

Teen smoking decreases bone accumulation in girls, may increase osteoporosis risk

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Teenage girls who smoke accumulate less bone during a critical growth period and carry a higher risk of developing osteoporosis later in life, according to new research in the *Journal of Adolescent Health*.

In a study published Dec. 4, researchers at Cincinnati Children's Hospital Medical Center report the data can be useful for developing strategies to help prevent osteoporosis (a disease where bones lose mineral density and become brittle) and [bone fractures](#). The study points to the largest negative impact on bone mineral density occurring in the lumbar region of the spine and the hips – areas of particular [fracture risk](#) for older women with osteoporosis.

"Osteoporosis is a costly health problem affecting an estimated 10 million Americans, with an additional 34 million considered at risk," said Lorah Dorn, PhD., principal investigator and director of research in the Division of [Adolescent Medicine](#) at Cincinnati Children's. "To our knowledge this is the first longitudinal study to test and demonstrate that smoking by girls, as well as [symptoms of depression](#), have a negative impact on bone accrual during adolescence."

Numerous studies have been conducted in adults showing a link between smoking and decreased [bone density](#) accrual. Dorn and her colleagues focused their research on [adolescent girls](#) as they progressed through their teens because this is when 50 percent of bone accrual occurs.

"As much bone is accrued in the two years surrounding a girl's first

menstrual cycle as is lost in the last four decades of life," Dorn explained.

The researchers set out to determine the impact of smoking, symptoms of depression and anxiety and alcohol use on bone accrual in girls aged 11 to 19 years. The study enrolled 262 healthy girls from the Cincinnati area in age groups of 11, 13, 15 and 17 years.

The girls received annual clinical exams for three years at which measurements were taken for total body [bone mineral content](#) and bone mineral density. Using established measures the girls self-reported how often they smoked or used alcohol and any symptoms of depression or anxiety.

Researchers said high-frequency smoking was associated with a lower rate of lumbar spine and total hip bone mineral density from the age of 11 to age 19. Higher depressive symptoms were associated with lower lumbar spine [bone mineral density](#) in all ages. Also, the researchers reported that alcohol intake had no impact on any bone outcomes.

Dorn said the data show that bone mass was essentially equal among study participants at age 13, regardless of how much or little the girls smoked. As the girls progressed through their teen years, heavier smokers had a lower rate of bone mass accrual in the hip and spine than girls who smoke less frequently.

Girls in the study who reported a higher rate of symptoms for depression continued to accrue bone, but at a lower upward trajectory than girls who reported fewer depressive symptoms.

The researchers stressed that the current study should be followed up with additional research to include a broader geographic area and races other than black and white girls. They also noted the sample of girls in

the current study fell below recommended national guidelines for calcium intake and physical activity, and that the findings may not generalize to girls who meet those standards.

Provided by Cincinnati Children's Hospital Medical Center

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