established at medical schools. It is the private clinics that particularly bother him. One sent out fliers to obstetricians throughout the country claiming phenomenal success rates—with no documentation. Others are charging as much as $7000 per attempt.

The American Fertility Society has put together a committee, headed by Howard Jones, to set up minimal standards for in vitro fertilization teams. The society hopes to use these standards in order to determine which groups to recommend when patients ask for referrals. The committee believes a team should include a person with formal training in reproductive endocrinology, a reproductive biologist who is experienced in sperm and egg collection, fertilization and early cleavage in both humans and animals, a person with extensive experience in gynecological laparoscopy who is technically capable of getting eggs but who also is sufficiently experienced to recognize when tubal reconstruction is more appropriate than in vitro fertilization, and a person with experience in male infertility and egg handling.

The problem with the current uncontrolled, wide dissemination of the procedure, say the experts, is not only that some patients will be gouged. It is also that insurance companies are unlikely to recognize in vitro fertilization as an established treatment if most teams are inexperienced and unsuccessful. But, as has happened before, the medical profession is finding it very difficult to police itself.—**GINA KOLATA**

Dioxins' Health Effects Remain Puzzling

In vitro tests suggests it causes cancer, medical results remain ambiguous

The disagreement among researchers about the public health effects of dioxins is widening, judging from several papers presented during the national meeting of the American Chemical Society, held in Washington in late August. At one extreme, a study of U.S. veterans who served in Vietnam has found no unusual medical problems attributable to dioxin exposure. At the other, researchers studying dioxin toxicity reported that these chemicals are full-fledged cancer-causing agents, capable of initiating tumor growth as well as promoting it.

There seems little likelihood that these conflicting views can be reconciled anytime soon. Moreover, the scope of the dioxin health debate is widening in other ways: New York health officials have found dioxins not only in soot that resulted from a transformer fire but also in body fats of personnel who fought that fire and cleaned up after it. Some of those people appear to have suffered health effects, including chloracne and altered liver functions, according to Arnold Schecter of the Upstate Medical Center, State University of New York, Binghamton.

About 500 persons still are under medical surveillance because of that fire, which occurred in early 1981 and has since elicited more than $1 billion in law suits. Elevated levels of liver enzymes, triglycerides, and cholesterol were found in some of these 500 patients "without etiology being well characterized," Schecter says. Liver biopsies reveal that mitochondria of these patients sometimes take on "bizarre shapes" and that other abnormalities in liver cells are plentiful. "We think this is clinically related to chemical exposure," he says.

These patients were exposed not only to dioxins but also polychlorinated biphenyl compounds (PCB's), furans, and biphenylenes, Schecter points out. However, it has proved difficult to estimate exposure levels to those chemicals for various reasons, not the least of which is the problem of reliably measuring their residues in human tissues. Nonetheless, some of these patients have dioxins and other such chemicals at levels in the 8000 parts-per-trillion range in their body fat, he says. But, to further complicate this picture, analysis of control patients (typically, Binghamton area residents hospitalized for surgery) revealed that some of them also carry such chemicals in their body fat, the highest such reading being in the 2000 parts-per-trillion range, Schecter notes. Validating the degree of exposure to dioxins and other potentially harmful chemicals must be done so "epidemiology won't fall flat on its face," he concludes.

> "I believe dioxin actually has the ability to cause cancer itself . . . rather than being merely a cancer promoter."

The difficulties encountered by Schecter and his collaborators in following a modest-sized population are meager compared to those facing the Veterans Administration team that is looking at 85,000 veterans of the Vietnam War. These veterans are a "self-selected" group, who voluntarily have reported back to VA hospitals in the belief that their medical problems might be attributable to exposure to the herbicide Agent Orange, according to Alvin L. Young of the VA's Agent Orange projects office. That herbicide, which contained dioxins as contaminants, was used to defoliate the Vietnamese countryside during the war. Within this large group of veterans who have come in for the Agent Orange registry exam, according to Young, about three-quarters of them did not know whether they had indeed been exposed to the herbicide or what the extent of that exposure was.

"Nothing stands out—nothing confirms any specific Agent Orange effect," Young says. Instead, the health patterns of those Vietnam veterans so far resemble those of similarly aged men "growing older." Incidence of cancers within the group also is not unusual, he says. Critics point out that, because it is so difficult to establish what constitutes a proper control group, conclusions about incidence are extremely difficult to reach and potentially misleading. Young, who agrees that this medical surveillance of such a vast group is fraught with problems, says that the more definitive Ranch Hand study will be released early in October. This is a "carefully matched

epidemiologic study'' of health effects of Agent Orange on the 1200 men who handled herbicides daily for periods up to 4 years during the Vietnam War.

