A Strange Ignorance

The role of lead poisoning in failing schools

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Executive Summary

(of A Strange Ignorance)

> "The education community has not really understood the dimensions of this because we don't see kids falling over and dying of lead poisoning in the classroom. But there's a very large number of kids who find it difficult to do analytical work or [even] line up in the cafeteria because their brains are laden with lead."

Bailus Walker was dean of the public-health school at the University of Oklahoma and a former commissioner of public health in Massachusetts when he gave this quote to Newsweek magazine in 1991; *over ten years ago.* For some reason the education community, even today, displays a strange ignorance of an entire spectrum of medical and psychiatric research demonstrating both the widespread prevalence of childhood lead poisoning and the horrible consequences of lead-induced brain damage.

For some reason the education community, even today, displays a strange ignorance of an entire spectrum of medical and psychiatric research demonstrating both the widespread prevalence of childhood lead poisoning and the horrible consequences of lead-induced brain damage.

That strange ignorance alone explains why democratically elected public school governing boards are under attack across the country for their "failing schools," the "achievement gap," student drug use and disruptive behavior. The turmoil in Philadelphia and other districts where lead-laced children fail to learn has produced heated accusations and extreme actions, but the implications of the known presence of brain damaging lead in these children has been ignored.

Politicians have indulged in a frenzy of school bashing over the past few years epitomized by the slogan "All Children Can Learn." Yet the evidence is as clear as it can possibly be: As long as society allows environmental lead to poison children, those children will fail in school, engage in violence and drug use, and disrupt the education of other students.

Not all children can learn, not when they have been poisoned. If environmental lead, instead of calcium, is incorporated into a child's rapidly developing brain tissue "between birth and age three," those tissues will not function correctly. Ever. By the time children reach the public schools, the damage has been done, and it is irreversible.

Lead is an incredibly potent neurotoxin prevalent in older neighborhoods. It takes a surprisingly small amount of lead to damage developing brains, a few sand-grain sized paint chips will do it. Those children, in turn, will sustain brain damage that ensures both educational and social problems for the rest of their life. This early lead poisoning has been linked to:

1. an inability to learn because brain tissues constructed of lead do not bind properly to form the neural learning connections,
2. to attention deficit disorders because lead damaged brain tissues have a tendency to misfire and disrupt normal concentration,
3. to violence because the careful balance of brain structures in the prefrontal cortex that inhibits impulsivity and violence is disrupted, and
4. to drug use because untreated sufferers find illegal drugs help to medicate the agitation caused by lead damaged brain cells.

Public schools can no longer ignore the tragedy of lead poisoning. Environmental lead in low-income housing begins a conveyor-belt of tragedy that inevitably produces precisely the symptoms of "failing schools." School officials, both administrators and governing board members, need to organize school and community resources in an effort to interdict the poisoning of children during their first three years of life, as well as to look for ways to ameliorate the consequences of lead poisoning in subsequent years.

But up to now, schools have done nothing. The fact that most "failing schools" are in low-income neighborhoods where children live in housing known to be laced with a brain damaging neurotoxin is not just a coincidence. The complete impact of lead poisoning is unmeasurable, because most of the victims do not even know the lead is there. But it is there and "failing schools" are but one symptom.

Governing board members need to stop automatically blaming the victims and the teachers and the schools for academic failure and start understanding "Maybe it's beyond that." As long as "The education community has not really understood the dimensions of this" continues, then the failure of public schools will mount, governing boards will be dismissed, the achievement gap will widen, violence will infest the schools, and more children will not be able to learn. No matter how hard they try. The problem is beyond them, beyond teacher competence, beyond funding shortages, beyond standards and testing and vouchers and every other ill-conceived rationalization that ignores lead poisoning.

Can All Children Learn?

Not if they have been poisoned.

(Chapter 1 of A Strange Ignorance)

Democratically elected school district governing boards are under attack nationwide for the perceived "failure" of public schools. This is particularly true in urban inner-city public schools where low-income children, often minorities, display an "achievement gap" between their test scores and the scores of more affluent children. In several recent jurisdictions, politicians have wrested control of public schools away from local parents.

