Food Poisoning Occurrences in New York City, 1969

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IN a 1968 annual summary of foodborne outbreaks, the Public Health Service stated: "Food poisoning in the United States is grossly under-reported. In England and Wales . . . , 3,744 incidents of food poisonings were reported in 1966, whereas only 181 were reported to NCDC (National Communicable Disease Center) for the same period. The estimated number of episodes for the United States proportionate to the population is over 15,000" (*1*). We believe that the number of food poisoning cases in the United States ranges from 1 to 20 million per year and that foodborne illnesses cause more absences from industry and school than any other ailment except the common cold.

The only available statistics on the incidence of foodborne illness in the United States are those published by the Center for Disease Control (CDC), formerly the National Communicable Disease Center, of the Public Health Service. These statistics are compiled from reports furnished by State and city epidemiologists. We immediately suspected the available figures when we realized that as recently as 1968, utilizing all sources of information, 11 of the 50 States had not reported any outbreaks of foodborne illness. Thirteen States had reported no outbreaks of foodborne disease in 1967. Of the States with outbreaks, 21 in 1968 and 23 in 1967 had reported only one or two outbreaks for the entire year (*1*).

Summarizing the situation in New York City shows the prevalence of foodborne disease in a large metropolitan area and the problem of under-reporting of cases. Reviewing the situation could be the basis for an accurate determination of the incidence of food poisonings in the United States. The large proportion of cases of unknown etiology indicates the need for further research into the epidemiology of this illness.

Dr. Fodor is chief of the epidemiologic intelligence division, bureau of infectious disease control, Mr. Reisberg is supervisor of the food poisoning investigation unit, Mr. Hershey is supervisor of the food processing unit, and Mr. Berkowitz is a sanitarian assigned to the food processing unit—all with the New York City Department of Health.

Marketplace Investigations

One available and important indicator of the number of food poisonings is the quality of food in the marketplace. Rasmussen and Strong (*2*) investigated protein salads in delicatessen foods. Fifty-five percent of the salads contained *Streptococcus faecalis*. They discovered total plate counts of 8.3 million per gram. McCroan and co-workers (*3*) found commercially wrapped sandwiches with total plate counts up to 4.9 billion per gram. Of 409 protein salads routinely sampled by the New York City Department of Health in 1967, Shahidi and co-workers (*4*) reported that 341 or 83.6 percent were unsatisfactory under the department's administrative standards. Shiffman and Kronick

(*5*) had similar results; they found chicken and tuna fish salads with an average plate count of 10 million per gram.

Salmonella organisms have been found in 17 percent of all poultry, 24 percent of commercial egg products, and up to 54 percent of processed raw pork (*6*). *Clostridium perfringens* has been found in 17 percent of raw meat, poultry, and fish (*7*).

Drawbacks in Reporting

The geographic area consistently reporting the most outbreaks of food poisoning in the years 1966, 1967, and 1968 has been New York City. It reported 47 outbreaks in 1967 of a total of 167 for the United States. Similarly in 1968, New York City reported 56 outbreaks in a nationwide total of 301. Woodward and associates (*8*) said that New York City leads in reporting not because of unusually hazardous conditions there but because of the city's special efforts to investigate and report the outbreaks of foodborne illness.

The division of epidemic intelligence of the New York City Department of Health reports to the CDC only the outbreaks that they have investigated. Since they do not investigate many food poisonings in the home, the "home" cases are not reported to CDC.