Other medical surveillance studies have connected dioxin exposure to increased incidence of soft tissue sarcomas, a rare form of cancer that affects fat, muscle, and nerve tissues. However, Schecter says that none of the 500 persons he is following medically has developed such tumors during the period since the Binghamton fire, although melanomas have been detected among members of the group. Young says that within the population of 85,000 Vietnam veterans being followed by the VA, only 11 compared to a predicted 16 have developed soft tissue sarcomas. He also notes that 20 rather than a predicted 15 of the veterans have developed lymphomas. The comparisons are based on expectations for a similarly aged group of American men. Young has no explanation for either finding.

It is noteworthy that soft tissue sarcomas are thought to have a long latency period, a factor that further complicates both the New York and VA analyses, and makes it all the more difficult to conclude anything yet about dioxins' role in human cancer.

Ambiguities about dioxin effects on man frequently have been matched with ambiguities in the lab. In particular, efforts to prove that dioxins (specifically, 2,3,7,8-tetrachlorodibenzo-*p*-dioxin, TCDD) causes mutations in bacteria—a widely used screening test for potential carcinogens—have not provided a satisfactory answer. Now, Alastair W. M. Hay of the University of Leeds in England and his collaborators report that this chemical causes mutations in mammalian cells cultured in vitro. ''From the evidence we have,'' Hay says, ''I believe dioxin actually has the ability to cause cancer itself . . . rather than being merely a cancer promoter.''

Hay's finding contrasts with other experimental evidence indicating that dioxins are not ''complete'' carcinogens. Despite his new and clear-cut evidence that the chemical causes mutations and growth-pattern changes in cultured hamster cells, however, little else can yet be said about how dioxins work. The mechanism for causing transformation is ''far from clear,'' Hay says. On the basis of a wide variety of experiments, there's little question these chemicals cause cancer in animals. Hay's latest work suggests it is likely that the dioxin TCDD has the potential to cause the disease in humans. ''We don't know how great that potential is,'' he says.—**JEFFREY L. FOX**

Exodus from OSTP

A wholesale change of top management is under way at the Office of Science and Technology Policy (OSTP), and presidential science adviser George Keyworth is likely soon to be left without any of his long-term senior advisers.

Victor Reis, assistant director for national security, left on 31 August to join Science Applications Inc., a consulting firm based in Arlington, Virginia.

Douglas Pewitt, assistant director for general science, has accepted a job with Western Research Corporation of San Diego. He will be leaving OSTP on 30 September.

John Marcum, assistant director for energy, natural resources, and international affairs, has been offered a job as head of the directorate of science, technology, and industry at the Organization for Economic Cooperation and Development in Paris. If he accepts—he was in Paris in early September to discuss the job—he will be leaving before the end of the year.

The only other assistant director, Denis Prager, who handled life sciences and institutional relations, left in May and has joined the Chicago-based MacArthur Foundation.

Although OSTP officials maintain that these departures are not linked, the sudden loss of every key policy adviser will do nothing to enhance OSTP's status and effectiveness in the federal bureaucracy.

—**COLIN NORMAN**

New Forum for Criticism of UC–Weapons Labs Link

University of California (UC) management of the Livermore and Los Alamos nuclear weapons laboratories has come under question from a new quarter—the state legislature. A resolution requesting that the UC regents study conversion of the labs to nonmilitary research was defeated on the Assembly floor on 29 August.

For more than a decade, the UC regents have come under intermittent pressure from UC faculty and students and from activist groups in the San Francisco Bay area to alter the contract arrangements under which UC manages the weapons labs for the Department of Energy (DOE), which owns them. The Assembly vote on the resolution was the first time, however, that the university's ties with the labs has been the subject of formal action in the legislature. The resolution, which fell six votes short of the 41 to pass, was the initiative of Assemblyman Tom Bates who represents the Oakland-Berkeley district.

Livermore was also in the news in June when protesters attempted to blockade entry to the Livermore lab, which is about 40 miles east of San Francisco. Demonstrations had been held at Livermore before, but the blockade attempt, which led to about 1100 arrests, was the most serious confrontation to date.

The encounter at Livermore in June appears to mark a shift in tactics by opponents of the UC link with the laboratories. In the past, the most active opposition came from a coalition of antiwar, religious, and student groups who sought to influence regents' policy on the labs through sit-ins, demonstrations, and appeals to public opinion.

In the blockade in June, the impetus came from a new organization called the Livermore Action Group, which changed the focus of efforts from influencing the regents and university administration to direct action at Livermore, using civil disobedience techniques. They decided that a resort to direct action was indicated after the regents in 1981 decided to renew for 5 years the UC management contract with DOE scheduled to expire in 1982.

The labs issue for the regents had been relatively dormant until the Assembly resolution. Wording of the Bates resolution was fairly mild, requesting essentially that the regents make a year-long study of converting the labs to civilian research, and asking the regents to "Seek public input from as broad a spectrum of concerned citizens as possible."

If passed, the resolution would have been nonbinding, since the regents' legal responsibility over the labs is clear. Bates says that his intention in pushing the resolution was to highlight university involvement in nuclear weapons development.

The regents' most serious recent bout over the labs occurred in 1979. The UC connection with the weapons