William Raspberry, a nationally syndicated Washington Post columnist, described it succinctly in a February 5, 2001, column:

> Much of President Bush's approach to education reform is based, I fear, on a persistent and misleading myth: That the people who run and staff our low-performing public schools could do a much better job if they wanted to.
>
> And this is not a myth brought to Washington from Austin. Listen to the way reformers across the country talk about school reform. One of the consistent arguments for vouchers, for instance, is not that a few, self-selected youngsters would get a better education, but that failing public schools — spurred by the threat of losing enrollment and money — would crack down and do what they (presumably) already know how to do.
>
> Some legislatures have enacted laws that allow — in some cases require — the states to take over failing schools from local districts. Again, the assumption seems to be not that state education officials are so much smarter at educating problem learners but that they, unlike the teachers already in those schools, will really try. (See at: http://www.washingtonpost.com/ac2/wp-dyn?pagename=article&node=&contentId=A26498-2001Feb4)

Over the past few years, politicians have indulged in a frenzy of school bashing epitomized by the slogan "All Children Can Learn." The slogan presupposes that "failing schools," the "achievement gap," drug abuse and disruptive behavior are a consequence of incompetent educators and indifferent governing board members. But there exists a body of medical research which demonstrates that politicians themselves are responsible for a conveyor-belt of tragedy that produces precisely those symptoms attributed to "failing schools."

"... the assumption seems to be not that state education officials are so much smarter at educating problem learners but that they, unlike the teachers already in those schools, will really try."

William Raspberry

Subsequent pages in this report will lay out the medical research that explains how exposure to environmental lead creates the conditions of "failing schools." The fact that most "failing schools" are in low-income neighborhoods where children live in housing known to be laced with a brain damaging neurotoxin is not just a coincidence. There is mounting evidence that a host of social problems, including "failing schools," represent symptoms of lead ingestion by children during their first three years of life. The subsequent "soft bigotry of low expectations" in their school years is thus a consequence of the hard bigotry of indifference by politicians to the well-documented brain damage caused by environmental lead in children who live in these neighborhoods.

Recently, scientists have documented that during the first three years of a child's life the brain undergoes a dramatic transformation from a disorganized network of neurons into a differentiated learning organ. If during that transformation the body incorporates lead into tissues when calcium is actually needed, the brain is irreversibly damaged. As a consequence, it is nearly certain that the presence of lead in the environment of a child during the first three years of life will cripple the child's brain. This early brain damage from lead poisoning has been linked by careful research to:

1. a ten to fifteen point drop in I.Q. that essentially eliminates the leaders, inventors, artists, and entrepreneurs from the affected populations,
2. an inability to learn because brain tissues constructed of lead do not bind properly to form the neural learning connections,
3. attention deficit disorders because lead damaged brain tissues have a tendency to misfire and disrupt normal concentration,
4. violence because the careful balance of brain structures in the prefrontal cortex that inhibits impulsivity and violence are attenuated, and
5. drug use because untreated sufferers find illegal drugs help to medicate the agitation caused by lead damaged brain cells.

While lead based paints were banned in most western countries during the 1920s & 1930s, the United States continued to use lead-based paints into the 1970s. The explosion of home building after World War Two created vast neighborhoods that were painted with lead based paints. The 30-year useful life of most tract housing structures means those homes are now deteriorating and showering lead dust and paint chips on the unsuspecting children living in low-income housing. It takes a surprisingly small amount of lead to damage developing brains, a few sand-grain sized paint chips will do it.

As long as this lead-laced housing exists, it establishes a well-documented conveyor belt of tragedy. The well-documented prevalence of poverty among children in the United States means many infants are forced to live in deteriorating low-income housing. Those children will inevitably ingest environmental lead from deteriorating paint, be brain damaged, enter school with well-documented learning disabilities, fail to learn, become frustrated with the well-documented agitation of lead-induced ills, find well-documented solace in illegal drugs, and engage in criminal (often violent) acts due to the well-documented lead-induced impulsivity.

Politicians who trumpet the slogan "All Children Can Learn" universally blame public schools for the "achievement gap" and support "high-stakes tests" to punish educators and close down "failing schools" in low-income areas. But as will be documented later in this report, the connection between environmental lead and academic failure is unquestionable. The connection between environmental lead and violence is unquestionable. The connection between environmental lead poisoning among children in low-income communities surrounding "failing schools" is equally well established. And the claim by politicians' that "failing schools" are due to incompetent teaching does not explain why so many of these so-called "failing schools" are wracked by lead-induced violence and drug use.

But it is even harder to explain why educators display such a strange ignorance of the consequences of environmental lead exposure. Over ten years ago, the July 15, 1991, issue of the national magazine Newsweek made "Lead And Your Kids" its cover story. Newsweek quoted "Bailus Walker, dean of the public-health school at the University of Oklahoma and former commissioner of public health in Massachusetts," as declaring *over ten years* ago:

> The education community has not really understood the dimensions of this because we don't see kids falling over and dying of lead poisoning in the classroom. But there's a very large number of kids who find it difficult to do analytical work or [even] line up in the cafeteria because their brains are laden with lead.

I did not dredge this quote up from some rationalizing public school educator attempting to explain away teacher incompetence. This quote, blatantly pointing out that lead poisoned children can barely line up in public schools, came instead from a top reporter in a top national newsmagazine interviewing a top public health expert about a well-documented public health issue. Yet public school educators still have "not really understood the dimensions of this" problem and the implications for both schools and suffering children.

