

hundreds of patients, both orally and intravenously, with 10 μg of ^{226}Ra every five days, with total doses of 100-300 μg . (Note that, for ^{226}Ra , 1 μg is equivalent to 1 μCi .) John also stated that he had taken about 1,000 μg himself and had given his wife about 200 μg . (John's intake was subsequently estimated to have been 711 μCi ; his wife's was estimated at 508 μCi .) John never identified any of the subjects he treated with radium, but some radium patients identified by their symptoms subsequently stated that John had treated them. A total of 29 individuals who had received radium from John have been located; 21 of them were measured for radium, and most had high intake levels. Five ultimately developed bone sarcomas and another a mastoid air cell carcinoma, two malignancies known to be induced by internal radium.

Perhaps the best known form of radium available to the public in the 1920s was radium water (bottled drinking water spiked with radium and sold over the counter or by mail). The brand that has received the greatest notoriety was "Radithor." Radithor was sold by the case; 30 bottles, a month's supply, were sold at one time. Each bottle was claimed to contain 2 μCi of radium in distilled water. Radithor, a product of William J.A. Bailey, was sold by his Bailey Radium Laboratories of East Orange, New Jersey. The full history of Bailey's activities was documented by the Bureau of Investigation of the American Medical Association (1932).

Radithor met its end after the death of one Eben MacBurney Byers. *Time* magazine for April 11, 1932, under the heading "Medicine," published a full-page account of the death of this prominent sportsman and Pittsburgh businessman. *Time* stated that Byers died of radium poisoning after several years of consumption of Radithor. Gettler and Norris (1933), in an account of findings derived from an autopsy on Byers, stated that he had consumed about 1,400 bottles of Radithor and that his body contained 74 μCi of radium. The cause of death was stated to be necrosis of the jaw, abscess of the brain, secondary anemia, and terminal pneumonia. (After a 1965 exhumation, the actual body content was found to be 6.1 μCi , and the initial systemic intake was calculated as 349 μCi of ^{226}Ra and 600 μCi of ^{228}Ra . With the generally accepted value of 20% for absorption of ingested radium, the total radium ingested was about 5,000 μCi , suggesting that Byers may have consumed somewhat more than the 1,400 bottles estimated by Gettler and Norris.)

More than 80 subjects in the files of Argonne's Center for Human Radiobiology are listed as having consumed Radithor, but this number must represent only a very small fraction of individuals who purchased this product. Apparently some 400,000 bottles of Radithor were sold in 1925-1930 at \$1 per bottle (Macklis 1990). William J.A. Bailey himself is