

completely than the specialist could ever neglect general medicine. Only no one seems to have felt the importance of warning the profession of this greater danger. The oculist regarded the eye as his peculiar province; was inclined to think contemptuously of any acquaintance with it possible to the general practitioner, and was selfishly willing that information regarding it should always be sought through himself. He has now for years recognized that the process of confining this knowledge to the specialist has gone too far, and he has tried, in elementary papers and addresses before general medical societies, to combat the prevailing ignorance. But the results of efforts along these lines have not been sufficient to bring the general profession to any adequate appreciation of what all physicians and surgeons might learn, and ought to learn through careful study of the eye.

With the development of modern ophthalmology, in the last half-century, have come the special journals, aggregating now between twenty and thirty thousand pages per year, into which have been poured the records of the enormous number of observations regarding newly discovered facts in this domain of medicine. There have grown up, too, the special societies, and sections of general societies, to which were relegated the discussion of these newly observed facts. The general practitioner of to-day is thus distinctly at a disadvantage, with regard to keeping posted in the new knowledge of ophthalmology, as compared with the general practitioner of fifty years ago. The fact that the practice of ophthalmology is destined to be in the hands of the specialist has robbed this branch of any interest for the general medical student, beyond a sufficient knowledge of it to pass his examination in those schools in which an examination in it is required as a step toward the medical degree.

If the general medical profession is to be brought to appreciate the importance to it of modern ophthalmology, we must begin with the medical student. Admit that the average medical student does not look forward to practicing ophthalmology, neither will he practice chemistry for a profession, nor dissection, nor pharmacology. The great mass of medical men will leave bacteriology and pathologic histology in the hands of specialists. Yet these branches claim a very large proportion of the years spent in undergraduate study. Their educational and developmental value, which are unquestioned, and which justify the attention paid to them, is less closely related to practical medicine and surgery than that of a similar training in the examination of the eye, particularly with the ophthalmoscope.

The anatomic method, sedulously developed and cultivated for one hundred and fifty years, since Morgagni systematically sought "the seat of disease," has made its contribution, has laid its foundation stone in the great temple of medical science. No man working in the dead-house, though, like Rokitsansky, who will celebrate his thirty thousandth postmortem examination, will ever again make a revolutionary contribution to our knowledge of disease. In the enormous swelling of the choked disc and the great changes in the color of the disc and in retinal or chorioidal pigmentation compatible with full vision, we have evidence that anatomic appearances may prove misleading. Appreciation of the fact that the anatomic method was approaching the limit of its development may be found in the London and Rome addresses of its greatest exponent, Virchow.

We are turning again to the study of disease in the living body. This is well exemplified in the address of William H. Welch on Adaptation in Pathologic Processes, delivered in Washington ten years ago, and in that on Neurology, by Putnam, at the Congress of Arts and Science, in connection with the World's Fair in this city. In the accurate study of pathologic processes during life, the skilled examination of the eye, particularly with the ophthalmoscope, must always play an important and in the near future a leading part.

Twenty-eight years ago Gowers suggested that all medical students should be taught to use the ophthalmoscope as a part of their course on anatomy. Has not the time arrived when this suggestion should be carried out? There are other directions in which clinical anatomy, as distinguished from postmortem anatomy, needs to be cultivated. But here, surely, is one point in which the training of the medical student might bring him into closer relation with the clinical problems of disease. Only when we have a generation of medical men so prepared for their life work will the importance of ocular lesions in general pathology and general diagnosis be fully appreciated.

Original Articles

INFANT MORTALITY IN THE SUMMER MONTHS.

