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SMALLPOX

AND

ITS PREVENTION

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Smallpox and Its Prevention

Progress in the prevention of disease was the great work of the 19th century. In this period man conquered diseases which in former times had aroused only fear and horror. Among these, smallpox especially had been the terror of the people of Europe. Its widespread character had made it the greatest enemy of mankind. Toward the close of the 18th century, however, Edward Jenner, an English physician, devised the method of vaccination. With the wide use of this discovery in all civilized countries, smallpox has become a mild and rare disease.

SMALLPOX AN OLD ENEMY

We learn from history that smallpox occurred frequently in ancient times. It spread widely during the middle ages, attacking cities and towns throughout Asia and Europe. By the year 1600 some part of Europe was always in its clutches. In 1774 an epidemic attacked the entire population of Chester in England, leaving only about seven in every hundred unharmed. Similar conditions existed in other cities, among which were Glasgow, London and Berlin.

The same was true in America. Whole tribes of Indians, free from smallpox until the coming of the white man, were wiped out. The colonists suffered severely, and the Revolutionary armies at Cambridge and Valley Forge were unable to avoid its ravages. An epidemic would die out only to be followed by a greater one. It was usual, in walking through the streets of cities, both here and abroad, to meet people whose faces were pockmarked. Few persons who lived a life of normal length were fortunate enough to escape.

You will be interested in a description of this disease. Smallpox is an acute contagious disease. Its symptoms are sharp chills, followed by fever, severe headache, backache, nausea and vomiting. After three days, the fever goes down and an eruption begins to appear on the face and hands in the form of firm red pimples. In mild cases there may be few of these pimples, and they may not spread to other parts of the body. Within a day or two after the eruption, fluid begins to form within the pimples. By the eighth day the eruption is at its height, and the temperature again begins to rise. Many of the pimples break, and the body is bathed in pus of a very disagreeable odor. When the case is a mild one the fluid dries, no sores are formed, and the patient does not feel very ill. In well-marked smallpox, on the other hand, the eruption is found over the entire body. The patient suffers great pain and "tosses from side to side, seeking rest that he does not find."

THE DISEASE DESCRIBED

It was this disease that Europeans continued to face in an unresisting attitude. In the East, however, the Turks discovered a method that insured a slight degree of freedom from the worst results. They noted that one who lived through an attack of smallpox rarely, if ever, had the disease again. Seldom was there an exception to this rule. On the strength of their observations they inoculated healthy human beings with the disease. The result was that these people, at a time when they were capable of a high resistance, developed mild cases of smallpox. Thus they were protected from severer infections later in life.

This method attracted the attention of Lady Mary Wortley Montagu, the wife of the English ambassador at Constantinople. In 1721 she introduced it into England. Soon afterward her example was followed by Cotton Mather and Doctor Boyleston in America. The process was often successful as far as the inoculated person was concerned, for he was protected

