

these cities. A 45 percent workforce engaged in "dirty" industry translates into something like about 22 or 23 percent of the general population, which is a large enough percentage of the population to skew the data up higher if, in fact, these workers were being exposed to significant levels of carcinogenic hazards.

This is the N.C.I.'s own data. We didn't manipulate it. And, curiously, in the OSHA hearings and in any discussions I have ever held with people on the Federal level, nobody ever looks at the Third National Cancer Survey. It's almost like their unwanted child because if you examine the data, within it is contained certain answers to questions that bedevil society, government, labor and industry. For example, there are questions raised about low-dose exposures. Let's not worry just about the workers, what about the people in the communities? They are exposed to low-dose emissions. What about the question of synergism, which is almost unanswerable in an experimental sense. The answers, again, to these questions, are found in the Third National Cancer Survey and the comparison of the three "dirty" cities and the four "clean" ones. Detroit, Pittsburgh and Birmingham have virtually every kind of pollutant chemical that you can imagine in the air and in the water. If synergism and chronic low-dose exposures were real hazards, and if, in fact, there were no thresholds, we should have seen higher rates in those three "dirty" cities. They have been in "business" for several decades, and the chances existed.

Now, there has to be a reason why we didn't see more of any type of cancer and the reason is as follows: There are thresholds. There is a threshold for virtually every substance that is noxious to mankind. There are thresholds for deadly viruses. There are thresholds for bacteria, fungi, anything that is noxious and harmful to humans generally has a threshold, and this includes carcinogens.

Now, clearly the exposures, although seemingly horrendous in the three "dirty" cities, were well below the threshold levels because there was no effect. Recall, the Third National Cancer Survey showed 8% less cancer in the "dirty" cities.

Another thing to keep in mind is there is a real biological reason to explain thresholds. It is not a magical thing. We have DNA repair mechanisms that are very efficient. Furthermore, most carcinogens and many toxic substances act by what we term free radical chemical mechanisms. There are endogenous anti-oxidants that we have evolved with over the eons that protect us against free radical pathology. These anti-oxidants can be overwhelmed with excessive doses of a carcinogen, such as occurs in laboratory animals, but human exposures are not at these doses, and we have not been overwhelmed, not even in Detroit, Pittsburgh, or Birmingham. It should be noted that the Third National Cancer Survey was conducted from 1969-1971. The cancers diagnosed at that time were starting to develop during the 1940's and 1950's. In those years, air/water pollutants were not controlled as they are now. We have therefore gone through "worst-case" conditions in our industrialized-urban centers, and nothing happened. Those who beat the drums of doom, as in recent books written by non-scientists, are clearly leading a march down the wrong path in cancer prevention. Abundant controls exist now, and most of them are needed; some are not, however.

Another thing that proves that there are thresholds is the experience with cigarette smoke. Cigarettes of the high-tar variety are perhaps the most carcinogenic substance that mankind deals with in a routine manner on a mass basis. Yet, it has been well proven through smoking dog studies; that thresholds exist; dogs, incidentally, love to smoke. Once they are trained, they jump right into the box and puff like mad. The threshold studies were

8002 0017