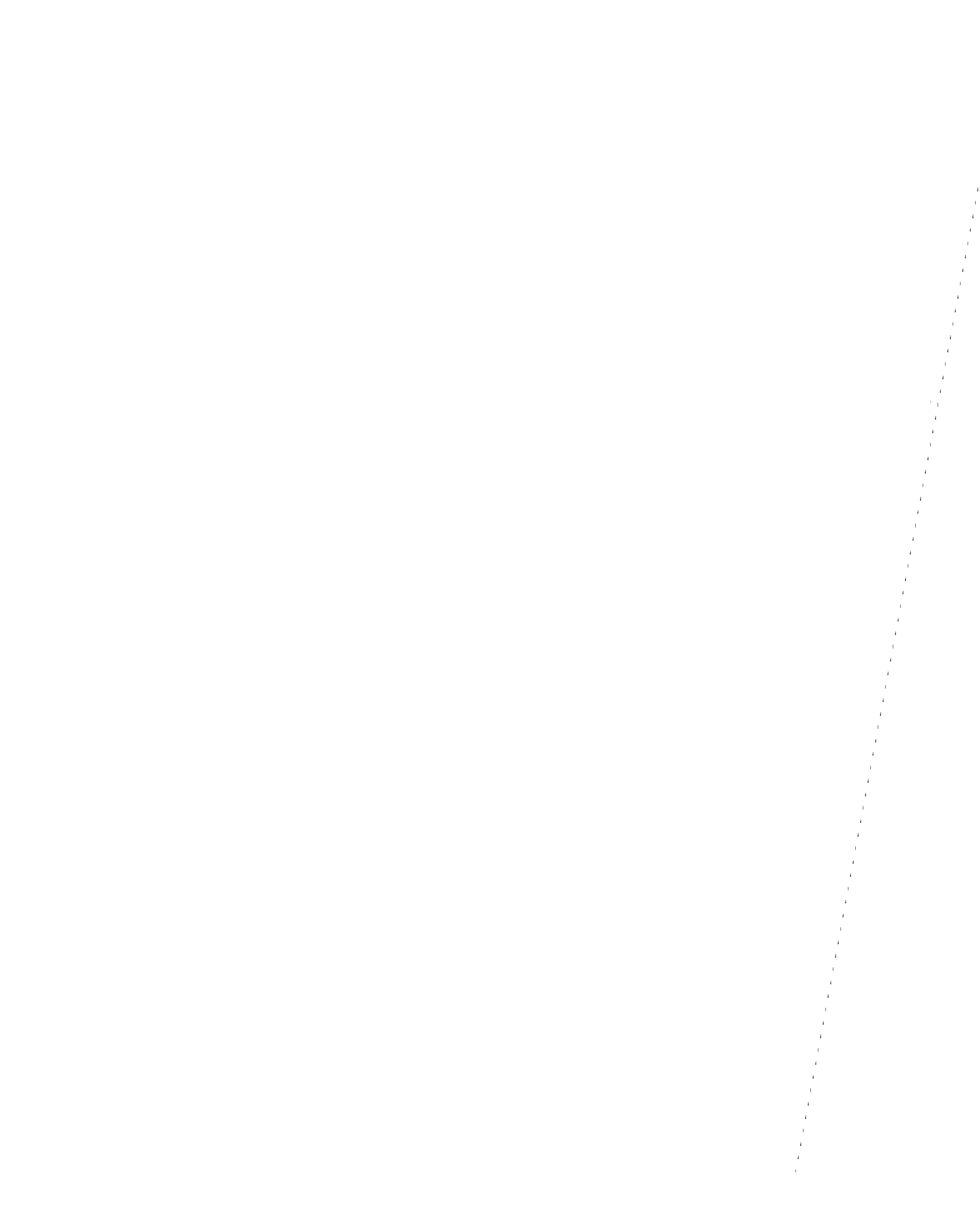


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Abstract

The occupational health MS Program at the University of Puerto Rico is geared to train industrial hygienists for the growing need of these professionals, particularly on the Island. Students are required to complete a 2-year curriculum comprising of an industrial hygiene core, supplemented by public health and environmental health courses. Four students with traineeship support completed the requirements for degrees during this project period, and seven others were working toward completing the thesis requirement. Important program objectives such as approval of the new industrial hygiene program and funds to recruit a full-time faculty member were achieved during this period. Another important area of progress within the program was a grant provided by the University of Puerto Rico to purchase laboratory equipment for the IH laboratory course. NIOSH training grant support for student traineeships, laboratory equipment, literature resources and faculty travel to AIHCE has had a significant impact in the quality of training of the program at the University of Puerto Rico.