Near its conclusion, the 1991 Newsweek article averred:

> The new science about lead's effect on the brain may force policymakers to re-examine some social issues through a new prism. For example, if lead can cause aggressive behavior, learning disabilities and hyperactivity, might it not also be a contributing factor in poor educational performance among low-income blacks, who suffer the most lead poisoning?

Why then, *over ten years later*, do educators and governing board members allow politicians to ignore lead poisoning as a dominating factor in the "achievement gap" and of poor educational performance among students in "failing schools?"

Eight years later, in the December, 1999, Phi Delta Kappan "Special Section on Urban Schools," Jacquelyne Faye Jackson, a research associate at the Institute of Human

Development at the University of California, Berkeley, wrote an article titled "What are the Real Risk Factors for African American Children?" After a long discursion rounding up and dismissing the usual suspects blamed for school failure, Jackson wrote:

> Inexplicably, the education literature has given scant attention to the growing body of medical information implicating low-level lead exposure as a critical factor in cognitive deficits and behavior problems. This is the case even though the threats to children's health posed by environmental toxins such as lead have become such a major concern to specialists in environmental health that they recently persuaded the federal Environmental Protection Agency to establish an Office of Children's Health and to fund eight research centers dedicated to children's environmental health issues. ….
>
> Where are the voices of educators in this policy debate? After all, it is educators who will face the formidable challenge of trying to prepare future generations of African American and other minority children for productive life in the 21st century after society has allowed those children to suffer ongoing lead exposure at levels known to undermine their educational potential.

The Center for Children's Health and the Environment of the Mount Sinai School of Medicine has a factsheet on its web site that reads:

> Lead is the most well-studied example of an environmental contaminant that interferes with learning. Lead causes reductions in IQ. In addition, exposure to lead has been linked to disruptive classroom behavior and reduced ability to pay attention. Lead exposure has been shown to be correlated with failure to graduate from high school, as well as a tendency toward violence, addictive behaviors and other behavioral and emotional problems. (see: http://www.childenvironment.org/factsheets/adhd.htm)

Is this not indicative of the typical "failing school?"

A 1996 National Institutes of Environmental Health abstract of an article titled "Behavioral Effects of Lead: Commonalities between Experimental and Epidemiologic Data" reported:

> While age-appropriate standardized measures of intelligence (IQ) have been the dependent variable most often used to assess lead-induced cognitive impairment in epidemiologic studies, researchers have also used a variety of other methods designed to assess specific behavioral processes sensitive to lead. Increased reaction time and poorer performance on viligance tasks associated with increased lead body burden suggest increased distractibility and short attention span.

> Assessment of behavior on teachers' rating scales identified increased distractibility, impulsivity, nonpersistence, inability to follow sequences of directions, and inappropriate approach to problems as hallmarks of lead exposure.
>
> Robust deficits in learned skills such as reading, spelling, math, and word recognition have also been found. Spatial organizational perception and abilities seem particularly sensitive to lead-induced impairment. Assessment of complex tasks of learning and memory in both rats and monkeys has revealed overall deficits in function over a variety of behavioral tasks. Exploration of behavioral mechanisms responsible for these deficits identified increased distractibility, perseveration, inability to inhibit inappropriate responding, and inability to change response strategy as underlying deficits.
>
> Thus, there is remarkable congruence between the epidemiologic and experimental literatures with regard to the behavioral processes identified as underlying the deficits inflicted by developmental lead exposure. (See at: http://ehpnet1.niehs.nih.gov/docs/1996/Suppl-2/driceabs.html)

In plain English, "there is remarkable congruence" in what researchers have found as symptoms exhibited by children exposed to lead who perform poorly in school and what scientific experiments have shown to be symptoms of lead exposure "in both rats and monkeys." Children exposed to lead have "increased reaction time" and "increased distractibility" plus "robust deficits in … reading, spelling, math and word recognition" because of an "inability to inhibit inappropriate responding" (misbehavior), "and inability to change response strategy" (learn). And the "behavioral mechanisms responsible for these deficits" are "congruent," meaning they are exactly the same as, "the behavioral processes identified as underlying the deficits inflicted by developmental lead exposure." In other words, scientists know lead exposure causes much of what politicians blame failing schools for.

"Where are the voices of educators in this policy debate?"
Jacquelyne Faye Jackson

After confirming that there is a plethora of research about the detrimental brain damaging effects of lead poisoning, I wondered whether the 1999 Kappan article on lead poisoning had stimulated any greater awakening of the issue among educators. I wrote to Ms. Jackson in 2001 about the response she received after her article was published. Her answer was that she received very little response and concluded:

> I fear that the current social and educational climates are too preoccupied with intimidating individual students and teachers to give much attention to something that implicates societal responsibility for failing schools.