CDC considers the illness of two or more persons as constituting an outbreak. New York City considers an outbreak to be three or more cases. Therefore, even for New York City, credited with reporting the most cases, totals are underreported in national statistics. Even if all outbreaks of three or more persons in New York City were reported to CDC, the number of persons involved still would be 13.7 percent less than the known patients because it is the practice never to report incidents of one or two persons. A significant proportion of known cases is missing from totals of food poisonings if incidents involving one or two persons are not reported. Following are the number of outbreaks of food poisoning reported by New York City to the CDC in 1967 and 1968 and the actual number shown in New York City records:

Outbreaks reported	*1967*	*1968*
To Center for Disease Control	47	56
In New York City records	127	89

The data reported in table 1 are biased in that all complaints received are not recorded as food poisonings. Illness from an obvious organoleptic cause, such as insects in food that made someone nauseous or eating obviously spoiled food, are considered to be complaints only and not true cases of food poisoning.

Most foodborne illness in New York City is reported by a telephone call from the victim. Only a small percentage of reports are received from physicians and hospitals. Lack of interest among the medical profession has persisted for years despite the requirement of the New York City health code that all food poisoning outbreaks must be reported. All physicians and hospitals have or can obtain pre-addressed, postage-paid notification forms from the health department.

Investigation Methods and Reports

The responsibilities for investigating outbreaks and applying measures to prevent recurrences in New York City are shared by the

Table 1. Foodborne disease cases reported to New York City food poisoning investigation unit, 1963–69

Year	Outbreaks, 3 or more persons	Number ill	Incidents, 1 or 2 persons	Number ill	Total persons ill
1963	73	648	98	156	804
1964	83	1, 241	73	110	1, 351
1965	102	804	87	127	931
1966	91	956	141	199	1, 155
1967	127	1, 568	169	231	1, 799
1968	89	1, 362	111	140	1, 502
1969	68	636	130	186	822
Total	633	7, 215	809	1, 149	8, 364

sanitarians of the food poisoning investigation unit of the bureau of food and drugs and by the bureau of infectious diseases control, which is staffed by medical epidemiologists. In food poisoning incidents of one or two persons, the sanitarians conduct the entire investigation.

An investigation of all food poisoning complaints includes an interview of a representative number of persons who are ill and of those who are not. The attack rate is established or estimated if a large number of people is involved. The establishment where the food was prepared is inspected, and a food processing study is made of the preparation of suspected foods. From the food histories, symptomatology, and reports of the investigation of the food establishment, a hypothesis is formed concerning the origin of the outbreak. Further investigation tests this hypothesis. Food samples, if important and available, are routinely taken for analysis. Food samples taken for bacterial analysis are examined qualitatively and quantitatively for total plate count, mold, coliform, enterococci, *Staphylococcus aureus* (coagulase negative and positive), *Clostridium perfringens*, and *Bacillus cereus*. Qualitative testing is done for *Salmonella* and *Shigella* organisms.

In table 2, the months to which the food poisonings are ascribed are the reporting months. Thus some illnesses listed for December occurred during and following Thanksgiving.

The least number of outbreaks was reported in the summer months, which has been true of New York City for many years. The national

Table 2. Food poisonings reported to the New York City Department of Health, by month reported, 1969

Month reported	Outbreaks, 3 or more persons	Number ill	Incidents, 1 or 2 persons	Number ill	Total persons ill
January	6	27	12	20	47
February	5	48	14	21	69
March	6	51	16	23	74
April	4	22	15	23	45
May	10	56	9	14	70
June	8	102	9	10	112
July	3	21	7	9	30
August	3	24	10	13	37
September	4	15	11	16	31
October	4	30	8	10	40
November	5	22	2	2	24
December	10	218	17	25	243
Total	68	636	130	186	822

Table 3. Food poisonings reported to New York City Department of Health, by place of occurrence, 1969

Place of occurrence	Outbreaks, 3 or more persons	Number ill	Incidents, 1 or 2 persons	Number ill	Total persons ill
Restaurant	27	309	67	96	405
Home	18	90	17	26	116
Institution	3	93	0	0	93
Retail food outlet processor	9	68	12	15	83
Supermarket	6	25	27	39	64
Caterer	1	30	0	0	30
Bakery	1	9	3	5	14
Other	3	12	4	5	17
Total	68	636	130	186	822

reports of Woodward and associates (*8*) and of CDC (*1*) pinpoint December, January, February, and March as having the smallest number of outbreaks. This disparity may be caused by the absence of a large number of residents from New York City during the summer months. Conversely, the hot summer temperatures in New York City should materially increase the growth of pathogenic organisms in contaminated foods.

