

shock from penicillin, it could not logically be considered an effective drug for this particular patient. Similarly, although chloramphenicol is highly effective in the treatment of urinary tract infections, its well known toxicity precludes its use and it is not regarded as effective for this purpose when other less toxic agents are available. Finally, some antibiotics, although active and effective, have a much more limited role than when they were initially discovered, and, indeed, may have no distinctive role at all, because of subsequent discovery of other agents which are more active and less commonly attended with side effects.

In such cases effectiveness obviously cannot be denied in the strict sense of the word. It would seem perfectly clear from the standpoint of practical therapeutics, however, that these once useful agents are no longer effective as drugs of choice and should be reserved for special limited indications for which they may still be useful and which in all but a few cases will be extremely uncommon. Thus, streptomycin, formerly widely used for the treatment of gram-negative bacillary infections is now reserved almost entirely for the treatment of tuberculosis because of the advent of more effective antibiotics (kanamycin and gentamicin). Novobiocin, once useful as an antistaphylococcal agent and, rarely, for the treatment of urinary infections due to *Proteus*, has been superseded by other more active and less troublesome agents to the point that it is seldom, if ever, an antibiotic of choice.

*Basis for evaluations.* The categorical areas which provided the basis for evaluation of efficacy of antibiotics, singly and in combinations, were as follows:

- (1) General principles of chemotherapy
- (2) Published data relating to efficacy
- (3) Opinions of consultants with special competence in specific areas
- (4) Personal experience and judgment of the panel members
- (5) Needs of practicing physicians.

It would be inappropriate to enter into an extended discussion of the general principles of chemotherapy in the present setting. They are readily and lucidly available in a variety of standard textbooks. It is obvious that the successful treatment of infections must be rational which requires that a firm diagnosis or a considered assumption as to the nature of the disease must be made, even though it may later be proved wrong. Although occasional exceptions exist, the use of powerful, potentially toxic antibiotics for most trivial infections is improper. Disregard for this principle unfortunately accounts for much unnecessary antibiotic usage.

My panel relied more upon published data in the literature as a basis for its evaluations than on any other source. I am confident this would be approved by all thoughtful practicing physicians as well as an overwhelming majority of others engaged in scientifically based activities. Such data constitute the storehouse of information upon which further scientific progress must be based. It is the primary source in which evidence, and the methods by which it was derived, can be held up for critical review to ascertain the quality and, therefore, the validity of the data and the conclusions which are drawn therefrom. Although testimonial observations have value, they cannot be accorded the same credence as carefully controlled studies characterized by meticulous collection and recording of data. The literature survey with respect to each agent covered the references the manufacturer was invited to present to document the claims for his product and additional bibliographic search by the panel members to make certain that all pertinent data were reviewed.

The opinions of consultants were sought in areas where they had special competence. Since none of my panel members were surgeons, specific questions concerning the effectiveness in surgical infections of some of the compounds and antibiotic combinations were addressed to three competent, widely recognized surgeons whose careers have been concerned with the nature and treatment of those infections. Other outstanding authorities of long experience in general internal medicine, infectious diseases, and pharmacology were frequently available to assist in our deliberations. At a final meeting concerned with evaluation of antibiotic combinations and in addition to many of the people already mentioned, a general practitioner and prominent member of the Academy of General Practice was consulted as to his views and with specific reference to the role of combinations in general practice. Consultations with representatives of the Food and Drug Administration were obtained to determine the administrative action and practical impact these evaluations might have on medical practice. Speaking entirely personally, I expressed major concern as to whether the panel