Weighty problems more fat than fancy

A panel convened last week by the National Institutes of Health (NIH) in Bethesda, Md., to determine whether obesity is a cosmetic burden or a medical hazard has come up with bad news for 34 million people in the United States: Obesity is a health-threatening condition.

"We want the average American to know that obesity is a disease and it carries with it a risk for increased mortality," says Jules Hirsch of New York's Rockefeller University, who chaired the 14-member panel. "This week and every week the average family physician will see 11 individuals who are 20 percent or more above their ideal weight. Of these 11 individuals, about half will have complaints that are obesity-related."

The panel based its conclusion on data from several population studies that link obesity to such life-threatening conditions as diabetes, hypertension, high cholesterol, heart disease and certain cancers, as well as early death.

While estimating that 34 million people in the United States are more than 20 percent over their ideal weight, the panel bemoaned the lack of a good standard weight table that takes into consideration age, build and whether a 6-foot-tall 220-pounder happens to be a muscular football player or an idle endomorph. In the absence of such a table, they recommend the 1983 Metropolitan Life Insurance Co. tables (SN: 3/12/83, p. 165).

Several of those who presented data to the panelists were not particularly pleased with the life insurance tables. Reubin Andres of the Baltimore-based National Institute on Aging, who analyzed the data used in formulating the tables, told SCIENCE NEWS that "the age of the individual makes a very large difference in the estimate of what the best weight should be."

According to his calculations, ideal weight increases with age. While the insurance tables hold that a safe weight for a healthy 5-foot-7-inch woman would be from 123 to 164 pounds depending on her frame size, Andres's figures hold that a 20- to 29-year-old woman at that height is best off weighing 112 to 148 pounds, while a 60- to 69-year-old woman should be between 153 and 190. Looking at the tables without adjusting for age, he says, "is highly inappropriate especially for individuals in their 60s and older."

Arriving at the 20 percent figure was no piece of cake. According to the design of NIH's consensus conferences, following a day and a half of presentations the panel reaches a conclusion, which is read to conference attenders for discussion, and the final product is issued a few hours later. The initial consensus set the danger point at 40 percent overweight; following questions and dissent from obesity researchers attending the conference, the panel lowered the number.

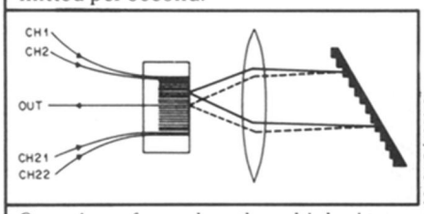
"There is a sliding scale," says Hirsch. "At 40 percent we're quite certain [about the health hazard], and at 20 percent we're certain as well."

Another obesity factor receiving attention is whether a person carries excess poundage in the upper body or in the hips and below. Upper-body fat distribution has been linked to an increased risk of diabetes (SN: 1/23/82, p. 52) and the conference included a presentation from a Swedish researcher relating that same pattern of fat distribution to heart disease (SN: 1/26/85, p. 57). "Regional deposits of adipose tissue may be a very important factor," says Hirsch. "It turns out in men and women, fat in upper distribution seems to carry a greater hazard for the adverse effects of obesity." This may be because upper-body fat cells are more active metabolically than fat cells in the thighs and buttocks.

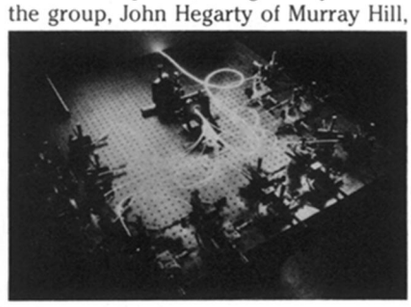
Several panel members compared the consensus statement to the Surgeon General's report in the 1960s declaring smoking to be a health hazard. But whether future Twinkies will carry a warning remains to be seen. Meanwhile, what are the 20 percent and overs to do? The topic of how best to lose and hold off weight needs a consensus conference of its own, says Hirsch. —*J. Silberner*

Trillion-unit 'hero' of fiber optics

As light waves moving in glass fibers take over more and more of the world's communications traffic from electrical impulses in copper wires, laboratories keep striving to increase and extend fibers' performance. Those working in the field refer to these efforts as "hero" experiments, because they keep breaking records in length of distance traveled without a repeater to boost the signal or in number of bits of information transmitted per second.



Olsson, OFC '85



Bell Labs

Overview of wavelength multiplexing experiment (right). Multiplexer consists of fiber array, lens and grating.

Scientists usually multiply the two criteria together to get a hybrid unit, bit-kilometers per second, which they use as a figure of merit to compare different experiments. In those terms the outstanding record breaker of last week's Conference on Optical Fiber Communication '85, held in San Diego, was an experiment by AT&T Bell Laboratories, which reached 1.37 trillion bit-kilometers per second, in taking a signal of 20 billion bits per second over a fiber 68.3 kilometers long. This is equivalent to carrying 300,000 simultaneous telephone conversations or 200 high-resolution television channels in the single fiber, according to Bell Labs.

More significant for future engineering is that this record was achieved by multiplexing, combining 10 different signals of 2 billion bits per second each in a single fiber. Multiplexing is a key characteristic of copper wire circuitry, and fibers must be able to match this ability to compete.

According to N. Anders Olsson of Bell Labs' Murray Hill, N.J., installation, who led the experimental group, the experimental apparatus took 10 communications channels from 10 different lasers and combined them into a single fiber. Each of the 10 incoming channels was slightly different in wavelength from the others; they were spaced 1.35 nanometers apart over the range from 1.529 to 1.561 micrometers.

The multiplexer, designed by one of the group, John Hegarty of Murray Hill, consists of a linear array of 23 fibers, 22 of which can carry incoming signals. One fiber, in the center of the array, takes the outgoing signal. The incoming signals pass through a lens and hit a diffraction grating that reflects them, each different wavelength at a slightly different angle. The signals then go back through the lens. The combination of lens-grating-lens angles them in such a way that they all combine in the central fiber. This output fiber was connected to 68.3 kilometers of transmission fiber. At the other end, a similar grating served as demultiplexer. Although the apparatus can take 22 incoming channels, the experiment stopped at 10, Olsson says, because they had no more room for lasers on the table.

There were no crosstalk effects between the channels, Olsson says, and the data rate was a 10-fold improvement over previous efforts. He estimates that, working at its capacity of 300,000 simultaneous telephone conversations, such a system could ring up $8.6 million per day in revenues. —*D.E. Thomsen*

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