



Swimming: Pool Water Sanitation

WHY should we concern ourselves with sanitary and environmental precautions relating to swimming facilities? In part, this question was answered in an article appearing in THE CAPITAL'S HEALTH,¹ which dealt with the health and recreational aspects of swimming, the number of persons involved and scope of aquatic activities.

Since most swimming in Washington must be conducted in man-made "swimming holes" the sanitary and environmental precautions of care of the water and the pool itself are of prime importance.

Water

Water is the commonest and the uncommonest substance on earth. Without water man cannot long exist, but with too much water his existence is even shorter. Water always carries dissolved substances in it and almost always carries suspended matter with it. Thus, the true chemical formula for water might be written $H_2O + x$, with x representing the dissolved and suspended matter. Either the H_2O or the x can put an **ex** in front of you.

Some of the things the x contains are: (1) particulate matter introduced into water by bathers, wind and rain, such as leaves, algae, grass, earth, stones, sand, hair, lint, feces, and bacteria. Of these materials some are heavier than water and settle to the bottom, while others are lighter and float. When the turbidity of water increases, dangerous organisms may be present and unsightly sediment forms on the bottom and sides of the pool. Dangerous organisms may also be present when the water is quite clear. (2) Dissolved matter introduced into water through innumerable chemicals which cause chemical reactions changes the pH, alkalinity, and other important factors. These materials enter the water in swimming pools as solids, liquids, and even gases, such as carbon dioxide. (3) Immiscible liquids introduced in water by bathers and exuded from bathers, including body oils, greases, cosmetics, and lotions. These exudations do not dissolve in or mix with water. Some of them will stick to the pool shell as a scum, collect floating dirt, and provide conditions for the accumulation of dirt.

Bacteria, Viruses, Plankton

Numerous organisms, bacteria and viruses, live in water. **Bacteria** ranging in size from 0.000006 to 0.0024 inches are minute single-celled organisms which can double in number about every 20 minutes. Most bacteria and large animacules living in water are harmless, but some cause disease in man. Among the diseases that can be spread by organisms which can live in water are: cholera, typhoid fever, amebic dysentery, bacillary dysentery, diarrhea, hookworm, tapeworm, and intestinal disorders. Infections of the eye, ear, nose, throat, and skin also spread in swimming pool water.

Very little is known about **viruses**, the simplest form of life-manifesting material. Most viruses are too small to be seen with optical microscopes, but have been photographed by electron microscopes. The common cold and many nose and throat infections are due to viruses. Some viruses may live in pool water long enough to transfer an infection from one person to another. While

¹Caswell, J. Edgar, "Swimming: Health and Recreation." *The Capital's Health*, IV:3:2 (June, 1955).

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Availability and Recommended Use of Immune Gamma Globulin

The allocation of the supplies of gamma globulin for the past two years has been administered by the United States Public Health Service on authority of the Office of Defense Mobilization. The American National Red Cross participated in this program by making available all of its gamma globulin for allocation. In addition to the gamma globulin which normally accrues from the fractionation of plasma from outdated or otherwise unusable blood, the Red Cross undertook to pay the cost of furnishing a quantity of gamma globulin obtained from the Department of Defense. In the past two years it has made available 10,354,638 cc. of gamma globulin solution for allocation to states and territories. The National Foundation for Infantile Paralysis last year set aside several millions of dollars to help finance the production and distribution of gamma globulin for short-term, passive immunization of paralytic poliomyelitis. This was done in the hope that it would be of benefit while the field test of the poliomyelitis vaccine was being made on a nation-wide sampling. When the funds set aside by the National Foundation were exhausted, the American Red Cross continued to provide gamma globulin, though of course in a drastically reduced quantity.

On October 1, 1954 the product was made available to all through commercial channels. On December 31, 1954 the Office of Defense Mobilization discontinued allocation of gamma globulin. Consequently, the only gamma globulin now available to the Red Cross is that obtained from fractionation of outdated or otherwise unusable blood in its civilian program. Realizing that this amount is not sufficient to cover the needs of the entire country, a plan was proposed in February, 1955, and it was determined by their medical staff that the most satisfactory method of distribution of the bulk of the Red Cross gamma globulin was through the state and territorial health officers as a control point for equitable and accessible distribution. This was based on the need as reflected in the accumulated reports by the medical profession over the past several years. Therefore, it is of considerable importance that all diseases wherein gamma globulin is effective should be reported.

