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Smoking and Cancer

"The Health Consequences of Smoking: Cancer, a Report of the Surgeon General,"¹ which constitutes the Department of Health and Human Services' (DHHS) 1982 report to the U.S. Congress, has been published by the Office on Smoking and Health. The Report consists of a preface by the Surgeon General, a foreword by the Assistant Secretary for Health of DHHS, and the following five parts: I: Introduction and Conclusions; II: Biomedical Evidence for Determining Causality; III: Mechanisms of Carcinogenesis; IV: Involuntary Smoking and Lung Cancer; and V: Cessation of Smoking.

The content of the Report is the work of scientists

within DHHS, as well as scientific experts outside the organization. Individual manuscripts were reviewed by experts within the Public Health Service and other institutions. The entire Report was reviewed by a panel of 12 distinguished scientists, many of whom are, or have been, directly involved in research on the effects of smoking on health.

Thousands of scientific investigations have provided additional evidence concerning the relationship of cigarette smoking to lung cancers. Smoking has been implicated as a cause of cancer of the larynx, oral cavity, and esophagus, and has been associated with cancer of the urinary bladder, kidney, and pancreas. This is the first report devoted exclusively to a comprehensive assessment of the associations reported between smoking and various cancers. The following review appraises the nature of these associations and presents an historical perspective of research in the field.

¹Copies of the report can be obtained by writing to: Office on Smoking and Health, Park Building, Room J-58, 5600 Fishers Lane, Rockville, Md. 20857.

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Overall Cancer Mortality

1. Cigarette smokers have overall mortality rates substantially greater than those of nonsmokers. Overall cancer death rates of male smokers are approximately double those of nonsmokers; overall cancer death rates of female smokers are approximately 30 per cent higher than nonsmokers, and are increasing.

2. Overall cancer mortality rates among smokers are dose-related as measured by the number of cigarettes smoked per day. Heavy smokers (over one pack per day) have more than three times the overall cancer death rate of nonsmokers.

3. As the duration of smoking cessation increases, the overall cancer death rate declines, approaching that of nonsmokers.

Site-Specific Cancer Mortality

Lung Cancer

1. Cigarette smoking is the major cause of lung cancer in the United States.

2. Lung cancer mortality rises with the increased dosage of exposure to smoke (as measured by the number of cigarettes smoked daily, duration of smoking, and inhalation patterns), and is inversely related to age of initiation. Smokers who consume two or more packs of cigarettes daily have lung cancer mortality rates 15 to 25 times greater than nonsmokers.

3. Cigar and pipe smoking are also causal factors for lung cancer. However, most lung cancer mortality in the United States is due to cigarette smoking.

4. Cessation of smoking reduces the risk of lung cancer mortality compared to that of the continuing smoker. Former smokers who have quit 15 or more years have lung cancer mortality rates only twice as great as nonsmokers. The residual risk of developing lung cancer is directly proportional to overall life-time exposure to cigarette smoke.

5. Filtered, lower tar cigarette smokers have a lower lung cancer risk compared to nonfiltered, higher tar cigarette smokers. However, the risk for these smokers is still substantially elevated above the risk of nonsmokers.

6. Since the early 1950s, lung cancer has been the leading cause of cancer death among males in the United States. Among females, the lung cancer death rate is accelerating and will likely surpass that of breast cancer in the 1980s.

7. The economic impact of lung cancer to the United States is considerable. It is estimated that in 1975 lung cancer cost US\$3.8 billion in lost earnings, US\$379.5 million in short-term hospital costs, and US\$78 million in physicians' fees.

8. Lung cancer is largely a preventable disease. It is estimated that 85 per cent of lung cancer deaths could have been avoided if individuals never took up smoking. Furthermore, substantial reductions in the number of deaths from lung cancer could be achieved if a major portion of the smoking population (particularly young persons) could be persuaded not to smoke.

Laryngeal, Oral, and Esophageal Cancer

9. Cigarette smoking is the major cause of cancer of the larynx, oral cavity, and esophagus in the United States. Cigar and pipe smokers experience a risk similar to that of a cigarette smoker.

10. The risk of developing laryngeal, oral, and esophageal cancer rises with increased exposure (as measured by the number of cigarettes smoked daily), and is diminished by discontinuing the habit. The longer a former smoker is off cigarettes the lower the risk. Heavy smokers have laryngeal cancer mortality risks 10 to 30 times greater than nonsmokers.

11. Smokers who use filtered, lower tar cigarettes have a lower laryngeal cancer risk than those who use unfiltered, higher tar cigarettes.

12. The use of alcohol in combination with cigarette smoking appears to act synergistically to greatly increase the risk for cancer of the larynx, oral cavity, and esophagus.

13. The habit of chewing tobacco over an extended period of time appears to be a factor in the development of cancers of the oral cavity, particularly cancers of the cheek and gum.

Other Sites

14. Cigarette smoking has been identified as a contributory factor in the development of cancer of the bladder, kidney, and pancreas in the United States. The term "contributory factor" by no means excludes the possibility that smoking plays a causal role in cancers of these sites.

15. Epidemiological studies have noted an association between cigarette smoking and stomach cancer.

16. Further research is needed to define conflicting results in studies published to date on the existence of a relationship between smoking and cervical cancer.

Cessation of Smoking

1. A total of 95 per cent of those who have quit smoking have done so without the aid of an organized smoking cessation program; most current smokers indicate a preference for quitting with a procedure they may use on their own, and a disinclination to enter an organized, comprehensive program.

2. Brief and simple advice to quit smoking delivered by a physician has substantial potential for producing cessation in a cost-effective manner.

3. Probability of quitting decreases linearly with duration of the smoking practice, changing from 64.5 per cent in the first year to 14.3 per cent after seven years.

4. Quitting "cold turkey" appears to be a more effective cessation strategy than cutting down without trying to stop entirely.

5. Success at quitting increases with the number of efforts made: about 73.4 per cent of adolescents who kept trying eventually succeeded.

Historical Perspective

Tobacco use was associated with the possible development of cancer as early as 1761. According to one medical historian, Dr. John Hill (1716-1775) should be credited with the first report documenting an association between tobacco use and cancer. In this work Hill reported on two case histories and observed that "snuff is able to produce... swellings and excrescences" in the nose, and he believed these to be cancerous. Others credit Soemmering in 1795 for noting a relationship between cancer of the lip and tobacco use.

It was not until the 1920s and 1930s that investigators began to examine scientifically the possible association of smoking and cancer. In 1928, Lombard and Doering in the United States found an association between heavy smoking and cancer in general. Muller and Schairer (Germany) in 1939 and 1944 respectively, Porter (USA) in 1945, and others, noted higher percentages of smokers

among lung cancer patients than among controls. The first major developments in the modern history of investigation of the effects of smoking on health occurred in 1950 with the publication of four retrospective studies on smoking habits of lung cancer patients and controls in the United States by Schrek et al., Mills and Porter, Levin et al., and Wynder and Graham. Each noted a consistent, and significant association between smoking and lung cancer. Other investigators proceeded to further examine the relationship by initiating prospective studies in which large numbers of healthy persons were followed over time and their subsequent mortality noted (Table 1).