INOCULATION AGAINST SMALLPOX

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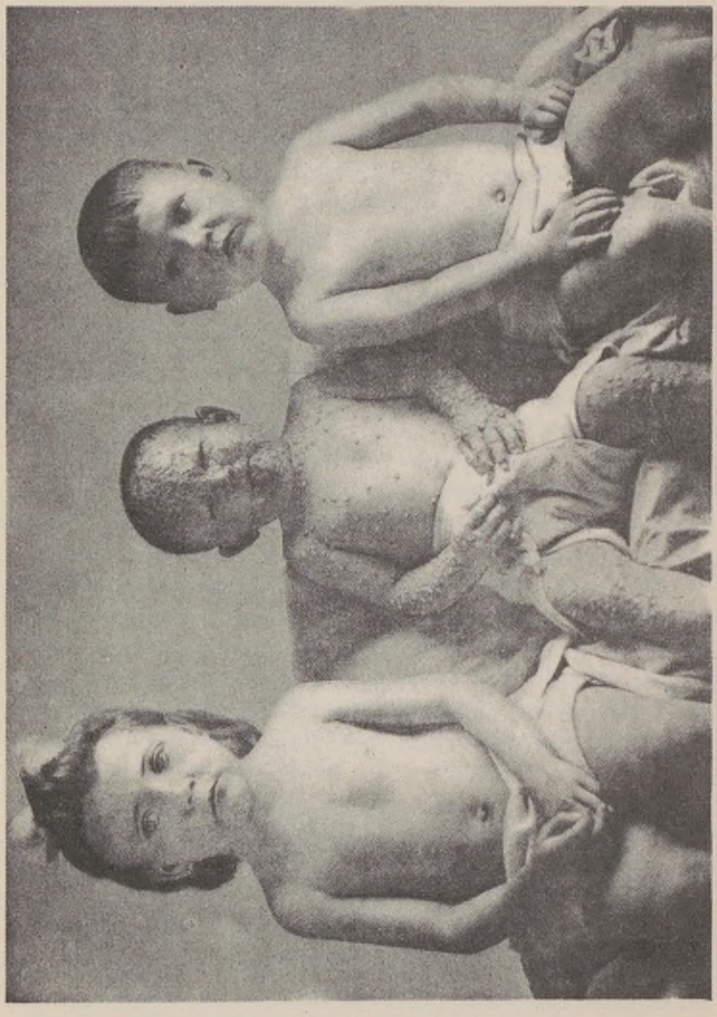
against smallpox for the rest of his life. There was this danger, however: the person so treated often acted as an agent for the spread of the disease to others who were not so well prepared to withstand the effects of the contagion.

Years later, Edward Jenner, a physician working in the dairy districts of England, was amazed at the beautiful complexions of the milkmaids. He observed that these girls were rarely attacked by smallpox, and that their appearance formed a striking contrast to the pocked faces of persons in other walks of life. At once, the idea flashed across his mind that perhaps infection with cowpox protected these dairy people from the effects of the more dangerous smallpox. In order to verify this casual observation he studied the disease carefully, and was soon convinced that these girls and others who did not get smallpox had at one time or another been infected with cowpox. Finally, on May 14, 1796, Jenner vaccinated James Phipps, a boy of eight years, with the virus or infectious material taken from a cowpox sore on the hand of Sarah Nelmes, a dairymaid. Several weeks later Jenner exposed the boy to actual smallpox infection, but the lad did not take the disease. Again and again he was inoculated with the virus of smallpox, and each time, as before, no evil effects followed. During the next two years he vaccinated more individuals, and they, like James Phipps, when exposed to smallpox infection, did not become victims of the disease. Jenner named this new principle "vaccination," from the Latin word *vacca*, meaning cow.

THE BEGINNINGS OF VACCINATION

He was finally convinced of the value of his discovery, and made it known to the medical profession in 1798. At first doctors were very doubtful, but after a few years many recognized its value. In a very short time vaccination was generally practiced in all civilized countries.

Soon after the value of vaccination was made known to the world, wonderful results were observed from its use. In



THREE CHILDREN BROUGHT WITH THEIR MOTHER, WHO HAD SMALLPOX, TO DETENTION HOSPITAL. THE CENTER CHILD WAS UNVACCINATED; THE OTHER TWO WERE VACCINATED A YEAR BEFORE AND REMAINED PERFECTLY WELL.—From Welch and Schamberg's "Acute Contagious Diseases."

1796 about 18 deaths out of every hundred in London were due to smallpox. Ten years later the figure was 6 out of every hundred. In 1816 it was only 3.

The effect of vaccination is evident from a study of conditions in various countries. In England and Wales vaccination was compulsory from 1853 to 1870, but was not strictly enforced. During this period many people died from smallpox, the number of deaths often going as high as 32 out of every 100,000 inhabitants. In 1871, however, compulsory vaccination was strictly carried out. The death rate at once dropped to 9 in 100,000 people in 1873; 3 in 1880, and less than 1 in every 100,000 in 1890. It has remained at about this point since that time.