But individual students and teachers don't make political decisions. What she is really saying is that for politicians, it is easier to intimidate school officials and governing board members than to fight venal lobbyists for the lead industry to protect children.

Instead of testing children for crippling lead poisoning, politicians have created an Orwellian testocratic Taliban that intimidates governing board members into abandoning local control, intimidates administrators into curricular burqas and intimidates teachers into being called to test practice three times a day. Where the salient feature of Talibanic legislation called "No Child Left Behind" is precisely to allow unpoisoned children who can learn to leave behind those lead-poisoned children who cannot.

Talibanic politicians ignore the laws of physics and chemistry to insist that moral infidelities by educators require "accountability" for those who can't make "All Children Learn." The fact that most children in "failing schools" are primarily suffering from political indifference is ignored, a strange ignorance, in order to flog teachers and administrators for not overcoming what scientists tell us is irreversible once the damage is done.

Over ten years ago, before politicians started their Orwellian chanting "All Children Can Learn" and before the political doublethink scapegoating of "failing schools" rose to today's prominence, it was well-known that environmental lead played a prominent role in academic failure and student delinquency. Sufficiently well known that the cover story on a national newsmagazine suggested "... lead's effect on the brain may force policymakers to re-examine some social issues through a new prism." Why, then, are educators and governing board members today chanting "All Children Can Learn" even if scientific research says they can't?

Why Some Children Can't Learn

(Chapter 2 of A Strange Ignorance)

On January 20, 2000, Jim Haner of The Baltimore Sun wrote about the travail of a young student there:

> Kyle Bridges lay down in the middle of McCulloh Street on his way to school last October. He rested his too-small head on his book bag. And he told his little brother to go on without him. "I'm sick of living," his brother recalled him saying. "I'm just gonna wait here till a truck comes and runs me over. Don't worry, I just want to die."
>
> Kyle can barely read a word more than three letters long. He cannot do math at all, not even two plus two. He was in special education, but nothing the teachers tried or said seemed to stick. He was a playground outcast at Dr. Rayner Browne Elementary School, Booker T. Washington Middle and Highlandtown Middle.
>
> Ridiculed as a 'retard,' he would lapse into confused and embarrassed gibberish. Under stress, he was prone to lash out at other kids, his teachers, his grandmother. For as far back as anyone can remember, he has had an explosive temper. Kyle is 12 years old. His small body is loaded with lead, ingested in a succession of East Baltimore slum houses toxic with peeling paint and dust.
>
> "Lead is associated with most of the problems this child has had in his life," says Dr. Paul Law, Kyle's physician at Johns Hopkins Hospital's Harriet Lane children's clinic. "And it's certainly the most consistent and prominent feature of his personal history. It's all over his chart."
>
> Once ingested, lead inhibits a child's ability to absorb iron, one of the basic building blocks of brain, nerve and bone development. It also stunts a broad range of chemical transmitters that affect hearing, sight and perception.
>
> The resulting brain and nerve damage, experts say, can trigger a cascade of secondary effects that include learning disabilities, hyperactivity, increased aggression and a greater likelihood of criminal behavior. While treatment can reverse some damage, long-term exposure can cause lifelong deficits.
>
> In Baltimore, lead exposure constitutes an epidemic that strikes more than 7,000 children every year and is a contributing factor in the city's crisis of violent crime, failing schools and disintegrating neighborhoods, experts say.

(*This is a small excerpt offered as a typical example of lead poisoning*

from a single article titled "Lead's lethal legacy engulfs young lives" in an excellent Baltimore Sun series. **Revision:** nonfunctioning link removed)

Children who suffer from lead poisoning, in fact suffer. They feel ill ("somatic complaints"), they know their brains do not function properly, they are frustrated by their inability to learn, and they feel a daily unease and agitation from the irritating presence of lead in their brain tissues. The presence of lead in the tissues is called a "lead burden" by researchers but it is a real physical burden for these children in many ways.

Research says their motor skills are affected, they have a debilitating attention problem, and that the chemical imbalance in their brain leads them to extreme behaviors in order to counter the agitation of that imbalance. Some discover that certain illegal drugs tend to moderate the agitation, often resulting in illegal drug use and the collateral problems of criminality.

The body excretes very little lead once it is incorporated into body tissues. Chelation therapy can remove lead still in the blood, but not lead already incorporated into body tissues. There was some hope for a few years in the late 1990s that a new drug called Succimer would reverse the effects of lead poisoning. The study was completed in 2001 and it failed. There is nothing that can be done once the brain damage occurs.

Over ten years ago, the 1991 Newsweek article explained

> Why is lead so toxic? The body, in effect, mistakes it for calcium. The lead attaches to and disrupts enzymes essential to functioning of the brain and other cells. Because lead is an element, it never decomposes into another, more easily tolerated, substance. While it can be removed from the bloodstream through chelation, most of the lead that is absorbed into a child's brain sits there, literally, forever.