METHODS ADOPTED IN YONKERS FOR ITS REDUCTION AND THE RESULTS.*

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Infant mortality in Yonkers during the early nineties was increasing at a greater ratio than the growth of the city. The deaths were at the maximum in July and August, and the chief causes of death were the various forms of digestive disorders. If this unnecessary waste of infant life had been allowed to go on unchecked it would have assumed alarming proportions. Two thoughtful men, one a physician, the other a layman, considered the subject and decided to take some steps to reduce the mortality. In 1893 the Nathan Strauss Milk Dispensary was opened in New York, and it was deemed a wise move to establish a similar dispensary in Yonkers, and in consequence the Milk Dispensary of St. John's Riverside Hospital was opened in 1894 and has been in operation during the summer months every year since with the exception of the summer of 1904, when it seemed impossible to procure a supply of pure milk. The founders believed that if such a dispensary were successful it would be more effective in a small community, as Yonkers had at that time a population of about 37,000, and a larger proportion of the children living in the tenements could be reached, and all physicians urged and encouraged to help in the movement, and it would be a comparatively easy matter to study accurately the death rate.

With the establishment of the milk dispensary a vigorous campaign of education was inaugurated through the press, by personal interviews with physicians, and by means of cards of instruction for mothers. Up to this time no municipal action had been taken to insure

* Read before the First District Branch of the Medical Society of the State of New York, Oct. 28, 1907.

a supply of clean milk. The city officials were urged to take the necessary steps and the dairymen were encouraged to send clean milk to the city. A close watch was kept of the deaths and careful statistics compiled. The result of the first season did not show a lowering of the death rate; the second season a marked decrease was shown, and the third season a decrease of 50 per cent. in the number of deaths from digestive diseases.

In the *New York Medical Journal*, Oct. 9, 1897, appeared a statistical study of the effect of the campaign on infant mortality in Yonkers, and the claim was then made of a 50 per cent. reduction in infant mortality due to digestive disturbances and that the reduction could be maintained, and it is proposed now to give figures of infant mortality in Yonkers for the succeeding ten years and draw deductions from them.

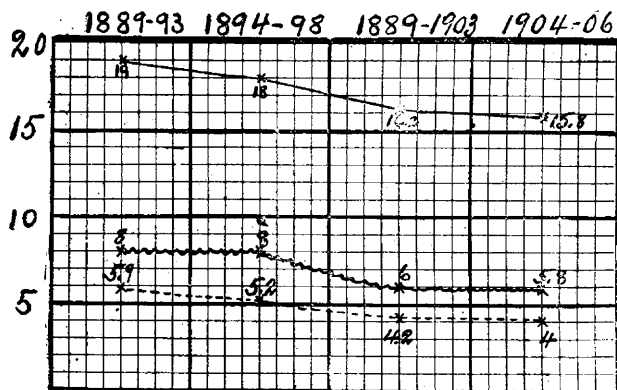


Chart 1.—Death statistics, 1889-1906. Solid line, death rate all ages per m. of population; wavy line, children under 5, per m. of whole population; dashed line, infants under 1, per m. of whole population.

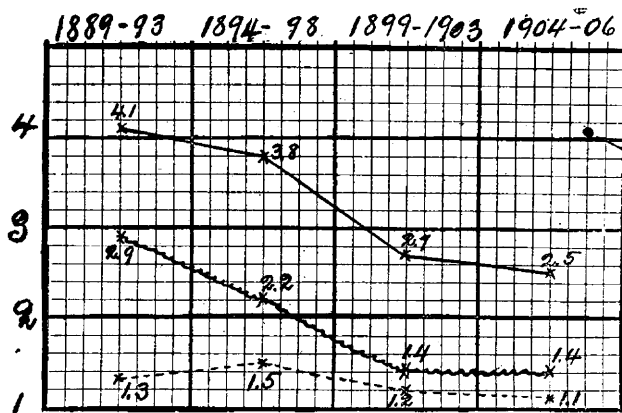


Chart 2.—Death statistics, 1889-1906, for June, July, August and September. Solid line, deaths children under 5, per m. of whole population; wavy line, deaths children under 5 from digestive diseases per m. of whole population; dashed line, deaths children under 5, all other diseases, per m. of whole population.