Vaccination was not compulsory in Prussia before 1874, and conditions were similar to those existing in England. After proper vaccination laws had been passed and enforced the number of deaths from smallpox dropped to about 5 in 100,000 inhabitants in 1881, and to less than 1 in 1886. Since that time it has not been greater than the latter figure. In Austria, on the other hand, where no steps were taken during this period, the death rate from smallpox remained high. In 1891 vaccination was more efficiently carried out, and the number of deaths from smallpox fell rapidly.

THE EFFECT OF VACCINATION

Although vaccination proved its worth, full knowledge of its use was not at hand immediately upon its discovery. In 1870, after a period of relative freedom from the disease, a fresh epidemic broke out. It spread over Europe, taking the lives of thousands. In explanation, one should remember that when vaccination was discovered the death rate from smallpox among children was very high. Consequently it was applied especially to them. These children grew to manhood, and sometimes to old age, in the belief that they did not need vaccination more than once in their lives. When the epidemic of 1870 broke out, however, many people who had been vaccinated early in life became victims.

The records of various countries were examined and compared, and new and startling facts were discovered. While in former times, nine-tenths of the smallpox deaths were of children under ten years of age, most of those who died during this epidemic were older people who had never been vaccinated, or who had been so treated in infancy or in youth. They believed that they were protected against the disease for the rest of their lives, and they paid dearly for their mistake. This lesson taught the world the necessity for revaccination.

THE NEED OF REVACCINATION

In order to be completely protected against smallpox, every person should be vaccinated once during infancy, again at about the age of 12, and during every epidemic.

The United States has never been entirely free from smallpox. During 1911, 21,767 cases and 134 deaths were reported to the United States Public Health Service from twenty-nine States. The area covered is only a portion of the United States. Furthermore, many cases of true smallpox are not recorded because they are mistaken for chickenpox. The true figures are therefore much larger.

SMALLPOX WIDESPREAD IN UNITED STATES

The following figures from the reports of the Public Health Service show the number of cases of smallpox reported in certain States during the calendar years 1909, 1910 and 1911:

States	Cases 1909	1910	1911
California	180	177	185
Colorado	345	1,096	1,381
Connecticut	3	.....	2
District of Columbia	24	96	28
Florida	3	1,286	2,195
Illinois	2,135	730	1,083
Indiana	1,363	764	1,082
Iowa	825	850	768
Kansas	2,197	2,202	2,043
Maine	36	8	68
Maryland (exclusive of Baltimore city)	26	6	31
Massachusetts	14	144	11
Michigan	1,175	2,585	691

States	Cases 1909	1910	1911
Minnesota	1,430	1,002	1,164
Montana	685	634	305
New Jersey	88	22	40
New York	762	353	337
North Carolina	1,733	4,281	2,484
North Dakota	204	306	157
Ohio	1,328	750	590
Oklahoma	1,434	2,342	1,080
Oregon	252	164	206
Pennsylvania	25	168	157
South Dakota	13	365	570
Texas	752	2,925	687
Utah	1,854	966	1,660
Vermont	73	.....	323
Virginia	202	350	910
Washington	310	583	979
Wisconsin	1,208	443	550
Total	20,679	25,598	21,767

It is true that smallpox has lately occurred chiefly in a very mild form, but this does not prevent those afflicted from becoming centers from which the disease may spread in a more dangerous form. Occasionally we hear of a local outbreak of virulent smallpox. In 1911 such outbreaks occurred in Texas, Kansas and California. Early in 1913 a very severe form of the disease existed in the same States, and also in Oklahoma and parts of Pennsylvania.

What, then, is the lesson to be learned from the facts which have been given? It is this. **If the people of the United States do not rigidly enforce the practice of vaccination and revaccination, they may at any moment expect such an epidemic as befell Europe during the seventies.**

THE CARE OF VACCINATION

A vaccination is generally made on the outer part of the arm, slightly below the shoulder. An eruption breaks out and reaches its height at about the tenth day. In children the eruption is accompanied by slight signs of fever, irritability and restlessness. In some cases the glands of the arm are enlarged, but the swelling soon disappears. On the eleventh day the sore-

ness decreases and the contents of the sore begins to dry. At the end of two weeks a dry scab forms. After three weeks the scab falls off and leaves a clean circular scar.

