

Salmonella Isolations From Stuffed Natural Poultry Toys

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TRANSMISSION of salmonellae from poultry and poultry products to man has caused concern among public health workers and to the poultry industry (1-4). However, improved media and techniques have resulted in more frequent and efficient isolations of salmonellae, not only from apparent sources, but also from previously unsuspected origins. They have served also to reveal the ubiquitousness of salmonellae and the need for more effective methods of control.

In March 1965 a shipment of stuffed toys was received by the Pennsylvania Department of Health division of laboratories for routine bacterial examination to detect *Bacillus anthracis*. The shipment consisted of one stuffed natural chick, one stuffed natural duckling, and four artificial chicks made from chenille. These toys were destined, ultimately, for the retail sales market where they would be sold for Easter decorations.

The natural toys appeared to have been 2- or 3-day-old birds that were eviscerated and stuffed. The down was fluffy and the skin showed no evidence of shrinkage, but the method of preservation was not determined. Examination for anthrax bacillus was negative. Nevertheless, additional examinations were made to ascertain whether the toys harbored enteric pathogens.

Materials and Methods

To provide the optimum conditions for growth and detection of enteric pathogens the lactose pre-enrichment method of North (5), later confirmed by Taylor and Silliker (6), was used. The lactose broth was made up in double

strength proportions. Tetrathionate broth (BBL) (7) and selenite-cystine broth (Difco) (8) were used as the selective enrichment broths. Bismuth sulfite agar (BBL) and *Salmonella-Shigella* agar (BBL) were used as the selective plating media. Triple sugar iron agar and sulfide indole motility medium were used as the differential tube media.

Portions of the down, skin, and stuffing from each toy were removed aseptically, placed in 250-ml. Erlenmeyer flasks containing 100 ml. of lactose broth, and incubated 18-24 hours at 37° C. Bismuth sulfite agar plates and *Salmonella-Shigella* agar plates were streaked with portions of the lactose broth cultures, and approximately 2 ml. of the lactose broth cultures were transferred to 18 by 150 mm. tubes containing selective enrichment broth media: tetrathionate, 10 ml. each, and selenite-cystine, 7 ml. each.

Plates of selective agar media were streaked and incubated at 37° C. for 48 hours. The tubes of inoculated selective enrichment broth media were incubated at 37° C. for 24 hours and 48 hours, respectively. Plates of selective agar media were streaked from each of the enrichment broth cultures after each incubation period and then incubated 48 hours at 37° C. Colonies suggestive of enteric pathogens were picked from each plate and inoculated into differential tube media; then subjected to biochemical and serological studies as outlined by Edwards and Ewing (9).

Results

Three suspicious colonies were picked from each plate. *Salmonella* colonies were isolated from the plates that were streaked from the lactose pre-enrichment, selenite-cystine, and tetrathionate broth cultures on the natural chick and duckling and one of the four artificial chick

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toys. The *Salmonella* organisms were serologically identified as *Salmonella* Group E₁, and serotyped as *Salmonella give*.

A second shipment of toys—two natural chicks, two natural ducklings, and eight chenille chicks—was processed in the same manner. *S. give* was isolated from one chick and both ducklings, but from none of the chenille toys.

Serotyping results for both shipments were confirmed by the Enteric Bacteriology Unit, Communicable Disease Center, Public Health Service, Atlanta, Ga.

Discussion

Salmonella give was first described by Kauffman in 1937 (10). The organisms had been isolated from a patient in Spain with a chronic diarrhea. It has been isolated from children in the United States suffering from severe bloody diarrhea (11), from mesenteric lymph nodes of healthy pigs (12), and from chickens (13). It also has been found in imported spray-dried eggs (14).

Data in this study demonstrate that natural toys in both shipments were contaminated, but finding *Salmonella* organisms on only one of the four chenille toys in the first shipment, and on none in the second, suggests surface contamination.

The toys in the first shipment had been packed together in a 10- by 7- by 2½-inch box. Those in the second shipment had been packed according to type and enclosed in six 10¼- by 7½-inch brown envelopes.