In the allocation plan it was determined that the method of allocation throughout the area served by the department of health would be the responsibility of the health officials. In developing the allocation plan many factors were considered by the Red Cross. The foremost of which were the following:

1. The cost of processing gamma globulin is shared by the Red Cross chapters in all states and territories.
2. The blood from which gamma globulin is prepared comes only from those areas which are part of the Red Cross Regional Blood Program.
3. The needs of the nation for gamma globulin for investigation of new uses must be met.

The Department of Public Health for the District of Columbia was notified in mid-February that the estimated allotment for Red Cross gamma globulin for the Washington, D. C. area for 1955 would be 8,610 cc. The delivery of our allotments were to be made quarterly. It was further stated that at the present time the supply

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polio virus has been reclaimed from fresh sewage, it has never been known to transmit polio through an adequately treated water supply. Likewise, it has never been proved that a child has caught polio from treated pool water.

Plankton, the tiny animals and plants which are larger than bacteria, may be seen by the naked eye. The only plankton which is dangerous to man is that which causes amebic dysentery. It is found in water freshly polluted with fecal matter. Other plankton are unsightly and annoying, such as water fleas, algae and the like.

Effect on Pool Water

Even these materials in very small amounts are impurities added to swimming pool water and have a considerable effect on the quality of water and the uses to which it can be put.

The various impurities that accumulate in swimming pool water must be removed or altered in form or the water soon becomes so cloudy as to be unsafe to swim in and so bacteria laden as to be a health menace. Suspended materials and immiscible liquids must be removed from the water. Dissolved matter must be treated chemically to neutralize undesirable effects.

Filtration and Disinfection

Because water in its natural state is not pure and may not be safe for use by man, it becomes necessary to treat the natural product. Nearly every city and town in the nation has provided water treatment facilities to assure their residents of water that is safe for use. When water is used for drinking, washing, cooking, laundering and in usual home and commercial activities it is used once and disposed of. With water in swimming pools the same is not true, the water cannot be used once and drained off. Thus, it is necessary to maintain a high standard of water quality and this is done by circulation of the water through filters and by disinfection.

Filtration is not disinfection. While filtering does reduce 70 to 80 percent of the bacteria present it is not sufficient by itself. Many bacteria and all viruses are so small that they can pass through the filter medium. Filters do remove plankton, but much of the plankton is not carried to the filters. Filtration does remove most of the suspended solids larger than bacteria, and thus prepares the water for disinfection. Disinfection of unfiltered water is not completely effective since bacteria may be inside larger particles which the disinfectant cannot penetrate.

Among the disinfecting agents such as chlorine, hypochlorite, bromine, silver, ozone, ultraviolet light, and most recently atomic radiation, the most practical for use in swimming pools are chlorine and hypochlorite. The latter two are actually the same since the active agent is chlorine in each case.

Chlorine oxidizes or "burns up" organic matter, probably causing death of bacteria by tying up enzymes and preventing them from carrying needed oxygen. Chlorine forms compounds with other chemicals in water. These may be from algae, oils, greases, urine, and other sources. As combined chlorine it is not as effective a bacteria killer as free available chlorine.

Chlorine not combined with other chemicals (the free available chlorine) is about 20 times as strong in killing bacteria as combined chlorine. Combined chlorine takes 100 times as long to do the same job as an equal concentration of free available chlorine. Tastes and odors produced by combined chlorine are also removed by free available chlorine.

Pool Chlorination

To adequately disinfect water for use in swimming pools the addition of chlorine by means of suitable apparatus is the most widely used and satisfactory method

of pool disinfection. The feeding apparatus used also makes it possible to vary the dosage to compensate for changes in the pool load. Chlorine may be applied as a solution of chlorine gas or as a hypochlorite solution, and the equipment should have the capacity sufficient to apply a dose up to 10 ppm of free chlorine to the entire pool content in two hours.

Extreme care must be exercised in use of gaseous chlorine since it is toxic. The equipment should be housed in a gas tight, rust resistant enclosure provided with a vent to the exterior of the building. The tanks in which the gas is stored should be away from direct sunlight and locked in place.