Significant Findings (Summary)

Major accomplishments of the program during the time covered by this reporting period include:

1. The new industrial hygiene program was approved in May 1994. However, implementation of the program has been delayed pending recruitment of a new industrial hygiene faculty member. During this reporting period the Chancellor of the Medical Sciences Campus committed hard money for the recruitment of a full-time industrial hygiene faculty member. At the time of this report, the program is in the process of appointing this person. In addition, during this period the Department of Environmental Health recruited two new faculty members, one of which will be involved in the industrial/environmental toxicology area. The new program was implemented in August 1996.
2. Substantial progress has been made during this period in the area of laboratory equipment for instruction in the IH laboratory course (SAAM 6548). Additional equipment was purchased with a \$30,000 grant provided by the University. It was possible with this new equipment to add a laboratory experience (sampling and analysis of asbestos) and significantly improve others (sampling and analysis of dust, noise measurements).

Body of report with conclusions

Purpose and Program Characteristics

During the last decades many industries have established operation in Puerto Rico. These include among others, pharmaceutical, electronic, and refinery plants. Puerto Rico has one of the highest (if not the highest) density of pharmaceutical plants per land in the world. The 850,000 workforce is distributed through 40,000 workplaces. The Department of Labor (BLS) estimates that one out of every eleven Puerto Rican workers will suffer an injury or illness every year. This represents approximately 70,000 new cases every year. The need for training and research in industrial hygiene and other occupational health and safety areas is demonstrated by this high injury and illness incidence rate among Puerto Rican workers. The IH Program at University of Puerto Rico is the only industrial hygiene training program on the Island.

Training Objectives and Goals

The industrial hygiene program at the University of Puerto Rico is geared to train industrial hygienists to supply the demand for this professional, particularly in Puerto Rico. It is expected that this professional will contribute to mitigate the high incidence rate of occupational injuries and illnesses among the Puerto Rican people and other areas of the United States.

Key objectives and goals for the program during this period focused on the following:

1. To initiate the transition of the Program from a concentration in occupational health in the Department of Environmental Health to a full, degree-granting Industrial Hygiene Program as recently approved by the University Board of Trustees. The new program incorporates new areas of knowledge and actualize existent ones. The most important aspects of this revision are: (a) change to a new degree of Master of Science in Industrial Hygiene instead of Master of Sciences in Environmental Health with Concentration in Occupational Health in the present program; (b) removal of environmental health courses not relevant to industrial hygiene (e.g., parasitology, food hygiene) and the addition of new courses in industrial hygiene; and (c) the substitution of the master thesis by an internship in industry.
2. To add at least one full-time faculty member to the new IH program.
3. To improve laboratory and library resources to provide trainees with adequate methodological skills for industrial hygiene practice.
4. To recruit sufficient number of students of the highest quality and provide trainees with an adequate financial support.

Program Accomplishment and Progress

The improvements included in the discussion below respond to recommendations made by NIOSH over the past few years.

Curriculum. During this period the graduate training program evolved from an area of concentration in environmental health to MS in industrial hygiene. The new program was approved by the University Board of Trustees in May 1994. The primary objective of the program during this period was to initiate the new program during the 1995-96 academic year. However, the University authorities did not approve the related request of funding to recruit a new full-time faculty member for the program. The Board returned this request to the Medical Sciences Campus, where the program is based. Recruitment of this faculty member is necessary to fulfill the new program purpose and goals. It was not until July 1996 when the Chancellor approved funds for this purpose. It is expected that this person will be appointed during the next few months. The first group of students was admitted to the program in August 1996.

The new program is described below:

The training program is a graduate program and the trainees will be granted the degree of Master of Science in Industrial Hygiene. The MS curriculum contains nineteen (19) credit-hours in public health; ten (10) credit-hours in environmental health, twenty-nine (29) credit-hours in

industrial hygiene courses and related areas, and ten (10) credit-hours in electives courses. The training program has a duration of two academic years. Training is conducted by means of lectures, seminars, laboratory practices and field practices.

The following table presents the program curriculum:

COURSE		Trimester hours
PUBLIC HEALTH COURSES		
MEDU 6500	Core Course in Public Health	6
BIOE 6525	Statistical Analysis	5
EPID 6523	Methods in Epidemiology	4
SALP 6584	Administrative Aspects of Environmental Health Programs	4
ENVIRONMENTAL HEALTH COURSES		
SAAM 6528	Principles in Environmental Health	3
SAAM 6535	Environmental Toxicology	4
SAAM 6541	Environmental Health Law	3
INDUSTRIAL HYGIENE COURSES		
SAAM 6524	Principles in Occupational Health	3
SAAM 6543	Industrial Hygiene	4
SAAM 6548	Industrial Hygiene Laboratory	4
SAAM 6565	Occupational Health Hazards Control	3
SAAM 6529	Seminar in Environmental Health	1
SAAM 6547	Principles in Occupational Safety	4
EPID 6547	Occupational Epidemiology	2
SAAM ____	Industrial Hygiene Internship	6
SAAM ____	In-Plants Studies	2
ELECTIVES		10
TOTAL		68

Trainees. During the time period covered by this report, four students supported by NIOSH traineeships completed the IH program. Their name and current employer are as follow: Michelle Lugo/ Abbott Laboratories; Brudel Sepulveda/ Lederle Pharmaceuticals, Inc.; Ivonne Bayron/ University of Puerto Rico; Yaritsa Perdomo/ Squibb Manufacturing Inc. Twenty-three students were enrolled full-time during this period. Seven of which were working in their research project and did not finish during this period. The vast majority of these students have received NIOSH support at some moment during their training program.

