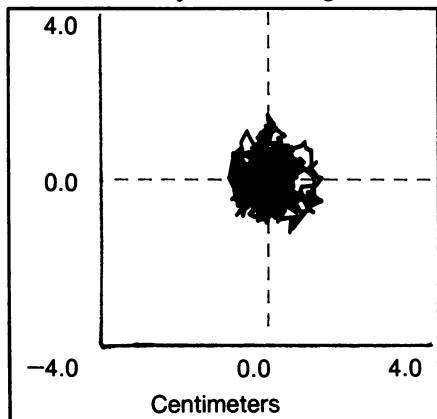


Lead effects show in child's balance

First it was diminished IQ. Then it was delayed motor development, hearing difficulty and impaired memory. Now, another subtle health effect has been identified in children carrying a low-level body burden of lead: They have trouble balancing.

Since 1980, researchers at the University of Cincinnati School of Medicine have been studying lead's effects on inner-city children (SN: 9/13/86, p.164) — those most likely to experience toxic exposures. Besides evaluating motor skills and mental abilities, this project records blood-lead levels every three months for 6.5 years, starting at birth.



Sway plots for two 6-year-olds with eyes closed, standing directly on platform. Left child's maximum blood-lead level (age 2) was 9.6 µg/dl; right child's was 42 µg/dl.

Two observations tipped the researchers off to lead's effect on balance. First, the older children, aged 4 or 5, often clung to stair railings with both hands and climbed slowly up or down. Second, in general balance tests — like walking on a beam — many consistently performed below levels normal for their age.

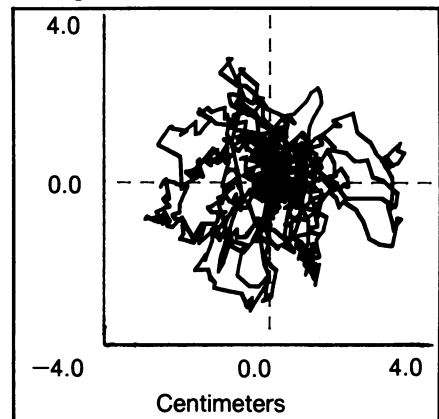
Adding to their suspicions were studies by others linking lead exposures to problems with nerve conduction — the relay of messages to and from the brain. Since balance relies on information relayed by sensory nerves, they decided to evaluate their 6-year-olds using a "postural-sway force platform." To plot swaying over time, sensors embedded in the metal platform measure force and twisting motion in three directions: side-to-side, front-to-back and up-down.

Each child participated in four 30-second tests: standing directly on the platform with eyes open, standing on the platform with eyes closed, standing atop 3 inches of foam with eyes open and standing atop the foam with eyes closed. Each test forces reliance on a different sensory system important to balance: vision, receptors on the feet, input from joints and stimuli from the inner ear.

Data on the first 63 of almost 300 children to be tested suggest the joint-

based and inner-ear balancing systems are most sensitive to lead. In the tests that forced reliance on these systems, for every 1-microgram-per-deciliter (µg/dl) increase in a child's maximum blood-lead level, the total area of sway increased by an average of roughly 2.8 square centimeters, reports Amit Bhattacharya, who directed the study. Those maximum blood-lead levels tend to peak at about age 2, when children typically explore their environment "hand to mouth" and are most likely to ingest lead-tainted debris and dirt.

Bhattacharya says it appears the observed dose-related impairments result from the fact that lead exposure "peaks precisely at the age when a child's neuromuscular system — important to balance — is maturing." He presented the findings this month at a National Institute



Sex survey provides data on homosexuals

In 1970, the Kinsey Institute for Sex Research in Bloomington, Ind., directed a national study of sexual behavior among 1,450 men and 1,568 women. Unlike virtually all other sex surveys, the Kinsey effort used a random sample whose responses could be generalized to the entire population.

After years of infighting among researchers involved in the project, the complete survey findings finally appear in the Jan. 20 SCIENCE. Data on male homosexual behavior may prove important in predicting the spread of AIDS, according to study coauthor Robert E. Fay of the National Academy of Sciences in Washington, D.C., and his colleagues.

Roughly one-fifth of adult males in the 1970 survey had at least one homosexual experience, the researchers note. This is lower than the rate of 37 percent reported in 1949 by the pioneering sex researcher Alfred Kinsey, who interviewed mainly white, middle-class, college-educated men.

Of more interest to AIDS epidemiologists is the 1970 survey's finding that 3.3 percent of men had adult homosexual contacts either "fairly often" or "occasionally." That estimate rises to about 6.2 percent when those men who did not answer questions about homosexuality are statistically controlled for. Currently or previously married men made up the majority of this group.

This is not particularly surprising, since surveys of self-identified homosexuals typically find that about one in five have been married, says sociologist and study coauthor John H. Gagnon of the State University of New York at Stony Brook.

However, data from the 1970 survey and a smaller random survey reported last year by University of Chicago researchers indicate never-married men are most likely to have had homosexual contacts within the past year.

"We're looking at the lower bounds of homosexual behavior," Gagnon says. Homosexual experiences tend to be under-reported even when, as in the 1970 survey, subjects are both interviewed and given detailed questionnaires to answer in private.

At this point, the findings are far from conclusive, Gagnon notes. "The real dilemma is the scandalous lack of knowledge about sexual behavior," he says. "If we consistently gathered a broad array of health information, the release of the 1970 data would be a less sensational event."

Gagnon and two other investigators are now preparing a pilot survey of sexual behavior, which they hope will eventually encompass about 20,000 subjects.

— B. Bower

of Environmental Health Sciences conference in Research Triangle Park, N.C.

At the time these children were tested, their mean blood-lead level was just 17.9 µg/dl — well below the 25 µg/dl that the Centers for Disease Control has labeled "excessive" (SN: 11/22/86, p.333). Bhattacharya suggests a refined version of the postural-sway testing might one day be used to screen other such children with subclinical lead exposures, in order to identify those predisposed toward clumsiness. "Balance can be improved," he notes, if children receive special training at an early age.

J. Julian Chisolm, a pediatrician at Johns Hopkins University in Baltimore, thinks the test's biggest impact could be in directing new lines of research. Studies of lead have tended to focus on its central nervous system effects. "These data," he says, "suggest the peripheral nervous system is affected as well."

But because the test "has the potential to provide a more objective measurement of lead impairment," says J. Routt Reigart, at the Medical University of South Carolina in Charleston, physicians might be able to combine it with blood testing to help establish which lead-exposed children have suffered actual neurological impairment.

— J. Raloff