The first major prospective study encompassing total and cause-specific mortality was initiated in October 1951 by Doll and Hill in the United Kingdom among 40,000 British physicians. Hammond and Horn followed 188,000 males beginning in January 1952 in the United States. These and subsequent prospective studies conducted in the United States, Sweden, Canada, and Japan, found not only that smokers have substantially elevated cancer mortality rates, but also that smokers experience significantly elevated overall death rates.

A relationship between smoking and lung cancer was first suggested in scientific reports from the 1920s and early 1930s. Muller in 1935 and Schairer and Schoeniger in 1943 reported that most lung cancer patients were smokers. Subsequently, eight major prospective studies and more than 50 retrospective studies have examined this relationship. In 1964 the Advisory Committee to the Surgeon General of the U.S. Public Health Service published a comprehensive review of the then available data, concluding that:

Table 1. Summary of eight major prospective studies.

Authors	Doll, Hill, Peto, Pike	Hammond	Dorn, Kahn, Rogot	Hirayama	Best, Josie, Walker	Hammond, Horn	Weir, Dunn, Linden, Breslow	Cederlof, Friberg, Hrubec, Lorich
Subjects	British doctors	Males and females in 25 States	U.S. veterans	Total population of 29 health districts in Japan	Canadian pensioners	White males in nine States	California males in various occupations	Probability sample of the Swedish population
Population size	40,000	1,000,000	290,000	265,000	92,000	187,000	68,000	55,000
Females	6,000	562,671	< 1%	142,857	14,000			27,700
Age range	20-85	35-84	35-84	40 and up	30-90	50-69	33-64	18-69
Year of enrollment	1951	1960	1954 1957	1966	1955	1952	1954	1963
Years of follow-up reported	20-22 years	12 years	16 years	13 years	6 years	4 years	5-8 years	10 years
Number of deaths	11,166	150,000	107,500	39,100	11,000	12,000	4,700	4,500
Person years of experience	800,000	8,000,000	3,500,000	3,000,000	500,000	670,000	480,000	550,000

“...cigarette smoking is causally related to lung cancer in men; the magnitude of the effect of cigarette smoking far outweighs all other factors. Data for women, though less extensive, point in the same direction. The risk of developing lung cancer increases with the duration of smoking and the number of cigarettes smoked per day and is diminished by discontinuing smoking.”

Cancer has been the second ranking cause of death in the United States since 1937. Provisional vital statistics data for 1980 indicate that cancer accounted for almost 21 per cent (approximately 42,000) of all deaths in the United States, compared with 17 per cent in 1970 and 14.5 per cent in 1950. Since 1950, the age-adjusted overall cancer death rate has changed little, whereas the

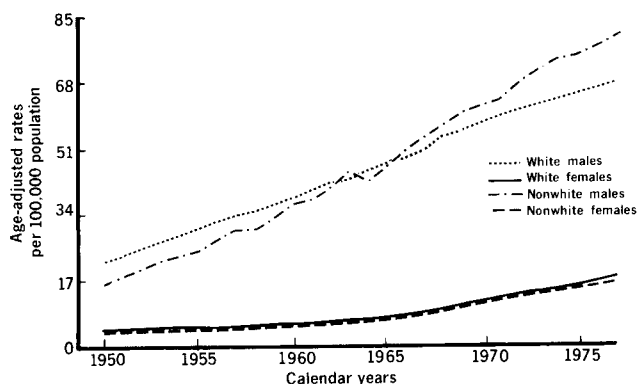
lung cancer death rate has increased dramatically for both males and females (Figure 1).

The male age-adjusted lung cancer death rate increased 192 per cent during the period 1950-1952 through 1976-1978. Female lung cancer death rates increased 263 per cent during the same time. Since the 1950s, lung cancer has been the leading cause of cancer death among males in the United States, and if present trends continue, will become the leading cause of cancer death in females during the 1980s; the age-adjusted female lung cancer death rate is projected to possibly surpass the death rate for breast cancer in 1983. Today, lung cancer deaths represent fully one quarter of all deaths due to cancer in the United States.

In 1962, the year the Surgeon General's Advisory Committee on Smoking and Health began deliberating the evidence presented in its landmark report, slightly more than 41,000 persons died of lung cancer annually, compared to 18,300 lung cancer deaths in 1950. It is estimated that in 1982 there will be 430,000 deaths due to cancer: 233,000 among men and 197,000 among women. The American Cancer Society estimates that 111,000 Americans will die of lung cancer in 1982, nearly a three-fold increase in the number of deaths in a 20-year time span. Various investigators have suggested that 22 to 38 per cent of these deaths can be attributed to smoking, and therefore are potentially “avoidable” if smoking did not exist as a human behavior.

(Source: “The Health Consequences of Smoking: Cancer, a Report of the Surgeon General, 1982.” Office on Smoking and Health, Public Health Service, U.S. Department of Health and Human Services.)

Figure 1. Age-adjusted^a mortality rates for cancer of the bronchus, trachea, and lung, by race and sex, United States of America, 1950-1977.



^a This graph is age-adjusted to the U.S. population as enumerated in 1970; all rates cited within the text of the Report, however, are adjusted to the population as enumerated in 1940.

Source: National Cancer Institute, 1980.

Diseases Subject to the International Health Regulations

Cholera, yellow fever, and plague cases and deaths reported in the Region of the Americas as 31 December 1982.

Country and administrative subdivision	Cholera cases	Yellow fever		Plague Cases
		Cases	Deaths	
BOLIVIA	-	95	35	1
Beni	-	1	-	-
Cochabamba	-	3	-	-
La Paz	-	3	3	1
Santa Cruz	-	88	32	-
BRAZIL*	-	24	24	60
Bahía	-	-	-	9
Ceará	-	-	-	50
Maranhão	-	5	5	-
Mato Grosso	-	2	2	-
Mato Grosso do Sul	-	12	12	-
Pará	-	3	3	-
Pernambuco	-	-	-	1
Roraima	-	2	2	-
COLOMBIA	-	1	1	-
Cundinamarca	-	1	1	-
PERU	-	17	17	4
Cuzco	-	1	1	-
Loreto	-	6	6	-
Piura	-	-	-	4
San Martín	-	9	9	-
Ucayali	-	1	1	-
UNITED STATES	-*	-	-	18
Arizona	-	-	-	4
Colorado	-	-	-	2
New Mexico	-	-	-	9
Oregon	-	-	-	1
Texas	-	-	-	1
Wyoming	-	-	-	1

- None.

*Revised data.

Dengue Outbreak in Boa Vista, Roraima Territory, Brazil

Beginning in early 1982, cases of a febrile illness (some with exanthema) were notified in Boa Vista, the capital of Roraima Territory, and were subsequently confirmed to be dengue.

Roraima Territory is located in the northernmost portion of Brazil. It borders Venezuela and Guyana to the north, the State of Amazonas to the south, Guyana and the state of Pará to the east, and the State of Amazonas

and Venezuela to the west. Its geographic location is important since it shares 958 km of international border with Venezuela and 964 km with Guyana. Boa Vista is located on the banks of Rio Branco and has a population of 71,492 inhabitants: 47,291 in the urban area and 24,201 in the rural area.