Restaurants comprised the main source of food poisonings in New York City, with the home as the next most frequent place of occurrence (table 3). For food eaten at home to be ascribed as the source of illness, the food must have been prepared there from the raw product, not merely consumed there. Processed foods are blamed on the processor unless there is evidence that contamination by pathogens occurred in the home. Places of occurrence in New York City parallel the national statistics in ranking.

The chemical causes of food poisoning included two separate reports of food poisoning in May from scombroids. One report concerned the illness of two persons and the other was an outbreak with three victims.

The Chinese restaurant syndrome or monosodium glutamate (MSG) reaction declined substantially in 1969. The New York City Department of Health has been conducting an educational program among Chinese restaurants in the city to limit their use of MSG to the minimum needed for effective cooking.

Table 5. Percent of foodborne disease outbreaks and persons involved, by causative organism, Center for Disease Control and New York City Department of Health records, 1969

Organism	Outbreaks		Persons involved	
	United States	New York City	United States	New York City
Staphylococcus	25.3	16.2	12.2	20.7
Clostridium perfringens	17.5	17.6	64.9	36.3
Salmonella	13.2	4.4	6.6	2.0
Chemical	7.3	8.8	<1.1	4.5
Unknown	21.6	32.4	8.1	27.0

Apparently salmonellosis is not as great a problem in New York City as it is a nationally (tables 4 and 5). The high percentage of unknown sources of foodborne illness in New York City records, however, could affect the findings. The city must expend even more efforts to reduce its unknown factor to a more "respectable" national level. The lower national level may be due to under-reporting of unknown sources.

New York City's experience with foods associated with food poisonings is similar to that of the whole nation (tables 6 and 7). The greatest disparity is in the percentage of outbreaks ascribed to Chinese foods, which often have been incriminated in food poisoning outbreaks in the city. The popularity of Chinese-style foods and

Table 4. Etiology of food poisonings reported to New York City Department of Health in 1969

Etiological agent	Outbreaks, 3 or more persons	Number ill	Incidents, 1 or 2 persons	Number ill	Total persons ill
Staphylococcus	11	132	26	39	171
Clostridium perfringens	12	231	0	0	231
Enterococci	3	12	7	9	21
Salmonella	3	12	5	8	20
Bacillus cereus	1	5	1	1	6
Escherichia coli	1	2	3	5	7
High plate count, no specific pathogen	6	35	12	13	48
Mold	1	4	2	3	7
Virus	1	3	1	1	4
Trichinosis	1	4	8	9	13
Chemical, all causes	6	24	10	13	37
Monosodium glutamate	*1*	*3*	*1*	*2*	*5*
Unknown	22	171	53	85	256
Total	68	635	128	186	821

Table 6. Foods implicated in food poisonings in New York City, 1969

Food	Outbreaks, 3 or more persons	Number ill	Incidents, 1 or 2 persons	Number ill	Total persons ill
Salads	1	3	9	12	15
Roast beef	9	57	4	7	64
Beef other than roast beef	10	182	20	24	206
Smorgasbord	6	168	0	0	168
Poultry	11	80	13	19	99
Chinese foods	7	29	12	19	48
Seafood	3	9	14	20	29
Pork	5	22	10	15	37
Cold cuts	6	42	10	15	57
Dairy	1	5	4	4	9
Bakery	3	12	6	8	20
Packaged products	2	9	17	30	39
Mushrooms	1	4	1	1	5
Other	3	14	10	12	26
Total	68	636	130	186	822

the presence of Chinatown, a popular attraction for tourist and resident, may account for the high percentage of cases reported in the city.

