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Commentary

Re: Doll's 1955 Study on Cancer From Asbestos

Barry I. Castleman, *scd*

While it is true that epidemiologist Richard Doll overcame pressure from Britain's leading asbestos company to publish his 1955 report [Greenberg, 1999], the surviving record from the company's files shows that important changes to the report were nonetheless made. The study showed a 10-fold excess of lung cancer in the work force of an asbestos plant of Turner & Newall (T&N), among men who worked 20 years or more in the "scheduled" areas of the plant subject to the Asbestos Industry Regulations that came into force in 1932. These workers' mean period from the onset of exposure until death from lung cancer was over 29 years. The follow-up period in Doll's study was less than 22 years after the 1932 implementation of U.K. asbestos industry dust control regulations [Doll, 1955a].

By the time Doll submitted the paper for publication on June 2, 1954, T&N management had already disapproved of letting the company medical officer, John Knox, be listed as co-author. Over the following months, T&N's campaign to block publication of the paper intensified. A letter was drafted threatening Doll with legal action, but it was so weak that it was decided to instead send Knox to talk to Doll [T&N, 1954]. The company also tried to get the journal editor to suppress publication but was rebuffed by him [Schilling, 1994]. This culminated with an invitation to Dr. Doll to come to the factory and then have dinner with T&N executive Ronald G. Soothill, Chairman of Turner Brothers Asbestos (the T&N company whose plant was the subject of the study). Doll visited Soothill in Rochdale November 26, 1954, and was pressed to withdraw the paper. Soothill told him that publication would threaten a major industry. Doll says he agreed that the industry was important but insisted that the report should be published [Doll, 2000].

One week later, on December 3, 1954, Doll sent several letters. One thanked the executives at T&N for having hosted him as their guest. One was to Knox requesting additional data on the workforce at the Rochdale plant. The third was to the journal editor, Dr. Richard Schilling. In the letter to Schilling, Doll wrote that he doubted the lung cancer risk of workers hired in the last 25 years had returned to normal, and "the sooner the firm is made to realize it the better." In longhand at the end of the letter he added, "Unless I give them quid pro quo, we may never find out" [Doll, 1954].

One of the reviewers also called attention to the disturbing lack of evidence that the workers' cancer risk had declined [Schilling, 1954].

Data is not produced in the second half of the paper to show that the risk has now decreased . . . The fact that there were only very few men who had completed twenty years entirely after the new regulations does not seem to be an adequate reason for leaving this point.

Had Dr. Doll decided to publish the concern that an excess cancer risk remained under the Depression era asbestos industry regulations then in effect, renewed governmental regulation might have been hastened.

The originally submitted manuscript of the paper, authored by Doll and T&N medical officer John Knox, concluded with this sentence: [Knox and Doll, 1954]

Insufficient data are available to determine whether the (excess cancer) risk has yet been eliminated by the improved conditions which now exist.

At some point, two closing sentences were substituted for that, concluding that the occupational cancer risk had diminished in the asbestos industry after the application of the regulations in 1932 and suggesting that any significant occupational cancer risk might have been limited to the earlier conditions:

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The risk has become progressively less as the duration of employment under the old dusty conditions has decreased. It is unlikely that the risk is now large, but insufficient data are available to determine whether it has been completely eliminated.

Doll crossed out the last of these sentences, however, in the manuscript sent for printing the month before the paper was published [Doll, 1955b].

He also changed other statements in the original manuscript along similar lines in the published paper, with the effect of suggesting more strongly that the cancer hazard in the British asbestos industry was a thing of the past. A few months later, the *British Medical Journal* published an editorial whose conclusion was copied from the last sentence of the published article [Editorial, 1955]. But a couple of months after that, the British government reported figures showing that, as the average age at death from asbestosis had gone up, the proportion of asbestotics dying with pulmonary cancer had risen from 13% in 1924–1946 to 22% in 1947–1954 [Annual, 1955].

To the relief of asbestos industry executives, there was “no reference to (Doll’s paper) in the British press” following its publication [Morling, 1955]. Asbestos consumption continued to rise in Europe and the United States until the 1970s, by which time Dr. Irving Selikoff and others had campaigned for years to raise awareness among workers and the public.

Doll has not been inclined to elaborate on the record. He has never been questioned in depositions in civil suits against T&N, nor has he performed services at the request of plaintiffs pressing claims against the asbestos industry. However, in the 1980s he submitted sworn statements in court cases at the request of asbestos industry leaders Johns-Manville Corporation and T&N. In these, he said his 1955 publication was delayed because he was hoping T&N would allow Dr. Knox’s name to be re-inserted as co-author; the affidavit said nothing about T&N efforts to suppress or weaken his report. One affidavit Doll prepared for the lawyers of T&N concluded with the statement, [Doll, 1986]

Subsequent to the publication of my 1955 report I always received cooperation and assistance from T&N and its subsidiaries with respect to my investigations and studies of its workers and working conditions.

Indeed, in an article whose lead author was the company doctor, John Knox, Doll later followed up the same factory’s work force through 1961. They concluded that the 1932 British asbestos dust control regulations had possibly “completely eliminated” the “specific occupa-

tional hazards to life” [Knox et al., 1965]. In this study, there were 80 men with 20 years or more of work in scheduled areas starting in 1933 and later, only four of whom had died. By mid-1966, no excess of lung cancer had yet occurred in the 136 men hired in 1933 or later who had worked 20 or more years in scheduled areas [Knox et al., 1968]. Lung cancer occurrence among the men and women hired in 1933 or later who had worked 20 or more years in the scheduled areas was twice the number expected in follow-up through 1974 [Peto et al., 1977].

