

point out that once the key subroutines of a problem are coded in assembly language, a compiler can be very useful for building up programs that can call many subroutines before returning control to the host.

A final point, for those doing high-precision computation, is that the array processors offer a shorter computer

word length than available on maxi computers. The number of significant digits in a number is limited by the number of binary bits in the computer word. Some scientists have shied away from the array processor because of this limitation. Henry Schaefer and William Miller, of the University of California at Berkeley, who pioneered the use of high-perform-

ance minicomputers in quantum chemistry, are examples of those waiting for an array processor that can do high-precision arithmetic.

With some loss in processing speed, it is, however, possible to circumvent the short word length limitation in some cases. At Cornell University, John Wilkins needs to diagonalize matrices in his cal-

Surgeon General Seeks Physicians' Help in DES Alert

The surgeon general, Julius Richmond, issued a physician advisory last October to every M.D. and osteopath in the country, warning of serious hazards associated with the synthetic estrogen diethylstilbestrol (DES). It is a drug that perhaps 2 million American mothers were given during pregnancy when it was freely prescribed between 1940 and 1970. DES has been linked with cancer in the daughters of the women who took it, and it is suspected of having done some harm to the mothers and—recent studies suggest—to the sons as well.

A warning from the nation's chief medical officer presumably signals something akin to a national health emergency. But the DES advisory stirred no commotion, largely because the dangers have been publicized already, and because the use of DES reportedly dropped to a trickle once the cancer link was documented. A spokesman for the surgeon general, Michael White, said that he did not know how many physician advisories had been issued in the past, but he judged them to be rare and significant because he knew of only two: one on the carcinogenic effects of asbestos, sent out early in 1978, and the DES advisory, sent on 4 October.

DES was first linked in 1971 with a rare form of vaginal cancer (clear cell carcinoma) in daughters of women who used the drug during pregnancy, and in the same year the Food and Drug Administration (FDA) ordered that DES be labeled as contraindicated for what was then a common use—the prevention of miscarriage. Oddly, DES was rather widely used for this purpose through 1971, even though a study done as early as 1953 at the University of Chicago found that it was ineffective as an aid to pregnant women. A number of studies since then have strengthened the suspicions about DES, and in 1976 the Department of Health, Education, and Welfare (HEW) began a major campaign to alert the public to the hazards. In March 1978, the secretary of HEW created a task force to look into the question and make policy recommendations. The report came out in September and the advisory in October.

In addition to recommending that the surgeon general himself alert physicians to the problem, the task force reached the following conclusions:

- Between 4 million and 6 million people were exposed to significant doses of DES and must be watched for symptoms of cancer or infertility. This includes the mothers who used DES, their sons, and particularly their daughters, for whom the evidence of risk is strongest.

- The risk of clear cell carcinoma in the daughters is "well established," but small; the incidence is expected to be between 1.4 per 1,000 and 1.4 per 10,000 in the exposed population through age 24.

- The risk of cancer in the mothers is "unproved," although there is "cause for serious concern" that exposure to DES may be linked with a higher risk of developing cancer of the breast, cervix, uterus, or ovary. More studies are needed.

- There is "no firm evidence" of higher rates of infertility or cancer among DES sons, but "recent studies clearly show an excess of genital abnormalities" in this group, the sort of abnormalities that can signal cancer. Again, studies are needed.

- Physicians who prescribed DES should warn their patients of the risks and urge them to come in for checkups. Daughters of DES mothers should be examined at least once a year, beginning at age 14. This counseling, HEW says, should be provided free of charge.

- DES should be prescribed only for FDA-approved uses: estrogen replacement in young women with serious deficiencies, therapy for menopausal symptoms, treatment of cancer, and treatment of osteoporosis (for which it is expected to be approved). The drug has been approved for use in suppressing lactation in new mothers, but the FDA is in the process of canceling this one from the list. Although DES is occasionally given as a postcoital contraceptive (known as the morning-after pill), and although one company has proposed to market such a pill, the FDA has not approved the drug for this use. Bernard St. Raymond of the FDA said the drug is available for other purposes, and there is "no way you can force the physicians not to prescribe it as a contraceptive." Apparently it is used as an alternative to abortion, most frequently by college women. The task force recommended: "Postcoital contraception with estrogens in any woman should be restricted to situations where no alternative is judged acceptable by a fully informed patient and her physician."

The medical profession is less than exuberant about the advisory, for it asks physicians to do a considerable amount of research in old files, it gives them the onerous task of informing patients that their doctor has given them a bad drug, and it suggests that all this be done gratis. "Maybe in five years we'll be out of this quagmire," said Ervin Nichols, a spokesman for the Washington, D.C., office of the American College of Obstetricians and Gynecologists. He felt that the decision to publish the advisory was "way out of proportion" to the size of the problem. Many physicians, he said, already have made an effort to tell the patients who received DES about the risks, and he doubted that there would be any major campaign to search the files for new names. Doctors will probably restrict themselves to answering queries about DES when they come in.

—E.M.