

# The Empyema Commission Report

## On the 1918 Flu

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Below are some excerpts from web articles on the **Empyema Commission Report** that was the gold standard report of the U.S. Federal Government on how to handle a repeat of the 1918 flu. Also attached is a photocopy the relevant section from the 1930 Cecil's Textbook of Medicine.

Even though this was in the preantibiotic era, a review of this material quickly shows us that in a pandemic of flu it could be expected that circumstances would quickly overwhelm the health care system's capacity to ventilate patients who would have consolidated viral pneumonia. We can expect to do nothing about that, but it is the secondary bacterial pneumonias which will present the greatest opportunity for meaningful mass intervention. It is obvious that we must have large stockpiles of antibiotics, and of thorocentesis kits, and physicians who know how to use them. As of May 2006 this is the only approach that we know will make a difference in outcomes.

### EMPYEMA IN WORLD WAR I

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In fast-progressing cases, mortality was primarily from [pneumonia](#), by virus-induced consolidation. Slower-progressing cases featured secondary bacterial pneumonias,

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In World War I, the U.S. experience with thoracic conditions was concentrated chiefly upon the treatment of infection, and, more specifically, upon the treatment of the infected pleura. This was partly because of the numerous epidemics of measles and

pneumonia that occurred in camps after this country entered the war and partly because of the worldwide epidemic of **influenza** and pneumonia in 1918 and 1919.

### **The Empyema Commission**

During the second half of 1917, pneumonia, in part primary and in part secondary to measles, was causing approximately 65 percent of all deaths in the U.S. Army. The Surgeon General, in an attempt to find some means to combat this terrible loss of life, appointed a commission to study pneumonia in its clinical, pathologic, and bacteriologic aspects. One of the far-reaching results of the work of this commission was the determination that the beta hemolytic streptococcus was playing the principal role in many cases of pneumonia and was giving rise to an entity which the commission termed interstitial bronchopneumonia.

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Because empyema constituted such an important complication of pneumonia, especially when the pneumonia was of the hemolytic streptococcic variety, The Surgeon General, in the early spring of 1918, created another commission to take up research work where the first research commission (p. 13) had left off. This commission, later known as **the Empyema Commission**, carried out its work at Camp Lee, Va. It had two groups of members. The continuous members were Maj. Edward K. Dunham, MRC; Maj. Evarts A. Graham, MRC; Maj. James F. Mitchell, MRC; Capt. Alexis V. Moschcowitz, MRC; Maj. Ralph A. Kinsella, MRC; Capt. Richard D. Bell, MRC; and Lt. Franklin A. Stevens, MRC. The temporary members were Capt. William L. Towers, SC; Capt. Clifford C. Hartman, MRC; Lt. Frederick D. Zeman, MRC; Lt. Milton B. Cohen, MRC; Miss Maude H. Hays, dietitian; Miss Bessie E. Stocking, artist; and Miss E. Pauline Jacobs, secretary.

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When the Commission began its work, there were two major problems to be solved. The first, as already mentioned, was the development of empyema as a sequel to the pneumonia that was itself a sequel of measles, meningitis, and **influenza**.

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### **Work of the Empyema Commission**

The experimental work on dogs carried out at Camp Lee, under the direction of Major Graham and Captain Bell, included studies on the comparative physiology of animals and humans; studies on pneumonia and empyema in both species; and studies on normal and diseased animals when the intact chest and the open chest were filled with sterile fluids and infected fluids.

**Changes of concept.**—As the result of these studies, the following conclusions on pneumothorax were possible:

1. In a normal chest, in which there is no thickening of the mediastinal pleura, alteration of the pressure in one pleural space produces almost the same alteration in the contralateral space. It could be concluded, therefore, that an open pneumothorax on one side affects the other side also, though not quite to an equal degree.
2. The lethality of an open pneumothorax depends upon its size and the vital capacity of the patient, just as the research unit operating in Europe had also demonstrated (p. 14). A unilateral pneumothorax would be fatal if the opening were beyond the size which the vital capacity of the patient could withstand. If his vital capacity were high, a much larger opening could be withstood than if it were low. If the vital capacity were so greatly reduced that its level approached that of the vital air requirement, then a very small, unilateral opening could be fatal.

**Practical application.**—The conclusions derived from the experimental work of the Empyema Commission had immediate practical applications. At this time, an epidemic of acute streptococcic empyema was raging in U.S. Army camps. The usual method of treating it was to resect a rib and establish open drainage of the involved pleural space as soon as the diagnosis was made. The case fatality rate averaged 30.2 percent and was as high as 90 percent in some series. The principal cause of death, the studies of the Commission showed, was open pneumothorax, created by surgical means during the period of acute pneumonia. Operation was being done on patients whose vital capacity was already seriously lowered by their pneumonic disease. It was still further lowered, sometimes to the lethal level, by the establishment of an open pneumothorax.

The policy recommended by the Commission was:

1. Careful avoidance of open pneumothorax during the active period of the pneumonic disease.
2. Early sterilization and obliteration of the empyema cavity.
3. Maintenance of the patient's nutritional status.

By this policy, simple aspiration every 3 or 4 days was substituted for surgery during the acute pneumonic stage, or closed drainage was instituted. The object of treatment was to prevent fluid accumulations from becoming large enough to cause dyspnea. Even before the Commission had advocated this policy, it had become evident in some civilian hospitals that these patients did better under repeated aspiration or with closed techniques of drainage than by early, open drainage, but it was not until the work of the Commission was published that the rationale of the improved results became clear.

When the purulent exudate had become thick, when recovery from acute pneumonia had occurred, and when the empyema could be presumed to be localized, open drainage, usually with rib resection, could safely be performed. As a rule, these criteria could be met in about 10 days. By delaying the institution of open drainage until

the pus had become thick, the surgeon made his opening into an abscess cavity instead of into the free pleural cavity. By the delay, the harmful effects of open pneumothorax were avoided in patients who, because of their extensive pneumonic process, were already dyspneic and often cyanotic. If a little air entered the pleural cavity when deferred surgery was instituted, it did little harm then because, with the clearing of the pneumonic process, the vital capacity had increased. Furthermore, the mediastinal pleura had become stabilized as the result of edema and inflammatory induration, and it was therefore less likely to be crowded over into the contralateral pleural cavity and to compress the lung on that side.

When the new plan of management became generally effective, results promptly improved. At Camp Lee, for example, the case fatality rate fell from 40 percent to 4.3 percent. At Fort Riley, Kans., Maj. William J. Stone, MC, chief of the medical service and in charge of the pneumonia wards, reported convincing comparative figures: In a series of 85 patients with empyema treated by the old plan of early, open operation, the case fatality rate was 61.2 percent. In a second series of 96 patients treated by early aspiration and late surgery, the case fatality rate was 15.6 percent. In a third, later series treated by the same methods, the case fatality rate was 9.5 percent.