Conclusion

Because of great inadequacies in reporting food poisonings, it is impossible to ascertain the true incidence of food poisoning outbreaks in the United States. New York City, which is credited with excellent reporting, is listed in national records as having 22 outbreaks in 1969, whereas the actual figure was 68. This difference creates an error of 300 percent, compounded because of the under-reporting of outbreaks to the Center for Disease Control.

Comparing the epidemiology of foodborne disease from region to region is difficult. There are no accepted known guidelines for determining the type of vehicle or establishment concerned. Many foods are handled and processed at different times and places. In what categories should notations be entered if improper food handling occurs at more than one processing plant or food purveyance? Why do State authorities show so little interest in reporting foodborne illnesses? Conferences and lines of communication between agencies responsible for food poisoning investigations should be opened. National criteria are needed for State and local epidemiologists.

Additional research into the etiology of food poisonings obviously is needed to reduce the high proportion of outbreaks listed with "cause unknown." The cause of food poisonings has always presented a reporting problem to health agencies. Despite food control programs that have existed for years, the extent of under-reporting is still unknown.

Table 7. Number of reported outbreaks associated with various foods, 1969

Food	Center for Disease Control (N=398)		New York City (N=68)	
	Number	Percent	Number	Percent
Beef, all	72	18	19	27
Poultry, all	70	17	11	16
Pork, all	63	15	5	7
Chinese food	6	1.5	7	10

REFERENCES

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(3) McCroan, J. E., McKinley, T. W., Brim, A., and Ramsey, C. H.: Five salmonellosis outbreaks related to poultry products. Public Health Rep 78: 1073–1080, December 1963.

(4) Shahidi, S. A., Hershey, H. A., Reisberg, C., and Berkowitz, H. R.: Celery implicated in high bacteria count salads. J Environ Health 32: 669–673, May–June 1970.

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in the microbiology of chilled foods. Assoc Food Drug Officials US Quart Bull 28: 144–149, July 1964.
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(7) Slanetz, L. W., editor: Microbiological quality of foods. [Proceedings.] Academic Press, Inc., New York, 1963.
(8) Woodward, W. E., Gangarosa, E. J., Brochman, P. S., and Curlin, G. T.: Foodborne disease surveillance in the United States, 1966, 1967. Amer J Public Health 60: 130–137, January 1970.

Tearsheet Requests
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Radiation Incidents Registry

A Radiation Incidents Registry to record cases of injury or potential injury resulting from exposures to radiation from electronic products has been established by the Environmental Health Service's Bureau of Radiological Health.

The registry was set up primarily to provide the basis for appraising the health effects on man from exposure to electronic product radiation, as required by the Radiation Control for Health and Safety Act; these may range from short-term effects such as skin irritations to long-term effects such as cataracts or leukemia. The registry also will help the Bureau establish priorities for electronic product radiation control and identify population groups for epidemiologic investigations of possible radiation health effects.

Numerous organizations have been asked by the Bureau of Radiological Health to report all radiation accidents or suspected incidents for possible inclusion in the registry. They include local and State radiological health authorities, Federal agencies involved in radiation control, organizations representing the health professions, hospital administrators, labor union officials, radiation safety officers, and others. They were urged to assist the Bureau by providing complete details of a radiation incident as soon after its occurrence as possible.

Incidents reported to the registry may involve human exposures to ionizing, nonionizing, sonic, infrasonic, or ultrasonic radiation from all types of electronic products. These include equipment, such as X-ray machines, lasers, microwave ovens, television receivers, and diathermy units, and equipment components, such as high-voltage vacuum switches and rectifier tubes, shunt regulator tubes, and cathode ray tubes.