All equipment and apparatus necessary for the circulation, disinfection, and related systems of the pool operation should be readily accessible for facile operation, inspection, maintenance and repairs. It is essential that all equipment be maintained in satisfactory operating condition during the season or seasons the pool is in operation.

Operation of a swimming pool, with its intricate equipment and potentially dangerous toxic gases, requires the service of a qualified person who should be on duty whenever a pool is in use. To meet the needs of the metropolitan area for qualified swimming pool operators the health departments of the surrounding area, cooperating with pool operating agencies, have conducted training courses for the past several years. Upon satisfactory completion of the training course, Swimming Pool Operator's Permits have been issued. The display of this certificate at your favorite swimming pool tells you that the pool operator had been trained and has passed a technical examination on the operation and maintenance of swimming pools. Periodic sampling and inspections by the local health department, further assures you of an enjoyable, safe and healthful swim.

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was packaged in 10 cc. vials since these were on hand but production of 2 cc. vials would be started, and, after the supply of the original 10 cc. packaged vials had been consumed, the future production would be delivered in 2 cc. amounts.

To quote the Medical Director of the American National Red Cross, "We are aware that the demand will exceed the supply. Therefore, it will be necessary to refuse any requests over that which will be shipped to you in accordance with the schedule. A small quantity of gamma globulin has been reserved for research, investigational work and individual cases requiring larger quantities. If your supply is insufficient to care for these individual cases, they may be referred to us."

The Public Health Committee of the Medical Society of the District of Columbia and the Department of Public Health of the District of Columbia evaluating the problem have reached the following agreement:

1. For the prevention and modification of measles 0.1 cc. per pound of body weight to be furnished upon written request by a physician on his prescription blank giving the name, weight and address for any child under two years of age.

2. For use in infectious hepatitis gamma globulin may be obtained upon consultation with officials of the Bureau of Disease Control. Recommended dosage is 0.02 cc. per

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BUREAU OF LABORATORIES AND PHARMACIES

1. Examines specimens for diphtheria, enteric diseases, malaria, meningitis, tuberculosis, streptococcus, staphylococcus, pertussis, infectious mononucleosis, gonococcus, rabies, fungi, causative agents in food poisonings, brucella, pneumonia, parasitic infections, Vincent's Angina, Rickettsial diseases, or any specimen submitted from infectious diseases.

2. Examines specimens of water from drinking supplies, swimming pools, and stream pollution survey; and swabs from eating utensils, milk, cream, ice cream, foods, and drinking fountain heads.

3. Examines blood for RH, blood grouping, and Ascheim Zondek.

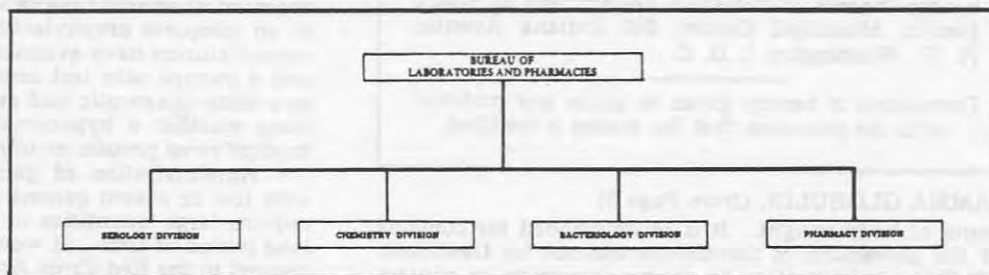
4. Conducts antibiotic sensitivity tests, bactericidal, and bacteriostatic tests, fungicidal, and fungistatic tests.

5. Analyzes milk, cream, ice cream and other milk products; food, water, drugs, air, urine (alcohol deter-

minations for Police Department), blood, samples in industrial hygiene problems, stream pollution survey, and samples submitted by the Coroner (toxicology), Police Department, Fire Department, and other departments of the District Government.

6. Conducts complement fixation and flocculation tests on blood and spinal fluid in the sero diagnosis for syphilis; conducts complement fixation tests for amebiasis and microscopic examination of slides for gonococcus.