A recent study explaining how lead creates brain damage (Neuroscience, Volume 99, No. 2, 2000, pp. 233- 242) was summarized by a Crime-Times newsletter:

> Studying the deleterious effects of lead on learning and behavior, researchers at Johns Hopkins say they have identified one mechanism by which lead impairs the function of brain cells.
>
> Michelle Nihei and colleagues tested rats with blood lead levels comparable to those of children suffering from lead toxicity. As expected, the lead-exposed rats performed more poorly than non-exposed rats in a test of learning, involving finding a hidden platform in a pool of opaque water. Testing another group of rats, the researchers found that the neurons of lead-exposed rats were unable to establish strong connections in response to conditioning.

> Molecular studies of a third group of lead-exposed rats revealed that the effects of lead were due to the inhibition of the NMDA receptor, which plays a key role in learning. Normally, the NMDA receptor is triggered when it receives two incoming signals—for instance, messages resulting from the sight of snow and the sensation of coldness—and initiates chemical changes that lead to memory formation.
>
> "We believe that lead, by decreasing these NMDA receptors, is interfering with calcium's entry into the neuron," says Nihei. "This is noteworthy since calcium is responsible for a huge cascade of cellular signals that ultimately propagate information and continue the nerve impulse on to the next synapse and neuron." (Crime Times, Vol. 7, No. 1, 2001 Page 3&6)

Research that finds lead "interfering" with "a key role in learning" in rats explicates that not "All Children Can Learn" if they have been poisoned by environmental lead. What this research indicates is that children who have lead poisoned brains have a vastly diminished capacity to learn. A diminished capacity not from lack of effort, or lack of instruction, but simply because the tissues in the brain lack the physiological ability to perform the chemically based process necessary for learning.

"... especially if the child can't seem to learn, no matter how hard he or she tries."

-the characteristic signature of lead poisoning

As far back as the July 15, 1991, Newsweek magazine cover story "Lead And Your Kids," there was widespread public awareness of this diminished capacity:

> Only in the past decade have researchers focused on how lead damages development, even when kids don't show obvious medical symptoms. In the 1970s, the CDC defined lead poisoning as occurring when a child had 30 micrograms of lead per deciliter of blood, the level at which problems like anemia, stomach ailments and noticeable learning troubles appear. But a 1979 study by Dr. Herbert Needleman, then a physician at Children's Hospital in Boston, found that asymptomatic working-class children in Chelsea and Somerville, Mass., who had higher lead residues in their teeth performed worse on IQ and development tests than those with less lead. A subsequent follow-up study showed that children with lead levels equal to 25 to 35 micrograms/dL were six times more likely to have reading disabilities and seven times more likely to drop out of high school.
>
> The Needleman study was one of the first that tried to factor out other possible explanations such as family stimulation and parental IQ, and it triggered a wave of research on the low-level effects of lead. A 1987 study of 249 mostly middle- and upper-middle-income infants in the Boston area reported that those exposed to 10 to 25 micrograms/dL of lead in the

> womb lost four to six points on developmental tests measuring memory, learning and tasks like putting pegs into a board or naming parts of a doll. A 1987 study of 501 children in Edinburgh, Scotland, found that those with average blood levels of 11 micrograms/dL suffered similar intelligence losses, while another Scottish study reported that children with slightly elevated blood-lead levels were more likely to be considered hyperactive or aggressively antisocial by their teachers.

The diminished mental capacity of children exposed to lead is muffled because they seem to be normal kids. The key word is "asymptomatic" because what hides the horror of chronic lead poisoning is it usually occurs without symptoms, and what symptoms do occur often mimic other ailments. Children suffering from lead poisoning are labeled as colic, or hyperactive, or misbehaving, or inattentive. Lead poisoned children go to schools and are expected to perform academically as if nothing was wrong. As the politicians say, "All Children Can Learn." But can they really, if they have been poisoned?

The ferocity of the lead problem defies understanding by those who fail to appreciate how the cumulative affects of lead can build year after year, and that it is a known *neurotoxin*. Lead toxicity does not just occur when lead is ingested. Lead remains toxic in the blood, in the bones, in the brain, and other parts of the body in which it becomes incorporated, and this toxicity slowly increases with each new exposure. Studies have shown that lead in the bones of mothers, ingested perhaps in their youth, becomes "mobilized" during pregnancy and affects their fetus, poisoning its development (see: "Legacy of Lead" Environmental Health Perspectives, Vol. 109:5 May 2001, pg A224).