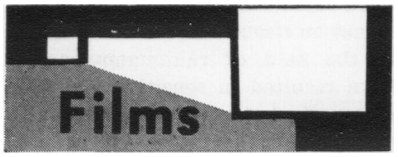
Three criteria have been established for identifying reportable incidents:

1. Known exposures to radiation in excess of allowable limits.
2. Unexpected injuries, latent health effects, or deaths which have been attributed to radiation exposure.
3. Exposures to unknown amounts of radiation generated when electronic equipment is either misused or malfunctioning.

All incident reports are to be evaluated to identify those which qualify as documented incidents of radiation health effects. Clinical aspects of individual cases and the capacity of the equipment involved to produce the biological effect reported will be considered.

An agency or individual reporting an incident is asked to include (*a*) a description of when, where, and how the incident occurred, (*b*) the type of radiation and estimated exposure, (*c*) age, sex, and occupation of persons exposed, and (*d*) health effects noted and medical treatment given.

Incident reports may be directed to the registry either through the radiation control program of the State in which the incident occurred or, in the case of Federal agencies, through agency channels. Incidents also may be reported directly to the Radiation Incidents Registry, Bureau of Radiological Health, 5600 Fishers Lane, Rockville, Md. 20852.



The following films are part of a continuing series on clinical pathology. They were produced by the National Medical Audiovisual Center in cooperation with Dr. Norman Ende, professor of pathology, Emory University School of Medicine, Atlanta, Ga., and are currently being used in the teaching curriculum of the department of pathology at Emory. All are cleared for educational closed-circuit television.

Diagnosis in Clinical Disorders of Calcium and Bone Metabolism, Part 1. *Order No. T–1501. Motion picture, 16 mm. (TFR), black and white, sound, 19 minutes, 1969.*

SUMMARY: Robert P. Heaney, M.D., professor, department of medicine, Creighton University, discusses parathyroid diseases, including primary hyperparathyroidism, parathyroid dysfunction in renal failure, and hypoparathyroidism (post surgical and idiopathic). Charts are used throughout the films.

Diagnosis in Clinical Disorders of Calcium and Bone Metabolism, Part 2. *Order No. T–1502. Motion picture, 16 mm. (TFR), black and white, sound, 22 minutes, 1969.*

SUMMARY: Using slides and charts, Dr. Heaney discusses the principal metabolic bone diseases including osteoporosis, osteomalacia, vitamin D deficiency, and familial hypophosphatemia.

Isolation and Identification of Salmonellae. *Order No. T–1494. Motion picture, 16 mm. (TFR), black and white, sound, 24 minutes, 1968.*

SUMMARY: John R. Boring, Ph.D., departments of preventive medicine and medicine, Emory University School of Medicine, discusses the diseases caused by salmonellae and their epidemiology and characteristics, principles of isolation and isolation from feces, reactions on brilliant green agar, TSI and biochemical reactions, and serologic typing. Charts are used to illustrate the major areas of discussion.

Isolation and Identification of Shigellae. *Order No. T–1495. Motion picture, 16 mm. (TFR), black and white, sound, 24 minutes, 1968.*

SUMMARY: Dr. Boring discusses bacillary dysentery, emphasizing the history of the disease, its epidemiology, the isolation of the organism, symptoms of the disease, and its serology.

Isolation and Identification of Enteric Bacteria. *Order No. T–1496. Motion picture, 16 mm. (TFR), black and white, sound, 25 minutes, 1968.*

SUMMARY: Dr. Boring presents an illustrated review of enteric bacteria including a discussion of groups in pathogenic enteric bacteria; lactose fermentation; selective plating media; reactions on MAC, SS agar, and triple sugar iron agar; and differentiation of *Escherichia coli, Klebsiella pneumoniae, Serratia marcescens, Providence, and Citrobacter.*

Pathogenesis of Anemia. *Order No. T–1504. Motion picture, 16 mm. (TFR), black and white, sound, 30 minutes, 1969.*

SUMMARY: William H. Crosby, M.D., chief of hematology and professor of medicine, New England Medical Center Hospitals, discusses the major types of anemias, their differentiation, tests involved in establishing the specific type, and some basis for therapy. He gives the formula for $M=IT$ where M is the mass of red blood cells, I (input) is the production of RBC's and T (time) is the average lifespan of the RBC's, and shows examples of normal and various abnormal $M=IT$ readings in several types of anemias.