7. Distributes biologicals to indigent persons upon request of physicians; supplies medicine for the indigent sick on prescriptions of the District physicians, clinics of the Department of Public Health, and the Public Assistance Division, Board of Public Welfare; and out-patient services of contract hospitals.

**John E. Noble Retires**

Following a year-long illness, "Doctor" John E. Noble, B.S., retired as Chief, Bureau of Laboratories and Pharmacies.

As has been the custom in the series MEET OUR STAFF, the following biographical sketch is included.

BIRTHPLACE: Branchville, South Carolina.

EDUCATION: Graduated Branchville High School, 1913; University of South Carolina, B.S., 1917; U.S. Army Medical School, 1919.

EXPERIENCE: Supervisor, Bacteriological Diagnostic Laboratory, Army Medical School, Washington, D. C., 1919-21; Bacteriologist, 1921-33; Chief, Bacteriological and Serological Laboratories, 1933-36; Director, Bureau of Laboratories, 1936-53; Chief, Bureau of Laboratories and Pharmacies, 1953-55.

AFFILIATIONS: Member, American Bacteriological Society; American Public Health Association.

PERSONAL: Residence, 1544 25th Street, S. E.; married Staley Toombs, 1923; one daughter, Nancy.

Dr. Wooldridge Named Coordinator

William N. Wooldridge, M.D., was designated Coordinator, Bureau of Laboratories and Pharmacies, in addition to his regularly assigned duties as Epidemiologist, Bureau of Disease Control, and will represent that Bureau in all its official activities.

Since 1936, Dr. Wooldridge has been associated with the Department of Public Health as a medical inspector of schools; Assistant Director, Bureau of School Medical Inspection, and since 1951, Epidemiologist.

After attending St. John's College, he entered Georgetown University from which he received his B.S. degree in 1926. Thereafter he attended Georgetown University School of Medicine and received his M.D., 1930. Following his internship at Georgetown University Hospital he entered private practice.

Dr. Wooldridge will serve as Coordinator pending further study of the organization of the Bureau of Laboratories and Pharmacies.

NEW FILM ADDED: "LIFE WITHOUT FATHER"

"Life Without Father," one of the programs of the FACE TO FACE television series on emotional health, has been put on 16mm. film. A copy of the 12-minute film has been given to Film Library of the Department through the courtesy of WTOP Television Station and Truman J. Keese, the writer-producer.

"Life Without Father," explains the emotional problems of a working mother and her two children—when husband and father are gone. It also shows the emotional problems grandmother experiences in trying to become a substitute for both parents.

As with other films in the Department's Film Library this film may be borrowed without charge by calling National 8-6000, Extension 2136.

NEW BOOK RECEIVED BY THE DEPARTMENT

GOOD HEALTH FOR YOU, YOUR FAMILY, AND YOUR COMMUNITY. Nelson S. Walke, Nathan Duscher, and Glenna G. Caddy. New York City: McGraw-Hill Book Company. 415 pages. \$4.75

An unusual and realistic college text which gives a thorough understanding of factors which determine individual physical and mental wellbeing and the interrelations affecting the family and the community. More than a third of the volume is devoted to modern concepts of public health including a chapter on first aid and disaster control. The numerous tables on dietary allowances, signs and symptoms of disease, diseases prevalent among certain workers, and others make this a very handy and ready reference book.

DISTRICT OF COLUMBIA



DEPARTMENT OF
PUBLIC HEALTH

"Not only to live but to be healthful in life."

DANIEL L. SECKINGER, M.D., Dr. P. H.
Director of Public Health

EDITOR - - - J. EDGAR CASWELL, M. A., Chief
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THE CAPITAL'S HEALTH is published monthly by the District of Columbia Department of Public Health, Municipal Center, 300 Indiana Avenue, N. W., Washington 1, D. C.

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GAMMA GLOBULIN, (from Page 2)

pound of body weight. It is recommended for contacts for the prevention of the disease and not for treatment.

3. For administration to pregnant women in contact with rubella. To be secured upon consultation of the physician and an official of the Bureau of Disease Control.

4. Gamma globulin may be indicated for prophylaxis in certain cases of poliomyelitis. It is not available however, for distribution by the Department of Public Health.