The most important findings of studies carried out in Boa Vista by a team of experts from the Instituto Evandro Chagas (IEC) between 19 April and 6 May 1982 are described below. Included is a summary of events preceding this period.

On 15 March 1982 the Pará Institute of Neurology, in Belém, requested the IEC to identify a possible virus agent responsible for the clinical picture presented by a patient from Boa Vista. She had been hospitalized the day before and, for the previous 10 days, had been suffering from muscle pain, nausea, vomiting, dizziness, chills, and headache.

On 21 March another patient, who had arrived from Boa Vista on 14 March, contacted the IEC. During the previous eight days she had the following symptoms: onset with high fever, intense headache, chills, retro-orbital pain, asthenia, and generalized pains. This person reported that, in Boa Vista, dozens of persons had manifested the same clinical symptoms since February.

Results of the serologic tests made on both patients were similar: secondary response to group B arbovirus (flavivirus) and negative for 13 other types of arbovirus used in the same hemagglutination-inhibition (HI) test.

On 25 March the Boa Vista Health Secretariat sent five blood and serum specimens to the IEC for identification of a possible rubella outbreak occurring in Boa Vista. The principal symptoms of the cases were intermittent fever, headache, constant back and head pain, pyrosis and, in some cases, exanthema. In serologic tests, three specimens showed high titers to the group B arbovirus (flavivirus) and two proved negative. In mouse inoculation, one specimen from a person with negative serologic tests, yielded a virus which was identified as a group B arbovirus by HI tests. When the complement fixation test (CF) was made, the virus proved to be different from the flaviviruses known up to that time in Brazil (yellow fever, Bussuquara, Ilheus, St. Louis, Rocio, and Cacipacore). The virus also reacted in HI and CF tests with dengue 1, 2, 3, and 4 immune sera provided by the United States National Institutes of Health. Nevertheless, it was not possible to type the virus. Subsequently, monoclonal antibodies were used in immunofluorescence and HI tests and the agent was identified as dengue-4.

A request was made for a second serum specimen from the patients; three were received, including one from the person from whom the dengue-4 virus had been isolated. Seroconversion for flavivirus was observed both in that specimen and in the other two specimens studied.

On 19 April, a team from the IEC was sent to Boa

Vista. In cooperation with the technical personnel of the Health Secretariat and the Campaigns Department (SUCAM) of the Ministry of Health, studies were conducted up to 5 May. During this time, 7,519 mosquitoes were captured, of which 1,478 (19.65 per cent) were identified as *Aedes aegypti* (Table 1). To isolate the virus, all the material was inoculated in *A. albopictus* cells and in suckling mice. It is of interest to note that *A. aegypti* was captured in the residence of the patient from whose blood specimen dengue-4 had been isolated. By 7 May two isolations of dengue-4 had been made from *A. aegypti* pools.

Concurrently, an active search of recent suspect dengue cases was carried out. Thirty-one cases were selected; their principal clinical manifestations were as follows: intense headache, fever, retro-orbital pain, generalized pains, lack of appetite, anorexia, chills, exanthema, dizziness, epigastric pains, pains in the joints, nausea, vomiting, runny nose, itching and, in one case, petechia. Blood specimens from these patients were also inoculated into *A. albopictus* cell cultures and suckling mice. A total of 12 dengue isolations were obtained: eight of type 1 and four of type 4 (Table 2).

Table 1. Mosquitoes captured in Boa Vista, Roraima Territory, Brazil, 30 April-5 May 1982.

Mosquitoes captured	Male	Female	Total
<i>Aedes (Ochlerotatus) sp.</i>	61	1	62
<i>A. (O.) fulvus</i>	-	1	1
<i>A. (O.) hortator</i>	-	5	5
<i>A. (O.) scapularis</i>	-	133	133
<i>A. (O.) serratus</i>	31	193	224
<i>Aedes (Stegomyia) aegypti</i>	978	500	1,478
<i>Haemagogus (Haemagogus) celeste</i>	-	8	8
<i>Psorophora (Janthinosoma) albipes</i>	1	176	177
<i>P. (J.) ferox</i>	26	32	58
<i>Culex spp.</i>	231	1,367	1,598
<i>Culex (Culex) sp.</i>	1,067	129	1,196
<i>C. (C.) coronator</i>	35	64	99
<i>C. (C.) declarator</i>	-	19	19
<i>C. (C.) pipiens quinquefasciatus</i>	946	1,396	2,342
<i>C. (Melanoconion) sp.</i>	-	69	69
<i>C. (M.) spissipes</i>	-	1	1
<i>C. (M.) taeniopus</i>	-	6	6
<i>Coquillettidia (Rhynchoaenia) sp.</i>	-	1	1
<i>C. (R.) venezuelensis</i>	-	6	6
<i>Mansonia (Mansonia) titillans</i>	-	1	1
<i>Limatus sp.</i>	-	9	9
<i>Trichoprosopon (Trichoprosopon) digitatum</i>	-	1	1
<i>Wyeomyia sp.</i>	-	21	21
<i>Uranotaenia (Uranotaenia) sp.</i>	-	2	2
<i>U. (U.) calosomata</i>	-	2	2
Total	3,376	4,143	7,519

To study the frequency of arbovirus and rubella antibodies, 359 serum specimens were obtained from contacts and convalescents in various districts of the city. High percentages of group B arbovirus (flavivirus) antibodies were found in several districts. The antibody levels for the other types of arbovirus used in the test was not significant (Table 3).

The frequency of rubella antibodies was appreciable, but was not correlated with the serology which suggested recent flavivirus infection. It should be noted that most of the cases had been diagnosed by physicians in Boa Vista as rubella or Oropouche fever. However, only two of the 359 serum specimens examined showed Orovirus antibodies, in low titers (1:40), which, consequently, did not suggest recent activity by that virus.

On the basis of the findings described, it was concluded that dengue flavivirus types 1 and 4 had been active in

Table 2. Distribution of 12 isolations of dengue virus, by age and sex of the patients, Boa Vista, Roraima Territory, Brazil, 1982.

Age	Sex	No. of isolations	Type	Total
0-5	-	-	-	-
5-10	M	2	D-1 and D-4	3
	F	1	D-1	
11-20	M	2	D-1 and D-1	3
	F	1	D-4	
21-30	M	1	D-4	2
	F	1	D-1	
31-40	M	-	-	2
	F	2	D-1 and D-1	
41-50	M	1	D-1	1
	F	-	-	
50+	M	-	-	1
	F	1	D-4	
Total	M	6	8 D-1	12
	F	6	4 D-4	

Table 3. List of 19 arbovirus antigens used in the hemagglutination-inhibition tests.

Serologic group	Type	Prototype
A	EEE	BE AN 7526
	Mucambo	BE AN 10967
	Mayaro	BE AR 20290
	WEE	BE AN 70100
B	Yellow fever	BE H 111
	Yellow fever	17 D (vaccine)
	Ilheus	BE H 7445
	St. Louis	BE AR 23379
	Rocio	SP H 34675
	Cacipacore	BE AN 327600
	Dengue-4	BE H 402276
Dengue-1	N.I.H.	
C	Caraparu	BE AN 3994
Bunyamwera	Guaroa	BE H 22063
	Xingu	BE H 388464
	Iaco	BE AR 314206
Simbu	Oropouche	BE AN 19991
	Utinga	BE AN 84785
Anopheles A	Tacaiuma	BE AN 73

Boa Vista, especially downtown, where large numbers of *A. aegypti* were also found.