There was neither an unusual increase in the number of isolations of *S. give* from human beings nor a report of an outbreak of salmonellosis attributable to these toys—perhaps because the toys were promptly removed from the retail market.

Whether the processing and preservation methods were sufficient to eliminate the *Salmonella* contamination from the finished product or whether the toy items were recontaminated after processing remains unresolved.

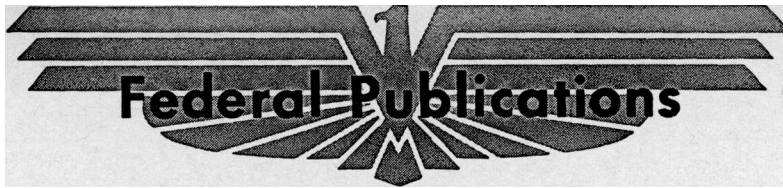
Summary

Eighteen imported toys, 6 eviscerated and stuffed 2- or 3-day-old chicks and ducklings and 12 artificial chicks made from chenille, were

examined for enteric pathogens. Five natural toys and one artificial chick were found to be contaminated with *Salmonella give*. The artificial toy may have been contaminated from contact with the natural toys.

REFERENCES

- (1) Edwards, P. R., Bruner, D. W., and Moran, A. B.: The genus *Salmonella*: Its occurrence and distribution in the United States. Kentucky Agricultural Experiment Station Bulletin 525, Lexington, Ky., 1948.
- (2) Edwards, P. R., Bruner, D. W., and Moran, A. B.: Further studies on the occurrence and distribution of *Salmonella* types in the United States. *J Infect Dis* 83: 220–231 (1948).
- (3) Edwards, P. R.: *Salmonella* and salmonellosis. *Ann NY Acad Sci* 66: 44–53 (1956).
- (4) U.S. Public Health Service Communicable Disease Center: *Salmonella* Surveillance Report No. 20, Special Report B. Atlanta, Ga., 1964, pp. 13–14.
- (5) North, W. R. Jr.: Lactose pre-enrichment method for isolation of *Salmonella* from dried egg albumin. *Appl Microbiol* 9: 188–195 (1961).
- (6) Taylor, W. I., and Silliker, J. H.: Isolation of *Salmonella* from food samples. IV. Comparison of method of enrichment. *Appl Microbiol* 9: 484–486 (1961).
- (7) Kauffman, F.: Weitere erfahrungen mit dem kombinierten anreicherungsverfahren für *Salmonellabacillen*. *Z Hyg Infektionskr* 117: 26–32 (1935).
- (8) North, W. R., and Bartram, M. T.: The efficiency of selenite broth of different compositions in the isolation of *Salmonella*. *Appl Microbiol* 1: 130–134 (1953).
- (9) Edwards, P. R., and Ewing, W. H.: Identification of enterobacteriaceae. Burgess Publishing Co., Minneapolis, Minn., 1962.
- (10) Kauffman, F.: *Salmonella* probleme. *Z Hyg Infektionskr* 120: 177 (1937).
- (11) Bornstein, S., Saphra, I., and Strauss, L.: Frequency of occurrence of *Salmonella* species. *J Infect Dis* 69: 59–64 (1941).
- (12) Rubin, H. L., Scherago, M., and Weaver, R. H.: The occurrence of *Salmonella* in the lymph glands of normal hogs. *Amer J Hyg* 36: 43–47 (1942).
- (13) Wallmann, W. L., Ryff, J. F., and Matthews, E.: Studies on the *Salmonella* group—methods of isolation and pathogenicity of strains occurring in the intestines of chickens. *J Infect Dis* 70: 253–262 (1942).
- (14) Soloway, M., McFarland, V. H., Spaulding, E. H., and Chemerda, C.: Microbiology of spray-dried whole egg. II. Incidence and types of *Salmonella*. *Amer J Public Health* 37: 971–982 (1947).



Heart Disease in Children. Training program in cardiology. *PHS Publication No. 1374; 1965; 74 pages; 35 cents.* Presents proceedings of a 4-day workshop on heart disease for physicians, nurses, and social workers. Includes a discussion of the anatomy of the circulatory system, major types of congenital anomalies of the circulatory system, methods of diagnosis and treatment, and the psychological impact of heart disease on children and parents. Discusses rheumatic fever and rheumatic heart disease and the epidemiology of congenital and rheumatic heart disease. Proceedings should be useful to clinical and public health workers in helping children with congenital or rheumatic heart disease.