Before vaccination, the arm and the rest of the body must be thoroughly cleansed. Fresh linen should be worn. **Cleanliness is absolutely necessary.** The part of the arm where the vaccination is to be made should be washed with alcohol or with soap and warm water. The skin is scratched slightly by the physician with a sterilized needle. The vaccine, which is kept in pure condition, is then rubbed in and is allowed to dry.

CLEANLINESS NECESSARY

The vaccination should be covered throughout the entire period with a clean handkerchief pinned to the sleeve of the shirt, or with a piece of new cotton gauze. The covering should be changed daily. The vaccination must not be touched with the hands. **Bad sores may result from such meddling.**

The vaccinated child should be bathed often and should not be allowed to play in dirty surroundings. No ointment or grease should be applied to the vaccination. Only clean, boiled water should touch the arm. Under proper care, the scab will soon dry, and will fall off in three or four weeks. If the vaccination is accidentally injured or becomes dirty, go at once to your family doctor.

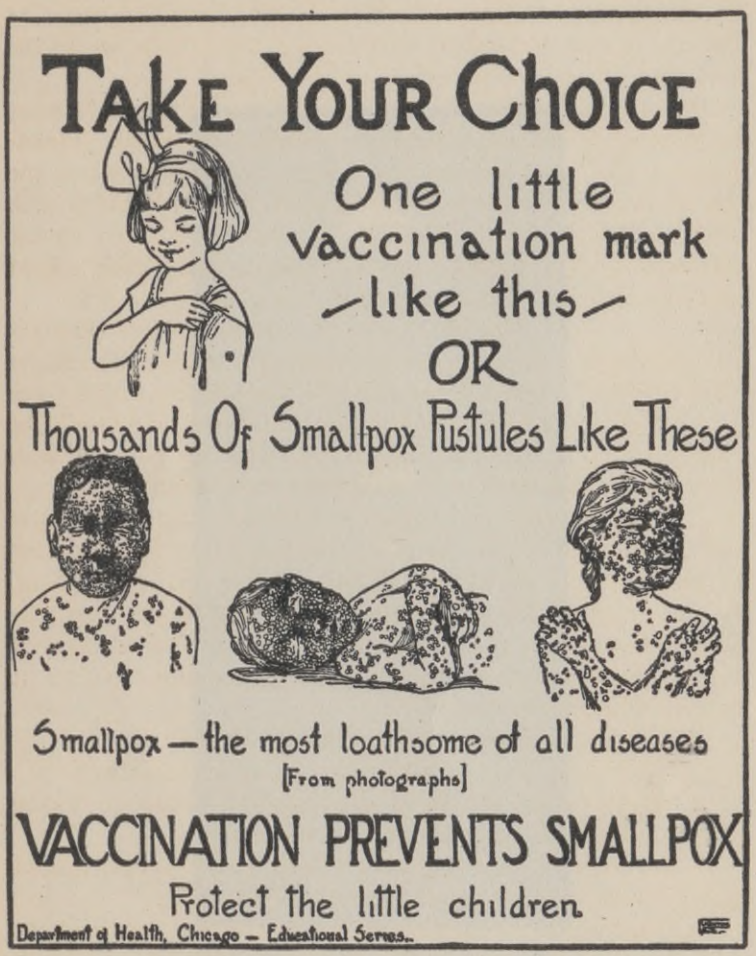
In conclusion, it should be remembered that:

1. Vaccination is a certain protection against smallpox.

2. Every person should be vaccinated at least once during infancy, and again when about 12 years of age.

3. In order to insure perfect safety, every person should be vaccinated when exposed to smallpox infection.

4. Only when vaccination and revaccination are properly carried out can we hope to rid ourselves of smallpox.



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