(Source: Ministry of Health, Epidemiological Division, Brazil, *Boletim Epidemiológico* 14(9), 1982.)

Editorial Comment

This is the first time in 50 years that dengue has been confirmed in Brazil. The investigation highlights the importance of including in the epidemiological surveillance of dengue and of vector-borne diseases in general, the systematic and coordinated analysis of the distribution and density of the vectors, of the occurrence of suspected cases of the disease, and of the laboratory findings in order to promptly detect outbreaks.

Severe Hepatitis Caused by Delta Virus Infection in Venezuela¹

From September 1979 to June 1981, an epidemic of severe hepatitis occurred among the Yucpa Indians in western Venezuela, which caused 144 cases and 30 deaths. The outbreaks occurred in three communities; the disease is endemic in other villages. The majority of those affected were children and adults over 25. Eleven autopsies were performed; they revealed that the causes of death were: fulminant hepatitis (55 per cent), acute hepatitis with complications (18 per cent), and chronic hepatitis with hepatic insufficiency (27 per cent).

Although serologic tests suggested that hepatitis B virus was the cause of the outbreaks, investigations made in control villages showed that while hepatitis B was highly endemic, it did not have severe manifestations. One year later, 35 persons who had been affected by the disease during the outbreak were examined, and 80 per cent were found positive for some virus B (HBV) marker. Of the persons from the same villages that did not fall ill, 1.5 per cent were hepatitis B surface antigen (HBsAg) positive and 86 per cent were positive for some marker of hepatitis B virus (HBV).

In the control communities, an average of 7 per cent of the persons were positive for HBsAg and 68 per cent for some marker of B virus.

Tests made on serum specimens of the persons involved in the outbreak and in the control villages for Delta virus antibodies (an imperfect virus which replicates only in the presence of HBV) showed the following results: of 26 persons who fell ill during the outbreak, 17 (65 per cent) were positive for Delta virus antibodies, while of 25 persons who were surface B (HBsAg) carriers but did not fall ill during the outbreak, only one (4 per cent) was positive.

This outbreak of severe hepatitis was apparently due to a Delta virus superinfection among HBsAg carriers in a population extensively infected by hepatitis B virus.

Note: Delta is a hepatotropic agent whose antigen/antibody system depends on the hepatitis B virus for its expression. It was discovered in Italy in 1977 by Mario Rizzetto and, at that time, was thought to be a new indicator of hepatitis B. Subsequently it was demonstrated that it

was a specific agent, dependent on hepatitis B virus, and capable of being transmitted to susceptible persons under certain circumstances and of inducing acute and chronic hepatitis. The virus is a small particle (38 nm) coated with HBsAg and with an interior antigen: core delta antigen (cdAg). Its nucleic acid appears to be ribonucleic acid in the form of a twisted strand.

Delta infection may occur both in humans and in chimpanzees, and occurs either as an acute coinfection with hepatitis B or as superinfection in a hepatitis B virus carrier. In the first case, the coinfection induces acute hepatitis. Recent information from Italy suggests that the evolution of this infection is usually accompanied by the development of antibodies specific to hepatitis B and sometimes to Delta antigen. The superinfection of a hepatitis B carrier with Delta virus may cause asymptomatic infection, acute hepatitis, or chronic hepatitis. Although very little specific information is available about the frequency of each of these results of superinfection with Delta virus in hepatitis B virus carriers, in prevalence studies the frequency of Delta infection indicators is usually four or five times higher in persons with chronic hepatitis than in asymptomatic carriers of hepatitis B virus without hepatic disease. It is estimated that between 50 and 75 per cent of Delta infections may lead to chronic infection.

Epidemiological studies have shown that Delta infection is more common in southern Italy. In that region, between 20 and 80 per cent of persons with acute hepatitis B, over 50 per cent of those with chronic hepatitis B, and 10 per cent of hepatitis B virus carriers may have Delta infection. Delta infection appears to spread endemically with hepatitis B and does not appear to be connected with an obvious blood contact. In other places, the infection is observed more frequently in drug addicts and hemophiliacs with chronic hepatitis B. More than 50 per cent of these individuals in almost all regions of Europe and the United States are infected. In these groups, Delta virus is transmitted by direct blood contact, that is, by the classic hepatitis B mechanism. In most of the developed countries, transmission of Delta virus is believed to coincide with transmission of hepatitis B.

¹Paper presented at the 31st Annual Conference of the United States Epidemic Intelligence Service (Atlanta, Georgia, 19-23 April 1982) based on research by Venezuelan doctors E. Anzola Pérez, M. Alcalá de Monzón, A. Mondolfi, D. Rivero and A. Bracho, in collaboration with the United States Centers for Disease Control (S. Hadler and R. Purcell).

(Source: Ministry of Health and Social Welfare of Venezuela, *Boletín Epidemiológico Semanal* 38, 30 May-5 June, 1982.)

Misuse of Antibiotics

Antibiotics are an international treasure whose value is diminishing. Since the 1930s when the antimicrobial action of sulfonamides was discovered, man has endeavored to control the infectious agents sharing his environment. In the 1940s penicillin revolutionized the treatment of bacterial infections—it was a true “miracle drug.” What followed was the discovery and development of a large number of unrelated antibiotics made by organisms living in the soil.

The discovery of streptomycin (1944), chloramphenicol (1947), tetracycline (1948), and the cephalosporins has given man an antimicrobial armamentarium with seemingly unbeatable potential. At therapeutic concentrations, these drugs have little effect on the activity of normal human or animal cells but kill bacteria by inhibiting essential metabolic processes.

Almost coincident with the introduction of antibiotics, bacteria appeared which were no longer susceptible. Initially, these bacteria were resistant to low amounts of drugs, but with the advent of increased antibiotic use (for prevention as well as therapy), highly-resistant strains appeared which were refractory to these drugs. Since antibiotics occur in nature, it is hardly surprising that natural selection caused small numbers of resistant organisms to emerge contiguous to the antibiotic-producing strains. It was unexpected that man’s use would lead to such a rapid appearance of large numbers of resistant strains.

An understanding of the rapid emergence of antibiotic resistance came when the genetic basis for resistance was discovered. Unlike the majority of other bacterial traits, most resistance genes reside on small, circular pieces of DNA called “plasmids” which are not part of the bacterial chromosome. Many of these extrachromosomal DNA elements are infectious since they can be transferred or can transfer themselves among bacteria of the same or different species. The continued use of an antibiotic leads to an increase in the numbers and kinds of bacteria resistant to that and other antibiotics. Most resistances are carried by separate genes, but as many as 8-10 different resistances can be carried on one or several plasmids in the same host bacterium.

Recent surveys have shown a continued rise in the numbers and kinds of resistant bacteria in all countries. This trend has paralleled the increased use of antibiotics. Even more alarming is the emergence of antibiotic resistance in organisms such as those which produce typhoid fever, cholera, and gonorrhoea. Antibiotic misuse and overuse has led to a large reservoir of these resistance genes in nonpathogenic bacteria (intestinal *Escherichia coli*, for example), which in turn transfer resistance to pathogenic bacteria.