In January 1977, the *Sunday Times* reported on Doll’s associate Julian Peto’s analysis questioning the safety of the U.K. occupational exposure limit adopted in 1969 regulations. The next day, Doll was prominently quoted in a news report beginning, “An Oxford professor has denied that research done in his department has thrown serious doubt on asbestos safety standards.” [Don, 1977]. This article was widely circulated to T&N managers and directed through some of them to unions [Lunt, 1977]. Months later, Peto presented a report to a government advisory committee stating that 10% of the men who spend a working life at that exposure limit would probably die from asbestos diseases [Peto, 1978].

The U.K. occupational exposure limit was still unchanged in 1982, when a television documentary “Alice: A Fight for Life” was broadcast. This had a profound effect and led the government to announce within days that the occupational exposure limit for chrysotile asbestos was being lowered from 2 to 1 f/cc (and 0.5 in 1984) [Tweedale, 2000]. Weeks after the broadcast, Doll was brought in to speak to workers at the large Turner Brothers Asbestos plant in Rochdale. Doll explained that their increased cancer risk at the 1 f/cc level for 50 years was 2.5%. “Well I think that’s a pretty outside chance. If there are any of you who go to the races you would call a 40 to 1 chance an outsider . . .” Doll went on to state that the affected persons would on average lose 10 years of life, and spreading this out over the entire work force, that averaged out to just “a risk of loss of life of 3 months.” He went on to “get this into perspective” by saying that the exposure limits permitted in the radiation industry (which he noted managed to keep exposures “well down below the maximum level”) gave a 2% risk of dying of occupational cancer [Doll, 1982].

Disclosure of T&N records obtained in legal discovery by Chase Manhattan Bank in an asbestos property damage case led to the broadcast of a program by BBC radio in 1993 on cover-ups by T&N including the attempt to suppress Doll’s 1955 paper. (It was this program that led Dr. Schilling to come forward with his story of being approached to suppress the paper from his journal.) T&N Chairman Colin Hope sent a lengthy letter of protest to the U.K. Broadcasting Complaints Commission. He followed this with a letter asserting that the company’s discussions with Dr. Doll had provided additional information. In this letter, it was

alleged that Doll believed T&N's reaction to his effort to publish his 1955 article was "understandable". The T&N Chairman went further, saying: "(Doll) does not believe there was anything sinister in that regard; nor does he believe that such a reaction should be held against the company" [Hope, 1994].

Afterword

A draft of this commentary was sent to Dr. Doll before it was submitted to this journal, and he agreed to meet the author in his office and discuss this history. During our discussion, we examined his file on this subject; he also showed me letters from his fruitless efforts to coax Cape Asbestos (now Cape Industries) into cooperating in a lung cancer epidemiology study in 1948–1949. He was quite willing to answer questions, and his description of Soothill pressing him to withdraw his publication went beyond what had previously been disclosed. When asked about the "quid pro quo," Doll said that there was never any agreement or understanding with T&N to do anything but continue the research. In a letter he sent after our meeting, he explained that his use of that term referred to an effort to get the company to give him the names of workers hired in the most recent 25-year period, whose mortality experience might well have been normal up to that time. "Once I had got the names I could, of course, follow them for an appropriate interval," he explained [Doll, 2000].

When asked for copies of seven letters from his files, Doll wrote that, "in principle," he was "happy to let you have copies of the material you asked for, but I need something from you in exchange." He asked for my written assurance that, "in your future writings on asbestos you will make it clear that the changes to the first draft of my 1955 asbestos paper were made wholly at the suggestion of the journal's scientific reviewers and not as a result of suggestions from the company." I replied that I accepted his explanation of the reason for the words "quid pro quo" in the letter to Schilling and that I also accepted that the changes he had made to the 1955 paper were made freely by him [Castleman, 2000]. This at first produced a favorable response, to the effect that the requested letters were being mailed and that he would be "happy to discuss with you my 'way of dealing with industrial concerns' at any time." [Doll, 2000]. However, 2 days later, Doll wrote that the requested letters had not yet been mailed, and he again asked for me to accept that there were no alterations to the text of the 1955 paper at the company's request; further, that all alterations arose from the referees' suggestions and "my scientific reaction to them."

I responded that I still had some unanswered questions. When and why was the last sentence changed in the paper? Why did he agree to be co-author of the 1965 report with its unsupported optimistic conclusions? Did he feel he was

fairly represented in the letter from T&N's Chairman protesting the BBC radio program to the U.K. Broadcasting Complaints Commission? I asked that he be patient enough to first answer my questions rather than trying to impose an ultimatum on what I would conclude and publish in advance of a complete discussion. It is not at all clear to me that changes to the 1955 paper arose exclusively from referees' recommendations. Nor is there a clear correspondence between the reviewers' comments and all the changes Doll made.

Our communications broke down at this point. Doll wrote that he had given all of his papers on his early work on asbestos to the Wellcome Institute for the History of Medicine in London [Doll, 2000]. Upon seeing the final draft of this commentary, Doll's response was confined to the events of 1954. He insisted that T&N did not raise the matter of making changes to his first report. "As a result of [the reviewer's comments] I carried out further analyses which appeared in the published paper which showed (I thought) that the risk had decreased and this led me to modify my opinion of the findings of the study with the result that I changed my conclusion."

It is not possible to know the difference one study or one author makes in the complex social and medical history of asbestos. But given the toll of asbestos-related cancer deaths arising from exposures after 1955, particularly among men born between 1945 and 1950 [Peto et al., 1999], one can only wonder how high the price was of rapprochement between T&N and Doll.

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