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## RSNA Press Release

### Gender Differences in Prepubescent Children: Implications for a Future Role of Imaging for Disease Prevention

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OAK BROOK, Ill.- It may now be possible to determine if a young girl will be susceptible to bone fracturing as an adult woman, or if a young boy is prone to accumulating visceral fat that could lead him to increased risk of cardiovascular disease as a grown man. A study appearing in the August issue of the journal *Radiology* reports that computed tomography (CT) can detect gender-based disease susceptibilities at a very early age, and may suggest future implications for early management to prevent many adult-onset diseases.

"Common adult diseases, such as osteoporosis, type II diabetes and hypertension, have their antecedents during childhood," explains Vicente Gilsanz, M.D., Ph.D, senior author of the study out of Childrens Hospital Los Angeles. Furthermore, Dr. Gilsanz, a professor of radiology at Keck School of Medicine at the University of Southern California, states, "Certain traits associated with negative health outcomes in adults, such as low bone density, a precursor to osteoporosis, or high visceral fat, which can lead to cardiovascular disease, can be measured in children."

While earlier studies have documented gender traits in older children, this study found that gender differences had a differential effect on musculoskeletal development and fat accumulation in prepubertal girls and boys. Using CT scans to measure fat, muscle and bone in 31 pairs of healthy Caucasian girls and boys matched for age (between 5 and 10 years old), height and weight, investigators found that girls had significantly greater total fat, and significantly less musculature and smaller bones than boys. Both sexes had a similar level of visceral fat. However, previous research has shown that, in general, adult males have more visceral fat than females, indicating that boys will tend to accumulate this fat at a greater rate than girls between childhood and adulthood.

"Hence, gender difference as a risk factor for osteoporotic fractures and cardiovascular disease can be attributed, in part, to the different accumulation of bone and visceral fat during growth," says Dr. Gilsanz.

The findings support a potential future role of imaging as a tool for prevention in addition to its current focus as a tool for diagnosis of disease. "There is no question that in years to

come, imaging will play a tremendous role in identifying people at risk for certain diseases," says Dr. Gilsanz. "We will be able to predict with imaging tools which kids are predisposed to diseases that won't become manifest until adulthood."

Why is this relevant to clinical practice? According to Dr. Gilsanz, early detection of disease susceptibility through imaging is similar to measuring blood pressure to predict cardiovascular disease. Recognition that, because of her low bone density, a young girl may be predisposed to later fracturing and osteoporosis could lead to very early behavioral intervention to establish habits, such as exercise, to reduce or avoid these later conditions.

This is all on the horizon, however, according to Dr. Gilsanz. More data are needed before imaging can be recommended for use as a screening tool in very young children. But, he says, "I wouldn't be surprised if, in the decades to come, pediatricians will deal with deficiency in kids to avoid development of diseases later in life."

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"Gender Differences in Muscle, Bone, and Fat Volume in Prepubertal Children." Collaborating with Dr. Gilsanz on this study were Kiumars Arfai, M.D., Pisit Pitukcheewanont, M.D., Michael I. Goran, Ph.D. (University of Southern California), C. Jane Tavaré, M.Sc., and Linda Heller, M.S.