The selection of resistant strains in one country can become a problem in another. For example, penicillin-resistant *Neisseria gonorrhoeae* emerged in Southeast Asia and was not contained in that region, but rapidly spread and is now present in about 50 countries; it has become an important international public health problem. In some areas, penicillin-resistant gonorrhoea strains account for 60 per cent of those isolated. Of particular concern was the discovery that the penicillin-resistance gene had apparently come from the non-disease-causing intestinal *E. coli*, which had been harboring this gene for over 20 years.

The need for a critical reevaluation of the use and abuse of antibiotics became evident. An allied response to this mounting public health problem came from a group of 200 medical and basic scientists representing over 30 countries who met in Santo Domingo, Dominican Republic, in January 1981. In August 1981 the participants issued a statement which was translated into many languages and signed by hundreds of clinicians and researchers worldwide. In response to this appeal, the Alliance for the Prudent Use of Antibiotics (APUA) was established as an international consortium of interested groups and individuals seeking to collect and distribute information related to the effective use of these drugs and to curtailing the consequences of misuse. The APUA Scientific Advisory Board is made up of researchers and physicians from different countries.

In the developed countries, specific problems include:

- improperly prescribing antibiotics for ailments such as viruses, “colds,” and allergies known not to respond to these drugs;
- disregarding physicians’ instructions to take the drugs to completion, stopping several days earlier to save the drugs for later use in less than therapeutic amounts for family members and friends;
- using antibiotics intended for human consumption in order to prevent disease and promote growth in animals and cultivated plants; and
- advertising newer antibiotics as replacements for older, still effective ones, thus allowing resistance to emerge more rapidly.

In developing countries people are:

- dispensing and buying drugs without prescription;
- using antibiotics in massive doses (often without prescription), as prophylaxis against diseases such as diarrhoea;
- packaging and selling drugs in combinations which include as many as five in one preparation, to treat single bacterial infections;

- failing to list all the side effects of these drugs in package inserts, so that dangerous sequelae are not suspected or expected; and
- failing to identify these drugs by their generic names, leading to situations where patients may be taking two forms of the same drug.

In many developing countries, the situation has become an economic as well as a medical problem. First line antibiotics, such as the penicillins and tetracyclines, are no longer very useful. The newer, more expensive antibiotics are hardly affordable by countries struggling to feed their people. An increased awareness of the prudent use of antibiotics is needed on a worldwide scale; this is APUA's main goal. A reduction in the nonessential use of antibiotics is necessary in order to effect a decrease in resistance genes and bacteria in the environment.

Worldwide public health efforts are sought to generate interest in, and to draw attention to this issue. In November 1981, a WHO Scientific Group prepared a document¹ which examines and makes recommendations on the proper use of antibiotics. This document should be used as a standard reference for the worldwide use of these drugs and hopefully will be accepted for implementation in all countries. APUA is one organization ready to assist other groups concerned with this problem. Only through concerted efforts can the world hope to preserve these naturally-occurring, valuable agents as mainstays of man's supremacy over disease-causing microorganisms.

(Source: S. Levy. Misuse threatens our precious antibiotics. *The Nation's Health* 12(8):5, 1982.)

¹Copies of the complete report of the WHO Scientific Group are available in English (Document WHO/BVI/PHA/ANT/82.1) and can be obtained by writing the World Health Organization, 1211 Geneva 27, Switzerland.

Editorial Comment

During the aforementioned meeting, the WHO Scientific Group stressed the importance of epidemiological surveillance of antibiotic resistance.

Reliable information on the susceptibility to antibiotics of important human pathogens is a prerequisite for finding solutions to the problems created by antibiotic resistance. Surveillance is needed in order to:

- Improve the quality of prescribing antibiotics for the individual patient, using antibiotics in cases where no resistance has been found.
- Influence the pattern of antibiotic usage in hospitals.
- Assist national governments and international organizations in formulating a policy for the supply and use of antibiotics in man and animals; and encourage responsible action by antibiotic manufacturers in the marketing and promotion of their products in individual countries.

In countries with well-developed laboratory facilities, a great deal of valuable information about antibiotic susceptibility is stored in hospital records. Some hospitals analyze this information periodically for local use, and in a few countries a comprehensive surveillance scheme, based on hospital-laboratory data, is in operation. At least one informal international collaborative study has been made of resistance in a range of important human pathogens. To these sources of information must be added several special schemes developed by WHO reference centers for the surveillance of resistance in enteric pathogens and gonococci.

Information from these sources, though valuable, is far from comprehensive. Earlier WHO reports have urged the establishment of national and regional centers for the surveillance of resistance. The working group was of the opinion that now is the time to implement a surveillance scheme which would cover a wide range of pathogens.

Reports on Meetings and Seminars

Workshop on Epidemiology and Health Administration¹

The Workshop was held from 2-6 August 1982 in the School of Public Health of the University of Chile, in Santiago. Its purpose was to discuss the teaching of epi-

demiology in health administration courses. In addition to the professors of that School and staff members of the Chilean Public Health Service, the Workshop was attended by specialists in the teaching of epidemiology and health administration from Argentina, Brazil, Colombia, and the Dominican Republic, as well as PAHO staff members.

Prior to the Workshop a bibliography (107 articles) on the topic was prepared. The articles were classified into four categories: health policies, planning, organization, and evaluation of health services. The cooperation of the

¹Copies of the Final Report of the Workshop may be obtained from the Program of Education in Health Services Administration, Division of Human Resources and Research, PAHO.

National Faculty of Public Health of the University of Antioquia in Medellín, Colombia was a key factor in preparing the bibliography.

Health administration courses have traditionally included epidemiology as a basic discipline for administrators. This use of epidemiology takes on greater importance to the extent that the administrative functions of various health agencies and institutions are strengthened. However, the needs of health services are not limited to the efficient administration of existing health systems, but also include the study and promotion of administrative analysis with an epidemiological approach designed to induce the changes required by increasingly complex medical care procedures.

The participants in the Workshop thought it important to encourage discussion on the activities which should be undertaken in the future in connection with the interaction between epidemiology and health services administration. In this regard, they emphasized the need to consider the human resources that will have to be trained and the problems they will face. Although it will be necessary to continue to rely on public health professionals who have a general and comprehensive background, additional specialized personnel should be trained at the doctorate level in public health, epidemiology, and health services administration.

The epidemiological method is applicable to the field of administration in terms of the diagnosis of the situation, evaluation, decision-making, and knowledge of the risk or prevention factors within the process that leads to health or disease. However, especially in Latin America, it is possible that not enough emphasis has been given to the correlation of epidemiology and administration in the teaching of these subjects.

Evaluation of health care technology and analysis of health economics, for example, should in the future receive special attention since they largely represent integrated, multidisciplinary areas in which the elements of epidemiological methodology play a determining role. On the other hand, an important future activity will be that of interesting epidemiologists in health service research projects. It is evident that epidemiology can make a great contribution to health administration if its methodology is applied to the rationalization and appropriate use of the available resources and to the evaluation of the strategies used to achieve a better health status.