Similarly, Crime-Times, an Arizona based national newsletter devoted to "Linking Brain Dysfunction to Aberrant/Criminal/Psychopathic Behavior," (Volume 4, No. 4, pp. 1&2) reported on a 1997 study in Mexico (Pediatrics, Volume 100, No. 5, November 1997, pp. 856-862) that

> T. Gonzalez-Cossio and colleagues recently tested 272 mother-infant pairs, and found that the mothers' tibia lead levels correlated inversely with their infants' birth weight. "Because lead remains in bone for years to decades," they say, "mobilization of bone lead during pregnancy may pose a significant fetal exposure with health consequences, long after maternal external lead exposure has declined."

Indeed, the National Academy of Sciences' Commission on Behavioral and Social Sciences and Education issued a report titled "Minority Students in Special and Gifted Education" that states "Interestingly, the incidence for low birthweight for babies of African-born Black women more closely resembles that of U.S.-born whites than of U.S.-born Blacks" (page 3-4). One commonality between "African-born Black women" and "U.S.-born whites" is their general lack of exposure to environmental lead.

The Southwest Human Development organization and Arizona's Children's Action Alliance jointly published a 33- page booklet in February, 2001, titled "Make Kids Count: Giving Babies a Smart Beginning" which devoted its first chapter to "The Brain." In the first paragraph of this first chapter it states:

> Recent scientific research concludes that 90 percent of brain development occurs between birth and age three. At birth, the human brain is not developed. Newborns start out with about 100 billion neurons (brain cells), which are the basic building blocks of the brain, and about 50 trillion synapses, or connections, among them. In the first year, the number of synapses increases to 500 trillion.

Unfortunately, other than a vague reference in the booklet's second chapter to "… exposure to environmental toxins…" there is no reference to lead poisoning. Yet it is "between birth and age three" that lead does the most damage (lead creates brain damage at all ages, but brain development is more rapid and more fundamental in the first three years).

Dr. Patricia M. Rodier, a researcher in the Department of Obstetrics/Gynecology at the University of Rochester, New York, made a presentation at a 1994 symposium on "Preventing Child Exposures to Environmental Hazards: Research and Policy Issues." Her presentation, titled "Developing Brain as a Target of Toxicity," (as reported by a 1995 National Institute of Environmental Health Sciences abstract) stated:

> The blood-brain barrier is not fully developed until the middle of the first year of life. The number of synaptic connections between neurons reaches a peak around age two and is then trimmed back by about half. Similarly, there is great postnatal activity in the development of receptors and transmitter systems as well as in the production of myelin. …. toxic substances such as lead, seem to have their greatest effects during even later stages of brain development, perhaps by interfering with the trimming back of connections. (see at: http://ehpnet1.niehs.nih.gov/docs/1995/Suppl-6/rodier-abs.html)

A 1996 National Institute of Environmental Health Sciences abstract of a 1995 presentation by Robert A. Goyer, one of their scientists, at a symposium on "Toxicology and Chemistry of Metals" stated:

> Experimental studies have shown that the developing nervous system is particularly sensitive to the toxic effects of lead and that a large number of the effects in the nervous system are due to interference of lead with biochemical functions dependent on calcium ions and impairment of neuronal connections dependent on dendritic pruning. (see at: http://ehpnet1.niehs.nih.gov/docs/1996/104-10/goyerabs.html)

Both the "trimming back of connections" and "dendritic pruning" refer to the same process of mental development that only occurs in the first three years of brain development. The interference with this process by lead poisoning during the first three years of life results in permanent brain damage, and an improperly "wired" brain. The consequences of this subtle damage are not subtle. Research is discovering that severe social and educational problems stem from this early interference with brain development.

The 1991 Newsweek article noted that the U.S. Centers for Disease Control (CDC) had been lowering 'acceptable' lead levels because lead is so poisonous.

> In the 1970s, the CDC defined lead poisoning as occurring when a child had 30 micrograms of lead per deciliter of blood, the level at which problems like anemia, stomach ailments and noticeable learning troubles appear. … It takes strikingly little lead to cause lead poisoning. … To achieve blood-lead levels of 35 micrograms/dL, a child would have to eat just the equivalent of one granule of sugar a day. That's why a child can become ill merely by regularly touching a windowsill and then sucking his thumb.

Window sills and dust grains laced with lead are found throughout low-income neighborhoods in the United States. In 1991 a study of 1,454 Mexican-American children by Roberto Frisancho and Alan S. Ryan, published in the American Journal of Clinical Nutrition, linked lead poisoning to reduced stature of up to an inch. Science News (Volume 140, No. 12, September 21, 1991, pg 189) reported that

> Although the federal Centers for Disease Control considers up to 30 micrograms per deciliter an 'acceptable' lead level in children, the high-lead group in this study averaged only 50 to 58 percent of that concentration. Indeed, Frisancho told Science News, stature-stunting effects appeared in children with blood lead levels as low as 10 micrograms per deciliter --- one-third the level previously reported to affect stature.