The problem of infant mortality in the summer months is not wholly one of impure milk, although it is the largest factor; the other factors are overcrowding in the tenements, ignorance of mothers in caring for and feeding their babies and (in the early years of the campaign) imperfect attention on the part of physicians to the feeding of infants brought up on the bottle, and, further, the irrational method of treating these babies when they are suffering from digestive disorders and toxemias. As a result of the agitation inaugurated fourteen years ago great advances have been made in all directions, not so much, perhaps, as had been hoped for,

but a slow, continued progress, which will be accelerated as the public becomes enlightened and realizes the importance of the movement.

The steps of our advancement in Yonkers may be enumerated as follows: Twelve years ago the city appointed a milk inspector, and soon afterward came the adoption of a sanitary code pertaining to the production and sale of milk, registration of all producers and dealers in milk, inspection of all local dairies, and inspection of stores retailing milk, with the result that the number of places where milk is sold at retail has been more than halved, although the population has doubled.

For the past five or six years the city has employed a veterinarian to examine all cows within the city limits. The milk coming into the city from without has improved in quality, but the dairies where it is produced are not inspected, and here is the weak point in our defense. An assistant milk inspector has been appointed, and it is planned to maintain a rigid inspection of all dairies sending milk to Yonkers.

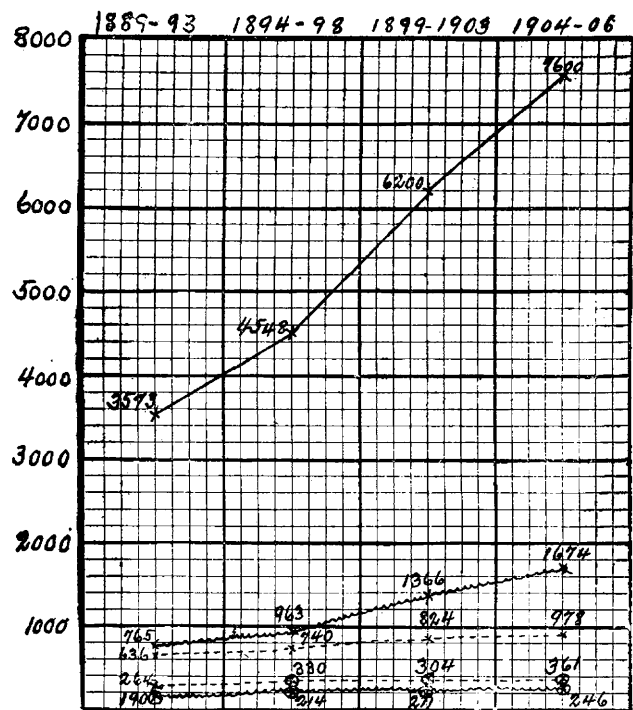


Chart 3.—Death statistics, 1889-1906. Solid line, average population children under 5, in 5-year periods (estimated on U. S. census, 1890-1900); upper wavy line, average population in infants under one; upper dashed line, total deaths in 5-year periods; lower dashed line, deaths children under 5, in 5-year periods; lower wavy line, deaths infants under 1, in 5-year periods.

About ten years ago the first sanitary inspector was appointed, a woman of rare intelligence, zeal and training, and largely through her efforts the sanitary condition of the tenements has been improved, a number of the old houses have been condemned and vacated by the Board of Health and many others have been placed in a sanitary condition. More recently a practical plumber has been appointed, an additional sanitary inspector, and a systematic inspection of tenements was begun.

The first district nurse was put to work about eight years ago and at present four are regularly employed, the funds being supplied by voluntary subscriptions, and during the past three summers the board of health has employed two additional nurses to look after sick infants. One other cause for betterment which will

largely count in the future was the adoption two years ago by the board of health of regulations requiring in all new tenements a sufficiency of light and air.