The following recommendations were made:

- Encourage the teaching of epidemiology aimed at its application in the various stages of the administrative process.
- Determine training needs in the various branches of epidemiology with this new approach.
- Promote the establishment of working groups of experts in the field of epidemiology applied to health services administration in order to: develop detailed programs for courses and seminars/workshops for professors and researchers, prepare teaching material, audiovisual aids, and exercises for teaching the subject, and organize a panel of professors capable of initiating the

continuing education of teachers and research workers in Latin America.

- Encourage research that applies epidemiology to, and integrates it with, health services administration.
- Exchange teaching and research experience among the different countries.
- Promote the relationship between teaching and service provision, to conduct joint research projects.
- Request the Regional Library of Medicine and the Health Sciences (BIREME) to include in its INDEX a chapter on epidemiology as applied to administration.
- Give wide distribution to the documents produced by seminars, workshops, and other meetings on the topic.

A selection of the 107 articles of the bibliography prepared for the Workshop is presented below:

Acherson, R. M. La epidemiología en la evaluación y planificación de los servicios de salud. Centro Latinoamericano de Administración Médica, *Revista de Atención Médica* 2(3-4):97-125, December 1973/March 1974.

Blanc, L. and M. Blanc. The role of utilization studies in the planning of primary health care. *World Health Forum* 2(3):347-349, 1981.

Chorny, A. H., A. R. Lanza, J. M. Paganini, and S. M. Rossi. La epidemiología, la planificación, la necesidad de atención de la salud y los sistemas de información. Seminario de Epidemiología aplicada a la organización y evaluación de los servicios de atención de salud. *Revista de Atención Médica* 2(3-4):125-161, December 1973/March 1974.

Costanzo, G. A. and I. Vertinsky. Medición de la calidad de la atención de la salud—Una clasificación para orientar decisiones. OPS, Traducciones 48. Centro Latinoamericano de Administración Médica. Buenos Aires, Argentina, 1975.

Curiel, D., et al. Trends in the Study of Morbidity and Mortality. WHO Public Health Papers No. 27, 1965.

Densen, P. M. Epidemiologic contributions to health services research. *Am J Epidemiol* 104(4):478-488, 1976.

Echeverri, M. L., Torres de Galvis, and F. Villegas. Diagnóstico epidemiológico como base para la atención de urgencias en Medellín, Colombia. Servicio de Epidemiología, Secretaría de Salud de Medellín, Colombia.

Gordis, L. Discussion of epidemiology contributions to health services research. *Am J Epidemiol* 104(4):489-492, 1976.

Grupo de Trabajo PRIDES sobre Atención Médica Ambulatoria. Servicios de atención médica ambulatoria: ¿Se usan en la forma apropiada? *Bol Of Sanit Panam* 90(5):388-406, 1981.

Hulka, B. S. Epidemiological applications to health services research. *J Community Health* 4(2):140-149, 1978.

Knox, E. G. Epidemiological approaches to planning. In *Epidemiology in Health Care Planning*, 110-135. (Edited by the International Epidemiological Association and WHO.) New York-Toronto, Oxford University Press, 1979.

Mahler, H. Las estrategias epidemiológicas para la salud de un mundo cambiante. *Bol Of Sanit Panam* 84(2):95-103, 1978.

Medina, E. Usos de la epidemiología en la organización de la atención médica. In Fondo Educativo Interamericano, *Epidemiología*. Chapter 15:186-193, 1981.

Morell, D. C. The epidemiological imperative for primary care. *Ann NY Acad Sci*: 2-10, 1978.

Neri, A. Infraestructura para el desarrollo de investigaciones aplicadas a servicios de salud. *Educ Méd Salud* 15(1):30-39, 1981.

Osuna, J. El concepto de riesgo en la atención materno-infantil. In *Condiciones de salud del niño en las Américas*. Washington, D. C., PAHO Scientific Publication 381, 1979, pp. 89-95.

Stallones, R. A. To advance epidemiology. *Ann Rev Public Health* 1:69-82, 1980.

Terris, M. The epidemiologic revolution, national health insurance and the role of health departments. *Am J Public Health* 66(12):1155-1165, 1976.

Terris, M. Epidemiology as a guide to health policy. *Ann Rev Public Health* 3:323-344, 1980.

Thompson, J. D. Epidemiology and health services administration: Future relationships in practice and education. *Milbank Mem Fund Q* 56(3):253-273, 1978.

Use of epidemiology in primary health care. *WHO Chronicle* 34(1):16-19, 1980.

White, K. L. Información para la atención de salud: una perspectiva epidemiológica. *Educ Méd Salud* 15(4):369-394, 1981.

Seminar on the Application of Epidemiology to Non-communicable Disease Control

The Seminar was held in Brasília, Brazil, from 31 May to 4 June 1982. It was organized by the National Chronic and Degenerative Diseases and Mental Health Divisions of the Secretariat for Special Health Programs of the Ministry of Health of Brazil, with cooperation from the PAHO Area V Office. It was attended by 41 professionals, most of whom were physicians concerned with public health or non-communicable disease control (30 were from the Ministry of Health, seven from State Health Secretariats, and four from PAHO).

The purpose of the Seminar was to review the status of non-communicable diseases and to propose activities for controlling them. Its principal objectives were to:

- identify and assess the most appropriate frequency and distribution indicators of this group of diseases;
- define and outline the most feasible epidemiological activities for the control of non-communicable diseases;
- discuss the role of multicausality, especially the role of environmental factors to this group of diseases; and
- identify ways of applying control measures according to their priority and the risk involved.

The sequence of health service activities for attaining those objectives was broken down as follows: diagnosis of the health situation, based on available information; generation of new descriptive and possibly causative knowledge; programming of activities; and, evaluation of the efficiency and effectiveness of non-communicable health care programs.

On the basis of this sequence, discussion was organized around the following five topics:

State of health and mortality. Given the above-mentioned objectives, it was deemed necessary to emphasize the principal health indicators, both positive and negative

and the characteristics that mortality studies have within this context.

Morbidity. The principal differences between incidence and prevalence were discussed in the light of non-communicable diseases. As in the case of mortality it was deemed important to single out the dynamic factors that can explain intra- and interpopulational variations as well as the rationale behind calculating the usual rates and of adjusting the rates for comparative purposes.

Research. The most important features of surveys and of studies of cases and controls were highlighted. A major focus of attention was the separation between normal and abnormal, and the sensitivity and specificity of diagnostic criteria in light of the study of frequency and distribution of diseases.

Causality. Emphasis was placed on the concept of multicausality, the role of environmental forces and genetic predisposition in the determination of health problems, and some of the strategies used by epidemiology in investigating the causality of chronic diseases.

Evaluation. As a rule, evaluation attempts to determine the value or social utility of the change accomplished, in terms of what had been programmed. In this regard, the importance of ascertaining the real health needs and the planning of supply was emphasized. In addition, a broad review was made of the evaluation process, in particular the investigation and analysis of health service delivery institutions.