A Guide for Teaching Poison Prevention in Kindergartens and the Primary Grades. *PHS Publication No. 1381; 1965; 95 pages.* Introduces the subject of poisoning prevention to children in kindergarten and grades 1 through 3 in a series of learning experiences involving interviews, excursions, discussions, games, plays, storytelling, and songs. Suggests grade placements for each unit, with the teacher selecting activities most appropriate to her classroom needs. Material is prepared to appeal to the child's natural desire to be regarded as more mature and knowledgeable and to encourage his eagerness to imitate his elders by protecting younger brothers and sisters.

Research Project Summaries, No. 2. *PHS Publication No. 1208-2; 1965; 110 pages; 60 cents.* Presents detailed information on 20 representative research projects selected from among 2,000 which make up the National Institute of Mental Health research grant program. Projects

described covered such subjects as the relationship between heredity and certain facets of behavior in mice, sleep, family communication as it relates to child development, brain waves and personality, drug tolerance, delinquent gangs, children of the rural South, and the brain's chemical coding system.

Current Research on Sleep and Dreams. *PHS Publication No. 1389; 1965; 125 pages; 65 cents.* Gives an up-to-date account of today's knowledge on the mental and physical aspects of sleep and dreaming. Includes findings about body cycles and life rhythms, sleep deprivations, sleep disorders, the chemistry of sleep, control over sleep and other states of consciousness, the dream state and meaning of dreams, and the development of infant sleep. Discusses significance of sleep research in treatment and understanding of mental and physical disorders.

Mental Illness and Its Treatment. Past and Present. *PHS Publication No. 1345; 1965; 18 pages; 20 cents.* Traces the historical development of man's recognition of and reaction to the problems of defective behavior among members of his social community. Presents facts and fancies about mental illness, from witchcraft practices to contemporary community mental health centers. Also contains information on research in mental health.

Research in Nursing—1955–1965. *PHS Publication No. 1356; 1965; 67 pages; 30 cents.* Contains brief descriptions of all 163 projects undertaken during 1955–65 with funds administered by the Division of Nursing. States title, purpose, and the period of support for each of the projects which fall into the areas of delivery of nursing care

services to patients in homes and health facilities; education, selection, and personal characteristics of the nurse supply; and ways of strengthening and communicating nursing research. Includes information about research settings, methods, and tools. Lists members of the investigating teams and tells where they may be reached for further information. Presents a subject index for easy reference.

Cancer of the Prostate. *PHS Publication No. 1352, Health Information Series No. 127; 1965; leaflet; 5 cents, \$2.75 per 100.* Describes the prostate gland and its function and malfunction in the body. Gives symptoms, methods of diagnosing, and treatment in prostatic problems. Stresses the importance of an annual examination for cancer of the prostate gland in men over 40. Also discusses research in cancer of the prostate.

What You Should Know About Oysters, Clams, and Mussels. *PHS Publication No. 1393; 1965; leaflet; 5 cents, \$2.50 per 100.* Explains to the consuming public how State and Federal agencies maintain health safeguards over the production and distribution of fresh or frozen oysters, clams, and mussels. Tells how shellfish sanitation controls operate and what is being done to improve the safety of shellfish as a food product.

This section carries announcements of new publications prepared by the Public Health Service and of selected publications prepared with Federal support.

Unless otherwise indicated, publications for which prices are quoted are for sale by the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C., 20402. Orders should be accompanied by cash, check, or money order and should fully identify the publication. Public Health Service publications which do not carry price quotations, as well as single sample copies of those for which prices are shown, can be obtained without charge from the Public Inquiries Branch, Public Health Service, Washington, D.C., 20201.

The Public Health Service does not supply publications other than its own.

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DIESCH, STANLEY L. (University of Iowa), and McCULLOCH, WILLIAM F.: Isolation of pathogenic leptospire from waters used for recreation. *Public Health Reports*, Vol. 81, April 1966, pp. 299-304.