Faculty. Program faculty has remained about the same throughout this period. This has been one of the major difficulties faced by the program. During this period the University made the commitment of providing hard money for the program to recruit a new industrial hygiene faculty member. At the time of this report the program is in the process of appointing this person. Two more faculty members were recruited during this period for the Department of Environmental Health, one of which will be involved in the industrial/environmental toxicology area. Outside lectures continue to have an important role in teaching specific IH topics (e.g., ergonomics, safety and OH management). In addition, other faculty members from the Department of Environmental Health and from other departments of the School of Public Health contribute to the Program through teaching courses, supervising research projects and advising students.

The program faculty and adjunct faculty are as follow:

Jesus Gonzalez, Ph.D., director of the Industrial Hygiene Academic Program and director of the NIOSH Training Grant Project, is an industrial hygienist (Ph.D.) with background in analytical chemistry (B.S.) and environmental health (M.S.). He provides leadership and supervision to the overall program activities. His research interest includes air sampling and analysis of the workplace, and health effects of environmental and occupational hazards. He joined the program in 1985 after he graduated from the University of Michigan. He is responsible for the Environmental Toxicology (SAAM 6535) and Industrial Hygiene (SAAM 6543) courses. He also has co-responsibility for the Laboratory (SAAM 6548) and the Control of Occupational Health Hazards (SAAM 6565) courses. He plays an active role in almost all student research projects.

Porfirio A. Toledo, M.S. is an industrial hygienist with background in health physics (M.S.), noise and industrial ventilation. His research interest is in the area of physical hazards. He joined the program 1979. His major responsibility is the ventilation area in the Control of Occupational Health Hazards courses (SAAM 6565).

Carlos Villafañá, MD., is a board certified occupational physician that contributes 50% of his time to the program. Previous to joining the program he was at SKB Pharmaceuticals in Puerto Rico. His major research interest is in the area of health effects of occupational hazards. He is responsible for the Basic Principles of Occupational Health (SAAM 6524) course. He also advises students on their research projects, particularly those related to the health effect of occupational health hazards, and provides leadership in the area of occupational health for other School programs. Dr. Villafañá plays a critical role in the continuing education effort of training in occupational health for physicians and nurses.

Norka Saldaña, Ph.D. is an ergonomics Engineer with background in industrial engineering. She is an adjunct instructor for the ergonomics area in the Industrial Hygiene (SAAM 6543) and Control of Occupational Health Hazards (SAAM 6565) courses. At present she directs the Ergonomics Program at ETHICON (a Division of Johnson and Johnson Professional Co. in Puerto Rico).

Aileen Ocasio, Ph.D. is an industrial hygienist with background in chemistry. She is the second adjunct faculty; she lectures in the Industrial Hygiene (SAAM 6543) course. Currently, Dr. Ocasio is Manager for Health, Safety and Environmental Affairs for Eli Lilly Industries in Puerto Rico.

Cesar Noble, B.S. Engineering, is a consultant of industrial hygiene, teaches the Safety Course (SAAM 6547) and lectures on IH management in the Industrial Hygiene course (SAAM 6543).

Laboratory Equipment. Significant progress has been made on this area. During this time period, Dr. Gonzalez requested and was awarded a \$30,000 grant from the University for the purchase of new equipment for the lab course SAAM 6548. With these funds, the program purchased several pieces of equipment that include: four phase contrast microscopes for asbestos analysis; one octave band analyzer/sound level meter; four noise dosimeters; three low/high flow sampling pumps; two electronic air flow calibrators; a multi-gas Analyzer; a heat stress monitor; and one thermoanemometer. In addition sampling equipment such as filter cassettes, cyclones and impingers were added with this grant funds. These were all pieces of equipment recommended by the NIOSH site-visit team in January 1994. The acquisition of these equipments has had an important impact on the IH laboratory course. A new laboratory experience for asbestos sampling and analysis was added, and other lab experiences were significantly improved because of this grant.

The NIOSH training grant made possible financial support to a significant number of trainees. In addition to direct support to a large group of students, other important aspects of the training program were improved with NIOSH grant funds: (1) literature resources were enhanced during this period; (2) it was feasible for one member of the faculty to attend annually to AIHC during this period; (3) NIOSH support during this period made possible an appropriate participation of key adjunct faculty.

Publications

No publication resulted from the project.