The examination and discussion of specific problems was one of the special work procedures of the meeting and included the study of general mortality and morbidity, surveys of mental health problems, the influence of heredity and the environment, arterial hypertension, and the importance of medical audits. Another work procedure consisted of short theoretical presentations followed by discussions which emphasized the principles of epidemiology applicable to non-communicable diseases.

Because of the present state of chronic diseases, national health workers must be provided, among other things, with the minimum epidemiological knowledge—both conceptual and methodological—which will enable them to address more objectively the increasing problems in this field and to conduct a more rational search for specific solutions. In this regard, the Seminar was an important step forward; similar activities in the future are expected to generate the knowledge required in order to offer an appropriate response to the needs identified.

Meeting on Rapid Laboratory Diagnosis¹

A joint WHO/National Bacteriological Laboratory meeting was held in Stockholm, Sweden, from 16-18 June

¹From WHO *Weekly Epidemiological Record* 57:257-261, 1982.

1982 to review rapid laboratory viral diagnosis with special emphasis on coordination of production, quality control, and supply of reagents. A summary of the meeting follows.²

Recent Advances in Rapid Diagnostic Techniques

Existing rapid diagnostic techniques and recent relevant advances in a number of viral infections were reviewed at the meeting. The major advances in viral respiratory disease diagnosis have been the successful extension of immunofluorescence to more laboratories, large-scale production of antibody in eggs, and the development of sensitive solid-phase immunoassays for detection of viral antigens in nasopharyngeal secretions. In diarrheal diseases, immunoassays for both rotaviruses and adenoviruses have been further refined and standardized and monoclonal antibodies have been used in enzyme-linked immunosorbent assay (ELISA) tests for rotavirus. In the field of hepatitis, advances include the growth of hepatitis A virus in tissue culture systems and the use of antigens for IgM immunoassays, the recent production of hepatitis B core antigen from bacteria through genetic engineering, and the development of immunoassays for both antigen and antibody associated with the "delta" antigen. The diagnosis of dengue has been facilitated by the development of monoclonal antibodies to all four dengue types. The detection of IgM antibodies during the acute phase of both dengue and Japanese encephalitis is of value in rapid diagnosis. The development of microscopic slides containing stable inactivated, formalin-fixed antigens for Lassa and Ebola viruses has facilitated the detection of antibody by immunofluorescence.

Reagents of Quality Control and Distribution

The preparation of reagents can be commercial or WHO-sponsored, but irrespective of the source, it is

²The full report of the meeting may be obtained from the Virus Diseases Unit, Division of Communicable Diseases, World Health Organization, 1211 Geneva 27, Switzerland.

essential that working reagents supplied by WHO consist of large lots suitable for quality control and wide distribution. Quality control must be carried out by at least two reference laboratories separate from the producer and must include not only serologic reagents but also the solid-phase supports and any other materials used in each assay system. Advances in biotechnology might change the availability and quality of reagents and the feasibility of production in the near future, but this eventuality should not delay the implementation of current plans.

General Recommendations

The Group recommended that a coordinated program be developed to ensure the availability of reagents within the network of WHO Collaborating Centers and National Laboratories for the diagnosis of the following diseases: viral hepatitis, respiratory viral diseases (including measles), viral gastroenteritis, arthropod- and rodent-borne viral diseases, rubella, and herpes virus group diseases.

In order to implement a program in each of these areas it was agreed that coordinators within the WHO Collaborating Centers, together with their associates, be appointed and assume responsibility for the following actions:

- identify specific tests to be recommended for rapid diagnosis, taking into account considerations of cost, simplicity, and accuracy;
- define the reagents and test material required, and identify specific suppliers of the reagents;
- define minimum standards of quality and performance of reagents and other material;
- develop a strategy for distributing reagents within the network of WHO Collaborating Centers and cooperating national laboratories;
- assist WHO in the development and implementation of training courses and the selection of suitable candidates for training;
- evaluate the rapid viral diagnostic tests performed in field situations; and
- solicit and review information on new tests and new reagents, including monoclonal antibodies, which might have application in rapid viral diagnosis.

Publications¹

Epidemiologic Surveillance after Natural Disaster, by Karl A. Western. Washington, D.C., Pan American Health Organization, PAHO Scientific Publication 420, 1982. (ISBN 92 75 11420 X). 106 pages. Price: US\$6.00.

This manual, a companion piece to *Emergency Health Management after Natural Disaster* (PAHO Scientific Publication 407, 1981), makes a more detailed presentation of the information in the previous publication's chapter on epidemiologic surveillance and disease control. Specifically, it sets forth the scientific basis for postdisaster disease surveillance and control measures and outlines relevant human experience to date.

This book is mainly directed at an audience of senior technical officers involved in disaster relief—particularly epidemiologists, disease control specialists, sanitary engineers, and senior medical officers. However, many other people involved directly or indirectly with this subject will find it a useful contribution to their work.

The manual contains five chapters and an extensive set of annexes. The first two chapters describe factors fostering communicable diseases and ways of assessing the communicable disease potential in the wake of a disaster. Chapter 3 provides guidelines for setting up surveillance systems under normal conditions and after a disaster—indicating the diseases to monitor; how to collect, interpret, and utilize data; and how to provide feedback to the field. Chapter 4 describes the operation of surveillance systems—focusing on investigation of rumors and disease reports, access to laboratories, presentation of findings to decision-makers, and surveillance during the recovery period. Chapter 5 deals with communicable disease control measures—including management of environmental health problems, immunization, chemotherapy, quarantine, and isolation.

In addition, the book's six annexes list key epidemiologists concerned with disaster-related events in the Americas, PAHO country offices and centers, PAHO/WHO collaborating centers and reference laboratories for selected communicable diseases, summary sanitation requirements for disaster relief efforts, factors to consider in weighing the merits of emergency-related vaccinations, and 59 bibliographic references.

Because of the impact ecological and nutritional factors can have upon disease transmission, the manual discusses topics such as drought and famine not covered in the parent guide. It also deals with periods extending beyond the parent guide's four-week time-frame, in recognition of the fact that the impact of disaster-related communicable diseases is often delayed for weeks or months after the event.

Sanitary Control of Food—Technical Discussions of the XXVIII Meeting of the Directing Council of PAHO. Washington, D.C., Pan American Health Organization, PAHO Scientific Publication 421, 1982. (ISBN 92 75 11421 8). 58 pages. Price: US\$3.00.

This book provides a good overview of food supply and food safety problems in the Americas. It contains three documents—the working papers on this subject produced for PAHO's 1981 Technical Discussions, the keynote address presented at those discussions, and the Final Report of the discussions, which were held on 25 and 26 September in Washington, D.C., in conjunction with the XXVIII Meeting of PAHO's Directing Council.

The working papers describe the current situation and suggest a detailed strategy for its improvement. Specific areas covered include food production, losses, distribution, and consumption; public health implications of food contamination; the nature of the food industry; and existing food quality-control patterns. The suggested strategy for resolving problems in each of these areas gives detailed attention to upgrading food control services; development of adequate manpower; community participation and public education; financing; the role of international organizations; and technical cooperation among developing countries.