In 1992, researchers reported in The New England Journal of Medicine (Volume 327, No. 18, October 29, 1992, pp. 1279-1284) of a study done in Port Pirie, Australia, that measured IQ scores in 494 seven-year-old children. They reported

> For an increase in blood lead concentration from 10 micrograms per deciliter to 30 micrograms per deciliter … the estimated reduction in the IQ of the children was in the range of 4.4 points to 5.3 points. This reduction represents an approximate deficit in IQ of 4 to 5 percent.

But it turns out new findings show this research missed the worst damage because it presumed a 10 microgram base. Dr. Bruce Lanphear, M.D., M.P.H., a physician in Cincinnati Children's division of General and Community Pediatrics, presented a paper at

the April, 2001, Pediatric Academic Societies annual meeting. According to a press release issued by the Pediatric Academic Societies:

> Dr. Lanphear and his research colleagues studied 276 6-month-old children born in five hospitals in Rochester, NY. They measured blood lead at 6, 12, 18, 24, 26, 48 and 60 months of age. A standard IQ test (Stanford-Binet IV) was administered when the children reached 60 months. Among all children studied, there was on average a 5.5 point reduction in IQ for every 10 micrograms per deciliter increase in blood lead. But for children who had blood lead less than 10 micrograms per deciliter, there was an 11.1 point reduction in IQ for the initial 10 microgram per deciliter increase in blood lead.

In other words, while other studies had shown a 5 to 6 point decline in I.Q. when blood lead levels increased from above 10 micrograms to above 20 micrograms, this loss occurred after the most severe damage occurred at the lower levels of lead exposure below 10 micrograms.

Since a normal IQ equals 100 points, a 10 percent loss is a 10 point loss in IQ. The standard deviation for IQ is approximately 15 points, which means two-thirds of the population have an IQ of between 85 to 115 (i.e. plus and minus one standard deviation). It also means that virtually nobody has an IQ below 55, three standard deviations below the average. A 10 point loss in IQ represents a substantial change in intelligence, equivalent to losing over one-fifth of the entire normal intelligence of a human being. It means many children born with normal intelligence become mildly retarded due to lead poisoning, and the mildly retarded become severely retarded.

A public health official in Philadelphia told me that he commonly finds people pooh-poohing even a 5% IQ loss, but in his lectures to doctors at medical schools he gets his point across by asking them how much they would give for a 5% increase in IQ. A graphical interpretation of such a loss among a general population is available at the website http://www.ourstolenfuture.org/NewScience/behavior/iqshift.htm demonstrating the particular loss of leaders, intellectuals, and other high intelligence human capital to that population.

During the 1990s, as more research on environmental toxins accumulated, the federal Centers for Disease Control (CDC) lowered its level of lead toxicity to 20 micrograms/dL and then to 10 micrograms/dL.

But the medical research indicates that blood lead levels of 10 micrograms/dL are high enough to cause a reduction in physical stature and an 11.1 point reduction in mental IQ. The latest research makes it clear that the worst damage from exposure to environmental lead occurs with the initial exposure

the medical research indicates that blood lead levels of 10 micrograms/dL are high enough to cause a reduction in physical stature and an 11.1 point reduction in mental IQ

below the official 10 microgram level, and subsequent damage is attenuated. Any exposure to lead by a child "between birth and age three" is presumed to cause brain damage of some degree.

The level at which lead poisoning affects school performance is therefore now believed to have no safe limit. As Charles W. Schmidt, writing in Environmental Health Perspectives (Volume107, No.6, June 1999) noted:

> "… a majority opinion holds that there is no threshold of effect in children, meaning that a level so low as to be without a measurable effect has yet to be identified." (see: http://www.mindfully.org/Pesticide/Poisoning-Minds.htm)

When children's brains have been built with lead instead of calcium in their first three years of life, there is nothing that "failing schools" can do about it, years later, as those crippled brains malfunction. Only intervention before those first three years to prevent exposure to environmental lead will prevent the damage from occurring. Only politicians can remedy that exposure. By the time the children reach school age, the damage is done.

The national newsmagazine U.S. News and World Report gave an example of this in their December 18, 2000, issue:

> Theodore Lidsky watches small kids struggle to do the simplest things. He has seen children who try to copy a drawing and end up with a vague mess, or who have trouble putting pegs in a pegboard. These kids, some just 5, likely will fail in school and flail through life if they don't get help. And Lidsky, a neuroscientist at the New York State Institute for Basic Research on Staten Island, knows why. "Lead," he explains. "It wreaks havoc in the brain."