Recreational use of water can become a hazard to man's health, as seen in 1959 and 1964 outbreaks of leptospirosis in one area in Iowa. The infected persons had swum in water to which cattle, swine, and wild animals had direct access or water into which pasture land drained.

When water samples from the bathing sites were examined by darkfield microscopy, a leptospiral-like organism was observed in one sample. Further studies indicated that the serotype was *Leptospira pomona*. The first isolation of pathogenic leptospire from natural waters in Iowa had been accomplished. Samples of heart blood, urine, and kidneys from five of six guinea pigs inoculated with the water sample in which the organism had been observed also evidenced leptospire when

examined by darkfield microscopy. Blood serums of five of the six animals contained agglutinins against leptospire.

Our growing population is demanding more water for recreational purposes. Supplementing recreational facilities established by Federal, State, and local governments, many privately operated recreational facilities are being established near centers of population. Ponds and other waters on farms are being used for recreation. Sometimes domestic animals share these waters; wild animals and lower forms of life also depend on the same waters. Preventive measures are needed to protect man against exposure to the agents of infectious disease that may be present in such recreational waters.

BENO, DAVID W. (U.S. Naval Hospital, Great Lakes, Ill.), and EDWARDS, EARL A.: Formalinized red cells in diagnostic virology. *Public Health Reports*, Vol. 81, April 1966, pp. 377-381.

Hemagglutination tests with 29 viruses, using seven types of fresh and formalinized red blood cells of human and animal origin, showed that human and animal cells stored for 5 to 6 months could be employed provided proper precautions were observed. Influenza, parainfluenza, Newcastle disease, and mumps viruses, as well as adenoviruses, reoviruses, and a

miscellaneous group, were tested on human cells of blood groups A, O, and B and on cells of rats, monkeys, sheep, and chickens.

Use of fresh and formalinized red cells in a presumptive identification of certain hemagglutinating viruses now appears to be feasible.

PRICE, JAMES, Jr. (Pennsylvania Department of Health): *Salmonella* isolations from stuffed natural poultry toys. *Public Health Reports*, Vol. 81, April 1966, pp. 387-388.

In a laboratory study of imported natural poultry and artificial toy items, 6 of the 18 toys examined were found to be contaminated with *Salmonella give*. The natural poultry toys were 2- or 3-day-old birds that were eviscerated and stuffed. The method of processing and preserving these toys was not determined.

Isolation of *Salmonella* organisms from these toys destined for the retail market as Easter basket decorations revealed a source of potential outbreaks of salmonellosis. The study emphasizes the ubiquitousness of *Salmonella*, the value of continual surveillance, and the need for more effective methods of control.

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PEDERSEN, A. H. B. (Seattle-King County Health Department), and KELLY, R. E.: *Rapid biochemical presumptive test for gonorrheal urethritis in the male. Public Health Reports, Vol. 81, April 1966, pp. 318-322.*

An initial trial of a rapid biochemical test for the presumptive clinical diagnosis of gonorrheal urethritis in the male was carried out on 288 male patients attending the venereal disease clinics of San Diego, Calif., and Seattle, Wash. Both clinics reported a 78 percent positive agreement between the biochemical and the standard bacteriological tests. This result at present represents the degree of sensitivity of the biochemical test. It seems likely, however, that if patients had been selected on the basis

of a more clinically obvious discharge, the sensitivity level would have been even higher than that obtained in the trial.

The specificity level of the test should be investigated in a population group other than that attending a public venereal disease clinic.

Present sensitivity levels justify further clinical investigation to assess the potential usefulness of this biochemical test in the epidemiologic control of gonorrhoea.

FLOM, MERTON C. (University of California School of Optometry, Berkeley), and NEUMAIER, RICHARD W.: *Prevalence of amblyopia. Public Health Reports, Vol. 81, April 1966, pp. 329-341.*

Amblyopia is a catchall term for unexplained reduction of visual acuity, usually in one eye. In spite of any refractive error being neutralized with lenses and in the absence of detectable eye disease, the acuity of the eye is still below normal. As long as amblyopic persons have one normal eye, their visual problems are more potential than actual.