The keynote address that constitutes the second part of the book was presented by Dr. A. B. Morrison, Assistant Deputy Minister (Health Protection Branch) of Canada's Department of National Health and Welfare. In his remarks, Dr. Morrison pointed out the widely varying levels of caloric and protein intake in the Americas. He also noted that the Region's population is outgrowing its food production, disorganized urban growth is common, and as a result, dependence upon foods produced outside the area is increasing. Specific recommendations made by Dr. Morrison for improving food safety were as follows:

- Establish food control as an element of primary health care.
- Develop sound legislation that is flexible enough to adapt to scientific and technological changes.

¹These publications are available at the quoted prices through the PAHO Office of Health and Biomedical Publications, Distribution and Sales Unit, 525 Twenty-third Street, N.W., Washington, D.C. 20037.

- Assign an important (but not necessarily exclusive) role to the health ministry in the development and administration of national food control policies.

- Strengthen inspection services.
- Develop analytical services to work in close cooperation with inspectors.
- Establish guidelines for good manufacturing practices, so as to ensure quality-control of high-risk foods involved in international commerce as a prerequisite for valid quality certification agreements.
- Develop quality certification agreements for food involved in international trade.
- Increase exchanges of information between national food control agencies.
- Expand manpower training and development programs.
- Expand public and private sector education programs.
- Make full use of international agencies' expertise.

The Final Report of the meeting directed its attention to the following subjects: the relationship between food safety and the goal of Health for All; quality control of food produced for domestic consumption; food laws, regulations, and standards; the financing and organization of food control services; food inspection and laboratory services; training of technical personnel; control of street vendor activities; and food losses. Specific recommendations approved at the meeting included the following:

1. Food safety programs should include education components for families and communities with special attention given to education of young schoolchildren and mothers.
2. Ministries of health should assume a leadership role in all activities concerned with sanitary control of food for human consumption; governments should commit themselves to food safety by establishing an adequate legislative groundwork for dealing with the complexities involved; and close collaboration between concerned national agencies should be developed.
3. Countries should conduct massive programs for training food safety personnel and strengthening the institutions responsible for food protection.
4. Governments, donor countries, and lending agencies should give high priority to funding food protection programs.
5. Governments should closely link their food and nutrition policies with their food control programs.
6. A study should be made of ways to regulate street-vending in the Americas.
7. These recommendations should be reviewed at a subsequent meeting convened in collaboration with PAHO; and representatives of national agencies concerned with health, agriculture, and commerce should be encouraged to participate in associated working groups or technical consultations in order to adapt available strategies to local conditions and incorporate them into plans of action for their countries.

Environmental Health Management after Natural Disasters. Washington, D.C., Pan American Health Organization, PAHO Scientific Publication 430, 1982. (ISBN 92 75 11430 7). 68 pages. Price: US\$6.00.

This publication is the fourth in a series of PAHO manuals on disaster preparedness measures (the previous volumes discussed health management, vector control, and epidemiologic surveillance), and serves as a guide to those in charge of planning and implementing environmental health measures following disasters. The effect disasters have on environmental health is also considered, as are the actions taken to correct postdisaster environmental health conditions, and the order in which these should be dealt with during the emergency phase. The publication also includes data on steps to be taken toward the rehabilitation and restoration of basic services. The annexes contain information on preparing emergency operation plans, guidelines for using tablet, powder, and liquid disinfectants, environmental health measures (evacuation and rescue operations), and a bibliography.

Report of the Director: Quadrennial, 1978-1981; Annual, 1981. Washington, D.C., Pan American Health Organization, PAHO Official Document 183, 1982. (ISBN 92 75 17183 1). 262 pages. Price: US\$10.00.

This combined four-year and one-year report, prepared for the quadrennial Pan American Sanitary Conference of 1982, describes PAHO's operation in 1981 and provides a general overview of its activities during the four-year period covered by the meeting. More specifically, it reviews recent measures taken by PAHO's Governing Bodies, examines long-term policy-making and international coordination in the health field, and presents a detailed narrative description of PAHO's work. It thereby seeks to provide health authorities of the PAHO Member Governments, health administrators and planners, and other health personnel with a useful account of what PAHO has been doing during the periods involved.

As the Director, Dr. Héctor R. Acuña, points out in the report's introduction, PAHO's main concern in recent years has been the urgent need to extend health services to all the people of the Americas. For this reason, one of PAHO's key tasks in 1978-1981 was construction of a framework for pursuing the goal of "Health for All." This was done by assessing health progress of the 1970s in terms of the Ten-Year Health Plan for the Americas covering that decade, by helping Member Governments to devise national strategies for extending health services to all their citizens by the end of the century, and by developing a similar general strategy for the Hemisphere as a whole.

Accordingly, the report's first chapter reviews these various processes. It also summarizes the actions of PAHO's Governing Bodies. Additional sections deal with recent reorganizations of PAHO's secretariat; budgetary and personnel management; and the provision of conference, translation, and computer services. The chapter also describes public information programs, actions designed to improve the health status of women, and PAHO's relations with other international organizations and agencies. In addition, it describes PAHO's relations with other inter-American organizations.

Chapter 2 is devoted to describing PAHO's work in the field of health services. Short sections describe work designed to improve management systems, financing arrangements, health facility maintenance, health education, nutrition, community participation, rehabilitative services, and health services research.

Chapter 3, "Disease Prevention and Control," covers PAHO activities directed against specific diseases. The communicable disease work described includes that performed under the auspices of the PAHO/WHO Expanded Program of Immunization and that aimed at specific types of diseases such as malaria, other parasitic diseases, tuberculosis, acute respiratory infections, diarrheal diseases, sexually transmitted diseases, hospital-acquired infections, and diseases transmitted by *Aedes aegypti*. The chapter also contains information on noncommunicable diseases (cancer, cardiovascular disease, diabetes, chronic rheumatic disease, and allergy), dental health, mental health, laboratory services, epidemiologic surveillance, biologicals, radiation health, and accident prevention.

Chapter 4, "Environmental Health Protection," outlines the assistance that PAHO provides its Member Governments in performing a wide range of environment-related activities. These involve extension of water supply

and sanitation services, protection of food supplies, solid waste management, improvement of occupational health, prevention and control of pollution and other environmental health hazards, and assessment of development projects' effects upon human ecology and health.

Chapter 5, which deals with human resources and research, describes PAHO's efforts in the promotion of the training infrastructure's development and manpower planning; encouragement of education and training in specific fields; support for continuing education of both technical and auxiliary personnel; granting of fellowships; and provision of educational technology designed to support manpower development. The chapter also details PAHO's efforts to encourage research by the provision of research information through its Regional Library of Medicine and the Health Sciences in São Paulo, Brazil; support for research conducted at the Organization's various Pan American Centers; the award of small grants to fund research projects; coordination of hemispheric research activities through the PAHO Advisory Committee on Medical Research; support for Member Countries' development of national health research policies; strengthening of 165 WHO collaborating centers in the Americas; and promotion of the WHO, World Bank, and UNDP Special Program for Research and Training in Tropical Diseases.

The final chapter of the report deals with four miscellaneous subjects: animal health, disaster preparedness and relief, statistical services, and publications.

Overall, the report should provide everyone involved in PAHO activities with an effective overview of the Organization's recent work. It should also serve as a good vehicle for providing others potentially interested in PAHO with an account of how the Organization operates and what it does.

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