The mothers are still ignorant, but in most cases they will listen to reason, and the physicians, especially the younger ones, have learned and appreciate the art of infant feeding and some few have become experts. The treatment of diarrheal diseases has been revolutionized in the last fifteen years; the old shotgun prescriptions are things of the past, and the physician to-day takes steps to prevent the summer digestive disturbances, and attempts to cure the sick infant in a rational manner.

There are two other supposed factors in the causation of these deaths, not controllable, the high temperature and the humidity of the summer months, and the prevalence of an epidemic of one of the exanthemata, in the preceding winter or spring, leaving a lot of children in

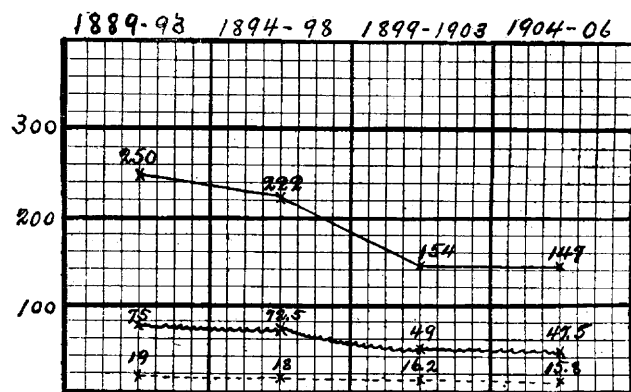


Chart 4.—Death statistics, 1889-1906. Solid line, death rate infants under 1, per m.; wavy line, death rate children under 5 per m.; dashed line, death rate all ages per m.

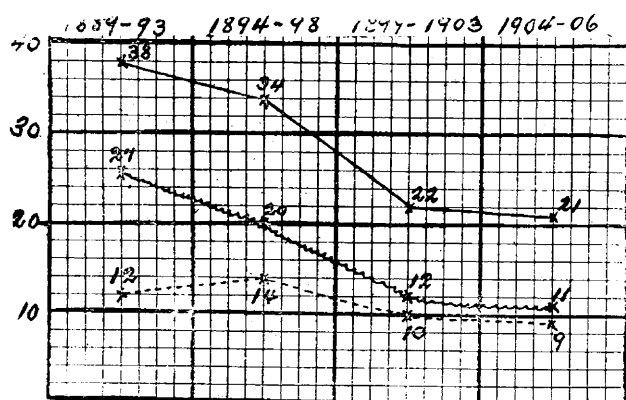


Chart 5.—Death statistics, 1889-1906, children under 5 for June, July, August and September. Solid line, total deaths children under 5; wavy line, deaths, digestive diseases, children under 5; dashed line, deaths from all other causes, children under 5.

a weakened condition, ill prepared to withstand and overcome the toxemias so liable to occur in the summer months. A close watch has been kept of the deaths to enable us to form some opinion on these points. Careful observation has failed to show increased mortality traceable to continued high temperature or humidity. The highest temperature and humidity of recent years in this latitude was in 1901, and the infant mortality during that summer was the lowest of which we have any record. The deaths apparently increase after rapid and frequent changes in temperature and are most frequent after a sudden drop in temperature following a heated term.

An epidemic of measles in the late winter or early spring seems to predispose to an increase in the number of deaths from digestive diseases in the following summer months. The same is true of whooping cough, but to a larger extent. In the case of scarlet fever and diphtheria no observations have been made, these diseases being endemic in recent years. As comparatively few cases of measles and whooping cough are reported to the board of health, these observations can not be put into figures.

The statistical summaries now presented will show the results accomplished in Yonkers. They cover a

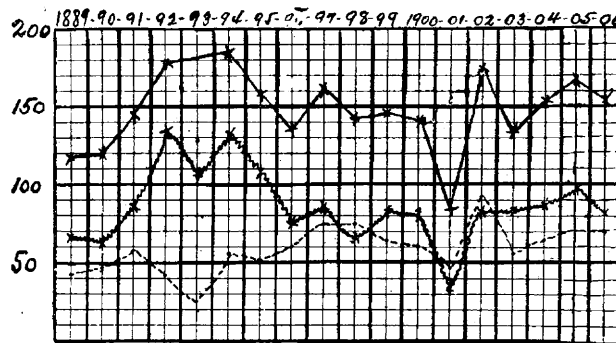


Chart 6.—Death statistics, 1889-1906, for June, July, August and September. Solid line, deaths children under 5 years from all diseases; wavy line, deaths children under 5 years from digestive diseases; dashed line, deaths children under 5 years from other diseases.