Many public and private agencies are embarking on programs of screening, diagnosis, and treatment of amblyopia. They are motivated by the prevalence of amblyopia found in samples of World War II inductees (1.8 to 4.0 percent) and in samples of eye patients (4.5 to 5.3 percent). Prevalence in these samples, however, is higher than that expected for the general population of adults or children.

In the present investigation, 1.0 percent of 2,762 school children had monocular amblyopia of 20/40-or-worse acuity with a difference between the eyes of more than one acuity line. Newly discovered amblyopia amounted to 0.4 percent. If account is taken of those amblyopic children who were perhaps missed by screening (0.2 percent) and those children who received preschool treatment which may have prevented or

eliminated an amblyopia (0.6 percent), the prevalence becomes 1.8 percent.

In a sample of 7,017 persons 10 to 50 years old who attended the clinic of the University of California School of Optometry, Berkeley, prevalence of amblyopia was found to be 1.7 percent when a criterion of 20/40-or-worse acuity with more than one line difference between the eyes was used. This proportion, substantially less than usually found in clinic samples, probably reflects the large number of visually normal persons who attend the university clinic.

Of all the amblyopic persons found in the samples of school children and patients, only a small proportion had worse than 20/200 acuity (legal blindness), and a large proportion had acuities in the region of 20/40. In this region, prevalence of amblyopia was found to change markedly with a small change in the acuity criterion.

There was no significant difference in the prevalence of amblyopia between kindergarteners and children in grades 1 through 6. Since amblyopia seems to develop only rarely after children reach school age, a similar prevalence is expected in children and adults.

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KLERMAN, LORRAINE V. (Yale University School of Medicine), JONES, JANE G., and HULL, MONA C.: Puerto Ricans in a small U.S. city. Peace Corps trainees undertake a survey of health and other adjustment problems. Public Health Reports, Vol. 81, April 1966, pp. 369-376.

As part of a Peace Corps training program, a survey was undertaken of health and other adjustment problems among Puerto Rican and other Spanish-speaking households in a small U.S. city. The trainees conducted interviews in 33 households containing 166 persons. The number of occupants per household was generally large, owing not only to the number of children but also to the presence of other relatives and friends. There were more than twice as many preschool as school-age children. Most of the households were concentrated in a small and dilapidated area of the city.

The survey uncovered health problems such as limited knowledge of medical care

resources, a low level of immunization, and little health insurance coverage. Difficulties in adjustment were also found in the areas of language, employment, housing, and recreation. One of the few organizations offering specialized services to this group was the local Catholic church, which provided transportation to Spanish services.

In addition to obtaining information about the Puerto Ricans, which helped local and State agencies plan remedial programs, the study served as an educational opportunity for the Peace Corps trainees and as a possible prototype for use of volunteers by other agencies.

GANEM, BARBARA T. (Massachusetts Department of Public Health): Source of admissions for tuberculosis to five Massachusetts sanatoriums. Public Health Reports, Vol. 81, April 1966, pp. 363-368.

An analysis of 274 tuberculosis patients hospitalized in 5 Massachusetts sanatoriums during a 3-month period emphasized the original source of referral for admission. Other factors considered were the bacteriological status on admission, duration of symptoms, contact history, and age and sex distribution. The study was undertaken to aid in the development of new tuberculosis control programs directed toward eventual eradication of the disease.

A particularly significant finding was that 43.4 percent of all patients and 66.8 percent of those with new cases were first seen by a physician because of illness. By the time of diagnosis, symptoms were often prolonged and the sputum positive. Ex-patients referred because of reactivation composed 31.8 percent of the sample.

Only 12.8 percent of the patients were first identified as a result of survey screening procedures.

The age and sex distribution reflected current epidemiologic patterns, that is, a preponderance of men over 40 years of age. In spite of this, there were still sufficient women of childbearing age to warrant attention.

Because practicing physicians in private offices or clinics seemed to bear the burden of early diagnosis, frequent, routine, and prompt use of the tuberculin test and chest X-ray by practitioners was recommended.

Also, the 31.8 percent of the sample who were ex-patients under supervision point to the importance of adequate followup facilities for outpatients.