

Scanning for Growth Trends

If you think kids today look chubbier than kids a generation ago, your eyes are not deceiving you.

“They’re bigger. They’re taller. But they’re also fatter,” says Kenneth Ellis of the Children’s Nutrition Research Center in Houston, Texas.

And Ellis should know. By the end of 1996, he will have measured body composition—fat, muscle, and bone—of some 1,000 black, white, and Mexican-American youths between the ages of 3 and 18.

Ellis, a research biophysicist, says that one in three American girls and one in four American boys now has body fat levels considered obese for adults. Twenty years ago, only one in six girls had more than the 32 percent body fat considered to be the threshold for obesity in adult women. And only one in six boys exceeded the 25 percent obesity threshold for men.

Survey findings released last year by the National Center for Health Statistics, which is part of the U.S. Department of Health and Human Services, showed that children today weigh more than they did a decade ago. Among other things, Ellis’ study is defining how much of that extra weight is fat, versus muscle or bone.

“Ours is the only U.S. study trying to establish normal ranges of body composition in children,” says Ellis, “and the only one worldwide that looks at children from three different racial/ethnic groups.”

Until now, he notes, the health community has had to rely on body composition data gathered on white children only during the 1950’s, 60’s, and 70’s. The data are good as far as they go. But they are based on only three age groups—birth, 6 months, and 9 to 10 years. And they give only average values for each age group.

“We wanted to know the range of normal,” he says, “to fill in the blanks.”

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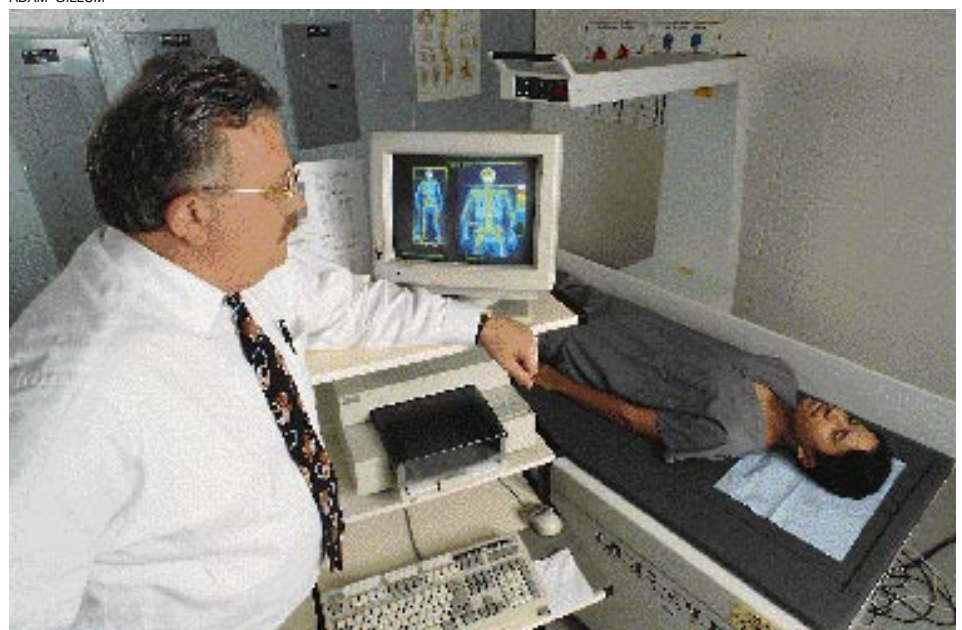
A whole-body potassium counter enables researcher Roman Hypailo to gain an accurate reading of this youth’s total cell mass.

Among their many uses, the data will help health professionals gauge whether bone growth is normal in young patients who are taking medications for the long term, says Ellis. Ultimately, he’d like to see the data in body composition charts

similar to the weight/height charts so common in pediatricians’ offices.

So far, Ellis has examined more than 700 children and teens living in the Houston area, and his measurements are showing differences in growth and body fat among ethnic

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Using DEXA (dual energy x-ray absorptiometry), biophysicist Kenneth Ellis noninvasively measures the total body composition of a young male.

groups. Black girls and boys tend to grow taller and heavier and to sexually mature about 3 years sooner than white or Mexican-American children. Black children start their growth spurt 2 to 5 years earlier, he says.

For instance, around age 6, black girls begin adding significantly more muscle and bone than the other two female groups, who wait till age 8 or 9 to begin their growth spurts. That trend progresses during puberty as black girls mature earlier than the other two groups.

Similarly, young black males begin to outpace white and Mexican-American boys in bone and muscle mass at age 7. By about age 12, as the other two groups begin their growth spurts, black boys are already substantially more physically developed.

The new information on growth patterns suggests that dietary guidelines may need to be tailored to meet the nutrition needs of particular groups.

"It raises the issue of whether black children may need more protein and mineral at an earlier age to get them through puberty," says Ellis.

His measurements also show that Mexican-American boys and girls have significantly more body fat than white or black youths, while the difference between the latter groups was not statistically significant. Mexican-American girls averaged 32 percent body fat; the boys averaged 24 percent. White girls had the lowest average body fat—26 percent—among the females. And black boys averaged the lowest—19 percent—among the males.

Invitations to participate in the study were distributed through pediatricians' offices and private and public schools in the Houston area. For children to qualify, said recruiter and coordinator Marilyn Navarrete, both parents had to be black, white, or Mexican-American, and they had to be at least second-generation U.S. residents. Navarrete says Ellis also measures body composition of volunteers who are of mixed heritage.

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In Houston, Texas, recruitment coordinator Marilyn Navarrete interviews a youngster as a possible study volunteer at the Children's Nutrition Research Center.

They are placed in a separate category for future study, and their data are kept separate from the other three groups of children.

An anthropologist by training, Navarrete has observed that some racial and ethnic groups that were traditionally small in stature are getting as large as the white population after a generation in this country.

"I'm seeing more and more Hispanics and Asians on football teams," she notes. And immigrants may continue to grow after age 21, when exposed to the U.S. diet. So the ARS study—which was extended this

year to include toddlers down to age 1 and young adults up to age 22—may change some current notions about when we stop growing, as well as the extent to which our lifestyles, rather than our genes, affect body size and shape.

To get an accurate picture of body composition during growth and development, Ellis is using two highly sensitive methods.

Dual energy x-ray absorptiometry (DEXA) measures bone mass and other lean mass, such as muscle, connective tissue, and organs, as well as water.

Emissions of potassium-40, a radioactive form of the element occurring naturally in the body in tiny amounts, measure mostly muscle mass, because at least 70 percent of body potassium is in the muscle, says Ellis. Body fat is calculated by subtracting lean mass from body weight.

At the same time, other researchers at the Houston center are looking at hormonal

changes in the children and teens, to see which changes forecast growth spurts and sexual maturation. And others are getting accurate diet histories from the volunteers to define ethnic differences in eating habits, which may correlate with differences in growth, body composition, and other traits.—By **Judy McBride, ARS.**

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