Isotopes in the Diagnosis of Anemia. *Order No. T–1505. 16 mm. (TFR), black and white, sound, 31 minutes, 1969.*

SUMMARY: Dr. Crosby discusses the use of four basic radioactive isotopes—iodine 131, chromium 51, iron 59, and cobalt 60—in the diagnosis of anemia. The virtue of these substances is the extremely small amounts necessary for the detection of emissions. Dr. Crosby also discusses pros and cons of splenic scanning and its relationship to splenic involvement, and broad-range surface scanning.

The Hemolytic Syndrome. *Order No. T–1506. Motion picture, 16 mm. (TFR), black and white, sound, 32 minutes, 1969.*

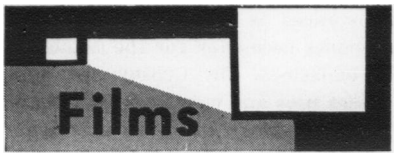
SUMMARY: Dr. Crosby indicates that this syndrome is best defined by the three major components involved in its makeup: (*a*) destructive reaction—jaundice, (*b*) compensatory reaction—reticulocytosis, and (*c*) decompensation—anemia. He discusses differentiation between this and other similar syndromes and the necessary tests for making a positive diagnosis—red cell lifespan, reticulocyte count, Coombs test, bone marrow examination, and bile pigment measurement.

Pathogenesis and Management of Hemochromatosis. *Order No. T–1507. Motion picture, 16 mm. (TFR), black and white, sound, 29 minutes, 1969.*

SUMMARY: Using ample visual support, Dr. Crosby presents a basic discussion of primary hemochromatosis, a rare metabolic hereditary disease involving inability of the intestine to block absorption of unneeded iron with resulting siderosis of several organs: liver, pancreas, and heart. He presents various therapeutic approaches as well as diagnostic tests for this disorder.

Human Blood Cell Morphology. *Order No. S–1402. 108 frames, 35 mm., color photomicrographic transparencies with descriptive key, 1968. Produced by the Laboratory Division of the National Communicable Disease Center as a training aid in the National Laboratory Improvement Program.*

AUDIENCE: Physicians, medical students, microbiologists, and clinical laboratory personnel and trainees, as well as other personnel concerned with clinical hematology laboratory procedures. The slides are not intended for distribution to lay persons, and distribution will be limited



to the professional personnel outlined above.

SUMMARY: Presents a selected set of color slides for use in lectures and for bench training in clinical hematology laboratories. Depicts normal cellular elements and morphological alterations in red cells, white cells, and platelets. A descriptive key emphasizes changes in size, shape, and color of red blood cells in acquired and congenital anemias; and white cell changes which occur in infectious, metabolic, and neoplastic diseases. These slides aid in increasing the proficiency in performance of the blood cell differential count, as part of the identification and classification of blood cellular elements in health and disease.

AVAILABLE: Free short-term loan to qualified professional groups from the National Medical Audiovisual Center (Annex), Station K, Atlanta, Ga. 30324. Not presently available for purchase.

Fundamentals of Clinical Enzymology. *Order No. T–1681. Motion picture, 16 mm. (TFR), black and white, sound, 40 minutes, 1969.*

SUMMARY: John Bernard Henry, M.D., professor of pathology and director of clinical pathology, State University of New York, Syracuse, reviews principles of enzyme assays, stressing the importance of zero-order kinetics in such reactions. He explains details of the lactic dehydrogenase assay, pointing out problems and pitfalls.