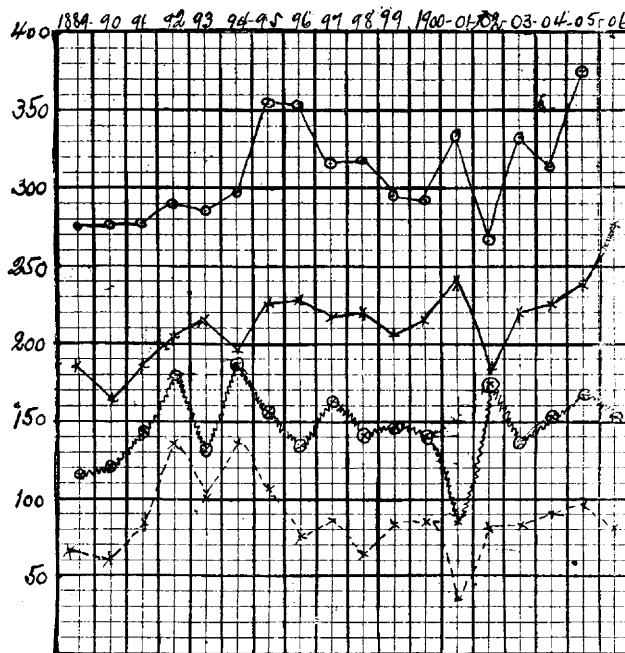


Chart 7.—Death statistics, 1889-1906. Upper solid line, total deaths children under 5 for whole year; lower solid line, total deaths infants under 1 for whole year; wavy line, deaths children under 5 for June, July, August, September; dashed line, deaths children under 5 for June, July, August, September, from digestive diseases.

period of eighteen years, from 1889 to 1906, inclusive, and have been averaged in four periods, three of five years each and one period, the last, covering three years. The first period represents the five years preceding the establishment of the milk dispensary; the last three periods, thirteen years in all, are the years the milk dispensary has been in operation.

Chart 1 shows a decrease of the total death rate from

19 per 1,000 to 15.8 per 1,000. The death rate of children under 5 has decreased from 80 per 10,000 of the total population to 58 per 10,000, and among infants under 1 year from 59 per 10,000 to 40 per 10,000 of the total population. There has been a decrease in the total death rate of 32 per 10,000, and 22 per 10,000 of the decrease has been among children under 5 years and 19 per 10,000 among infants under 1 year. That is, about 70 per cent. of the decrease in the total death rate has been among children under 5 years, and most of this decrease is among infants under one year.

In Chart 2 the deaths of children under 5 years, occurring during the months of June, July, August and September from 1889 to 1906 inclusive, have been averaged in the same manner as in Chart 1. The deaths have decreased from 41 per 10,000 of the total population to 25 per 10,000, and the deaths from digestive diseases show a decrease from 29 per 10,000 to 14 per 10,000, a fall of over 50 per cent. Of the decrease of 22 per 10,000 of total population shown to have occurred in the mortality of children under 5 years 16 per 10,000 has occurred in the four summer months and 15 per 10,000 from digestive diseases in these months. More than two-thirds of the total decrease in mortality noted in children has occurred in the four summer months and among diseases of one class—digestive disorders.

Chart 3 shows the average number of children under 5 years living in Yonkers at the various periods, estimated on the basis of the United States census of 1890 and 1900.

Chart 4 is based on these estimates and shows a decrease in the death rate of children under 5 years from 75 per 1,000 to 47.5 per 1,000, and a decrease among infants under 1 year from 250 per 1,000 to 147.5 per 1,000.