5. Administration of gamma globulin in mumps is not recommended since its effectiveness has not been established. Mumps vaccine is recommended for prophylaxis. Due to the fact that mumps is a widespread disease, few individuals fail to contract it during childhood, particularly in urban areas. The disease in children usually lacks the severe and complicating sequelae seen in adults. As a rule, one attack of mumps seems to immunize against subsequent attacks of mumps but second attacks have been reported. Therefore, it does not seem justified that general vaccination of children should be recommended unless special conditions exist.

The mumps vaccine is prepared from the allantoic fluid of chick embryos infected from the normal strain of the mumps virus. Persons who are known to be allergic to egg, chicken or chicken feathers may react unfavorably. Immunization of such persons is contraindicated. Or, in cases of necessity, the dose should be further subdivided and administered under close medical supervision. The recommended dosage is two injections of 1 cc. each administered either subcutaneously or intramuscularly. The interval for optimal immunization is not known, but one to four weeks between immunizations is suggested. It is felt that vaccinations repeated at annual intervals will keep the antibody titre at an adequate prophylactic level. The pharmaceutical manufacturers have available a mumps skin test antigen and a mumps skin test control. The former is of value as a clinic diagnostic tool and the latter serves to determine whether a hypersensitive response is due to the mumps virus protein or to normal egg proteins.

6. Administration of gamma globulin to individuals with low or absent gamma globulin in the serum would require large quantities of the gamma globulin over a long period of time. It would be considered as a special request to the Red Cross Area Medical Director.

It should be emphasized that the primary uses of gamma globulin established to date are for measles and infectious hepatitis. In order that the limited supply available to us may be sufficient, it is urged that gamma globulin be used for such cases. A special type of gamma globulin developed by Kemp of California for use in the rare cases of vaccinia has been evolved and further research for other uses are being carried on. However, there will be no supply allocated for distribution through the routine channels.

The Department of Public Health will make every effort to be as liberal as practical in the distribution of the product and urgently requests the cooperation of the medical profession to supply the necessary information for record keeping when requesting gamma globulin.

JOHN R. PATE, M.D., M.P.H. Chief
Bureau of Disease Control

District of Columbia Statistical Report

BIRTHS, DEATHS, AND INFANT DEATHS,
OCCURRING IN THE DISTRICT OF COLUMBIA
TWENTY-SIX WEEKS ENDING JULY 1, 1955

	Reported this week			Total 26 Weeks		
	White	Non-White	Total	White	Non-White	Total
Live births, 1955	577	214	791	9325	5393	14722
Live births, 1954	354	231	585	9176	5332	14508
Deaths, ¹ 1955	102	50	152	2764	1620	4384
Deaths, ¹ 1954	97	50	147	2792	1587	4379
Deaths under one year, 1955	5	6	11	188	210	398
Deaths under one year, 1954	13	5	18	206	154	360
Infant mortal- ity rate, ² 1955	--	--	--	20.2	38.9	27.0
Infant mortal- ity rate, ² 1954	--	--	--	22.4	28.9	24.8

¹ Includes deaths occurring at Glenn Dale Hospital.
² Deaths under one year per 1,000 live births.

COMMUNICABLE DISEASES REPORTED
WEEK ENDING JULY 1ST, 1955

	Resident Cases				Resident Deaths		
	Cur- rent week	Total this year	5-year median	Same week last year	Total to same date 1954	Total this year	Cur- rent week
Chickenpox	8	486	6	2	781	0	2
Diphtheria	0	2	0	0	0	0	0
Dysentery, Amebic	0	1	0	0	3	0	0
Bacillary	0	11	0	1	3	0	0
Influenza	1	81	0	0	14	2	0
Measles	6	350	17	17	2939	0	2
Meningitis, epidemic	1	8	0	0	13	3	4
Pneumonia	14	570	13	6	565	130	118
Poliomyelitis	1	5	1	0	4	0	0
Streptococcal Infections	4	189	3	3	266	0	0
Tularemia	1	1	0	0	0	0	0
Typhoid fever	0	3	0	0	2	0	0
Whooping cough	0	71	3	0	66	0	0
Salmonella	0	13	0	1	3	0	0