Clinical Pathologic Correlations of Enzymology, Part 1. *Order No. T–1682. Motion picture, 16 mm. (TFR), black and white, sound, 34 minutes, 1969.*

SUMMARY: Dr. Henry discusses principles and methods of classifying enzymes, categorizing individual enzymes according to clinical usefulness. He reviews in depth the long-standing enzymes alkaline phosphatase and amylase, and discusses sensitivity and specificity for acid phosphatase, transaminases (GOT, GPT), and lactate dehydrogenase (LDH).

Clinical Pathologic Correlations of Enzymology, Part 2. *Order No. T–1706. Motion picture, 16 mm. (TFR), black and white, sound, 31 minutes, 1969.*

SUMMARY: Dr. Henry compares glycolytic enzymes (aldolase and phosophexoisomerase) with lactate dehydrogenase in terms of origin, assay methodology, clinical application, and role in glucose metabolism. He reviews isoenzymes in depth, with specific reference to LDH, in terms of organ source and clinical application as well as genetic and molecular characterization.

Clinical Pathologic Correlations of Enzymology, Part 3. *Order No. T–1721. Motion picture, 16 mm. (TFR), black and white, sound, 31 minutes, 1969.*

SUMMARY: Dr. Henry describes enzymes from the tricarboxylic acid cycles (isocitric dehydrogenase and malic dehydrogenase) as well as the hexose shunt enzymes.

Clinical Pathologic Correlations of Enzymology, Part 4. *Order No. T–1722. Motion picture, 16 mm. (TFR), black and white, sound, 25 minutes, 1969.*

SUMMARY: Dr. Henry reviews 5-nucleotidase and creatinine phosphokinase, and enzymes of the formed elements of blood, including glucose-6-phosphate dehydrogenase, and discusses diseases that may be diagnosed through enzyme analysis.

New Diagnostic Procedures in the Diagnosis of Pituitary Disease. *Order No. T–1503. Motion picture, 16 mm. (TFR), black and white, sound, 34 minutes, 1969.*

SUMMARY: William H. Daughaday, M.D., director, metabolism division, department of medicine, Washington University School of Medicine, states that past procedures for the diagnosis of pituitary diseases have depended upon measuring the concentration of the hormones secreted by the peripheral target glands or by inferences derived from the effects of these hormones on tissues. New developments in the field of radioimmunoassay have resulted in sensitive and specific methods for the measurement of all pituitary hormones except prolactin in peripheral plasma. This film summarizes Dr. Daughaday's findings in this field.

Kidney Function Tests. *Order No. T–1493. Motion picture, 16 mm. (TFR), black and white, sound, 43 minutes, 1969.*

SUMMARY: Elbert P. Tuttle, M.D., department of medicine, Grady Memorial Hospital, Atlanta, Ga., discusses the origin and meaning of renal function tests, including the blood urea nitrogen and the creatinine clearance tests. He discusses theoretical aspects of such tests and points out the variables that may influence them. He also presents information concerning the albumin-to-creatinine clearance ratio and underlines the usefulness of this value in relation to the nephrotic syndrome.

Applications of Insulin and Growth Hormone Serum Assays in Clinical Medicine. *Order No. T–1675. Motion picture, 16 mm. (TFR), black and white, sound, 28½ minutes, 1969.*

SUMMARY: J. Stuart Soeldner, M.D., Elliott P. Joslin Research Laboratory, Harvard Medical School, describes the general principles of the radioimmunoassay, with special reference to insulin and human growth hormone. Special emphasis is placed upon the "double antibody" variant which may have advantages over other variations of the technique.

These films are available on free short-term loan from the National Medical Audiovisual Center (Annex), Station K, Atlanta, Ga. 30324. Order films by title and number. Films should be requested at least 2 weeks before the preferred showing date; if possible, two alternate showing dates should be given. For purchase, order films by title and number from General Services Administration, National Archives and Records Service, Washington, D.C. 20209. Attn: Government Film Sales.