As shown by Chart 5, the deaths among children under 5 years in the four summer months have decreased from 38 per 1,000 to 21 per 1,000. The deaths from digestive diseases have dropped from 27 per 1,000 to 11 per 1,000. The decline in the death rate of children under 5 years, as shown by this table, is abrupt and striking, and especially among those dying from digestive diseases, the decrease being more than 60 per cent. The deaths from all other causes have decreased but 1 per 1,000.

Chart 6 shows graphically the large excess in the first period of deaths from digestive diseases during the summer months over all other causes of death and the rapid fall in the deaths due to digestive diseases after the establishment of the milk dispensary, and the approximation of deaths from digestive diseases to the deaths from all other causes.

In Chart 7 the total number of deaths among children under 5 years are shown as occurring each year, also the deaths of infants under 1 year, and the lower line gives the total number of deaths of children under 5 years for the months of June, July, August and September for the same years. The two upper lines ascend gradually, somewhat in keeping with the growth of the city, which has more than doubled its population in the last eighteen years. It will be noticed that the deaths of children in the summer months have not increased, notwithstanding the growth of the city.

The claim made ten years ago that a reduction of 50 per cent. had been effected in the deaths of children from digestive diseases has been more than substantiated; furthermore, the saving of life in the summer

months has reduced the death rate of the city 15 per 10,000 as compared to a reduction of 17 per 10,000 from all other diseases at all ages and during the whole twelve months. In other words, half of the reduction in the mortality in Yonkers was effected in the four summer months from one class of diseases and among children under 5 years of age.

If the death rates of 1889 to 1893 had prevailed in the summers of 1906 and 1907 there would have been an increase in the number of deaths of children from digestive diseases of 108 and 101 respectively, a good showing for four months in a population of 70,000.

We firmly believe the measures adopted in Yonkers to reduce infant mortality were the means which produced the results, and we are of the opinion that the most effective of the means adopted was the establishment of the milk dispensary. Taken as a whole, the value of the work in Yonkers has been educational, and here is where much of its success lies. It has been impossible to feed all the bottle babies or even a large proportion of them—the largest average number fed was something over 200. The seed was planted by the milk dispensary and it has taken root and grown. To conduct a campaign successfully as planned in Yonkers requires enthusiasm, dogged perseverance and intelligence, and my opinion is that if we had injected more of these qualities the results would have been greater.

One word about pasteurized milk. We have always looked forward to the day when public opinion would demand a milk which would not require pasteurization, and we fully believe it to be almost at hand. For the children living in the tenements pasteurization and proper modification will always be necessary, as the mothers often are busy, and more often are ignorant and can not attend to many details, so that the cleanest milk becomes contaminated in the hot tenement. Consequently the milk dispensary has an established place in all cities where efforts are being made to reduce infant mortality from digestive diseases.

The milk dispensary of St. John's Riverside Hospital has been placed on a permanent basis, this summer having been moved to a building especially constructed for its use and a strong committee organized to conduct it.

CONCLUSIONS.

The problem of reducing infant mortality from digestive diseases in cities can be summed up in a few words. Clean milk, properly proportioned, for those infants and young children who can not be fed on the breast, and intelligent care and feeding by the physicians and parents. To produce these results we would suggest the following as the necessary means:

First.—Rigid state or municipal inspection of all milk from the producer to the consumer.

Second.—Milk dispensaries properly to modify clean milk in feeding bottles ready for use. The milk may be pasteurized if it is to be used in the tenements.

Third.—Campaign of education to instruct both physicians and parents in the art of infant feeding and urge on the officials the necessity and economic value of clean milk.

Fourth.—Employment of trained nurses in the summer months to follow up cases of digestive disturbances in infants and to aid physicians in their work.

Fifth.—The continued improvement of tenement houses so that the dwellers may have the benefits of proper sanitation and plenty of fresh air and sunlight.

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