of a large pharmaceutical firm in the United States, Western Europe, or Japan. However, part of that extra time was consumed in institution building and in creating technical capability in developing countries—two features that will be of long-lasting benefit. In terms of direct funding from the WHO (and indirectly from the NIH through its support of the biological screening) this program has proved to be much cheaper than would have been the case in a pharmaceutical industrial laboratory. This is because all of the indirect costs and a substantial portion of the personnel charges were absorbed by the participating university and government laboratories, thus making this a truly cooperative economic project. However, if these indirect costs were combined, then it is unlikely that the present program is much cheaper than the usual industrial effort. What is important is that societal goals rather than pure economics have become the driving force.

Conclusion

Even if no practical new contraceptive agent is eventually developed as a result of this research effort, the WHO program illustrates how a multinational cooperative project in drug chemical synthesis can be established outside the traditional pharmaceutical channels—a model that is of particular relevance to lesser developed nations. The program is an impressive example of an interdisciplinary and fruitful cooperation between an international organization, such as WHO, university or government laboratories from countries all over the world, and a prominent national public institution, such as the National Institutes of Health in the United States. The mechanisms utilized by the WHO chemical synthesis program could serve as a model for international collaboration in other areas.

References and Notes

1. The disciplines needed to bring a chemical contraceptive to the public include the following: organic chemistry, pharmacology, pharmaceutical formulation, biochemistry, physiology, toxicology, and clinical medicine. The skills of people trained in regulatory affairs and market research are also required.
2. C. Djerassi, *The Politics of Contraception* (Norton, New York, 1980).
3. This meeting was attended by Egon Diczfalusy (Karolinska Institute, Stockholm), Carl Djerassi (Stanford University), and Josef Fried (University of Chicago).
4. The attendees of this meeting were: Sydney Archer (Rensselaer Polytechnic Institute, Troy, New York), Giuseppe Benagiano (WHO Headquarters, Geneva), Pierre Crabbé, Egon Diczfalusy, Carl Djerassi, Josef Fried, Takeru Higuchi (University of Kansas), and Waturu Nagata (Shionogi Laboratories, Osaka, Japan).
5. World Health Organization, *Seventh Annual Report, Special Programme of Research, Development and Research Training in Human Reproduction* (WHO, Geneva, 1978).
6. The principal investigators are the following: Australia: T. Watson, Deakin University; Brazil: E. Ruveda, Universidad de Campinas (São Paulo); Bulgaria: R. Vlahov, Bulgarian Academy of Sciences, Sofia; German Democratic Republic: K. Schubert, ZIMET, Jena; Iran: A. Shafiee, University of Teheran; Mexico, two centers: G. Garcia, Universidad Nacional Autónoma de México, and J. Herz, Centro de Estudios Avanzados del Instituto Politécnico Nacional, México; Nigeria: E. K. Adesogan, University of Ibadan; Poland: M. Kielczewski, University of Poznan; Singapore: the late P. N. Natarajan and, more recently, Ngiam Tong Lan, University of Singapore; Spain: A. Gonzalez, Universidad La Laguna, Tenerife; Sri Lanka: S. Sotheeswaran, University of Sri Lanka, Peradeniya. Early in 1980, a Chinese group (Huang Liang, Institute of Materia Medica, Beijing) also joined the project.
7. P. Crabbé has acted in a part-time capacity as coordinator of the WHO chemical synthesis program since its inception.
8. A Contractual Technical Services Agreement is the official agreement document between WHO and a specific institution.
9. The background to this deplorable situation is little known and illustrates the importance of political considerations: As pointed out elsewhere (*2*, pp. 224–225), the U.S. government has never contributed financially to the WHO Special Programme of Research, Development and Research Training in Human Reproduction, even though the United States has been a major recipient of WHO funds because much research had to be contracted with American investigators or firms. In spite of strong congressional and White House support for U.S. financial aid to the WHO, all appropriations (most recently, the sum of $2 million) have always been vetoed by Senator Daniel Inouye of Hawaii, the chairman of the relevant Senate appropriations subcommittee. As a result, some reduction in the WHO research programs is being instituted; male contraceptive research is one of these areas.
10. For example, the antimalarial program during World War II was organized by the military.