In 1881 in West Virginia, as the 20-year feud between the Hatfields and the McCoys entered its 10th year, the state legislature established the original State Board of Health with an annual budget of $1,000. The board was replaced in 1915 with the newly created State Department of Health. With the department, the legislature created the office of the Commissioner of Health and a Public Health Council consisting of six physician members required to be graduates of "regular" medical schools with five years of medical practice experience. Members received compensation of $10 per diem. In 1949, the Public Health Council was abolished and a separate Medical Licensing Board was established. The board, which consisted of nine physician members, held its first meeting in the Capitol Building in Charleston in July 1949.

West Virginia did not adopt a Medical Practice Act until 1980. The West Virginia Medical Practice Act changed the medical board structure to 15 members - eight members holding the degree of doctor of medicine, two holding the degree of doctor of podiatric medicine, one a licensed physician assistant, three lay members to represent consumers and the State Health Officer. In the mid-1980s, new laws changed board procedures and functions in order to increase accountability and enable greater public access to information.

In 1984, Sister Eileen Catterson, M.D., was elected board president, succeeding Frank J. Holroyd Sr., M.D., who had served as board president for more than 30 consecutive years. Under Dr. Catterson and Ronald D. Walton, the board's first Executive Director, regular meetings of established standing committees were instituted. This permitted the bulk of the board's work to be accomplished at weekend meetings and reported to the full board at regular Monday meetings. In 2009, the board moved from under the direction of the West Virginia Department of Health and Human Resources and became an independent board.

The West Virginia board has benefitted from decades of service by several long-tenured individuals. Mr. Walton served the board as Executive Director for more than two decades. Reverend O. Richard Bowyer, current board president and the first consumer member to be elected president, has the distinction of being appointed to the board by five different governors. Lee Elliott Smith, M.D., was a member of the board for 12 years and FSMB Chair in 2005-2006. Deborah Lewis Rodecker was hired as the board's first in-house counsel in 1986 and remains General Counsel today. M. Ellen Briggs, the board's Executive Assistant, has overseen all directives and actions of the board offices since 1984.