Dr. John Rosen, one of the foremost experts in lead poisoning at the Montefiore Medical Center of the Albert Einstein College of Medicine in New York was quoted in the Albany Times-Union (September 12, 1999, pages E1, E9) as saying "if the poisoning isn't caught early the effects include extreme loss of intelligence and problems with language development and abstract thinking. … It doesn't actually kill children, it only kills their brains." Dr. Rosen was twice Chair of the Centers for Disease Control and Prevention Committee on Lead Poisoning and described by an appellate court decision as "a preeminent expert in the field relied on by all the relevant government agencies to establish the science for the policies that the government has adopted." (see at: http://laws.lp.findlaw.com/getcase/2nd/case/007511v2&exact=1 regarding U.S. 2nd Circuit Court of Appeals in CAMPBELL v METROPOLITAN)

It should not take a great amount of intelligence to understand that if all low-income children were capable of learning, they would have been taught by the numerous endeavors of universities, foundations, government agencies, and school districts that have made the attempt. Human brains work by establishing connections between neurons

with calcium ions. When the calcium ions have been replaced with lead ions, brains simply do not work properly. The evidence is very clear that schools are doing the best they can to overcome the achievement gap, but the problem is beyond the reach of the schools. By the time poisoned children reach the public schools, the damage is done, it was done during the developmental stages of brain development and it is irreversible.

Most of the public is already aware that schools are doing their best. They made this very clear in the PDK/Gallup Poll of the Public's Attitudes Toward the Public Schools (see: http://www.pdkintl.org/kappan/k0109gal.htm). When asked specifically "is the achievement gap between white students and black and Hispanic students mostly related to the quality of schooling received or mostly related to other factors?" the public overwhelmingly (parents 74%, non-parents 72%) chose "Other factors." So far, then, the public has not been fooled by Talibanic politicians, but the PDK/Gallup Poll did not explore exactly what comprises these "other factors."

However, the public is beginning to figure that out, too. The link between so-called "failing schools" and lead poisoning was recently outlined by a preliminary study performed in Pensacola, Florida. Parents complained to their state legislator that lead poisoning was behind their failing schools. When Escambia County Health Department Director Dr. John Lanza was asked by that legislator about lead poisoning in low-income areas of Pensacola with schools designated as "failing," he assigned a project to a University of Florida student to compare county blood lead level records with the test scores of students in failing schools. (see revised link: http://www.flahec.org/NFAhec/chs/lead.html)

Florida had implemented an assessment known as the Florida Comprehensive Achievement Test (FCAT) to label certain schools as "failing." A Pensacola News Journal article published July 30, 2000, summarized the subsequent report:

> More children have been diagnosed with lead poisoning at Escambia County's poorest-performing schools than at any other schools, suggesting the toxic substance might be partly to blame for some of the state's worst standardized test scores in the last few years. ….
>
> The study, conducted for the Health Department by a University of Florida medical student, is the first attempt locally - and perhaps in the state - to link high lead levels with poor academic performance. Most lead-poisoning cases involve students at A.A. Dixon Elementary and Bibbs Academy - which until this year were the state's only chronically failing schools - and Weis Elementary, which also failed the Florida Comprehensive Assessment Test, or FCAT, last year. ….
>
> Helen Crawford's voice grows soft as she talks about her 11- year-old granddaughter, Thomeshia King, a former Weis Elementary student who was diagnosed with lead poisoning four years ago. Thomeshia's symptoms, she said, were behavioral: crying spells, acting up in class,

> difficulty focusing on her school work. "Oh, she was out of control," said Crawford, 58, who has cared for Thomeshia since her mother died unexpectedly five years ago.
>
> Poor attention spans and impulsive behavior are classic problems associated with lead poisoning, especially if the child can't seem to learn, no matter how hard he or she tries, said Dr. Henry Doenlen, a child psychiatrist and medical director of the children's stress treatment program at Baptist Hospital.

Read that carefully: when a newspaper reporter investigated the connection between lead poisoning and failing schools, "a child psychiatrist and medical director" was matter-of-factly quoted as defining the characteristic signature of lead poisoning as "especially if the child can't seem to learn, no matter how hard he or she tries."

It has long been documented that poverty exacts a tremendous burden on ill-fed, ill-housed, and often just plain ill children, and there are numerous social programs meant to ameliorate these problems. Low-income families often lack one parent, live in multi-family circumstances in overcrowded housing, with adults leaving and arriving late at night due to odd shifts. They are affected by crime, both as victims and perpetrators, with court appearances, hospitalization and incarceration affecting the employment and income of these families.

Politicians insist that these "parental problems" do not affect the children, that "All Children Can Learn" despite these "disadvantages." For many in poverty, perhaps this is true, but social workers have been stymied in addressing the problems of the so-called "hardcore poor," as if there were something intractable about their problems hiding in the shadows. There is an enormous difference between the consequences of poverty and the consequences of poverty induced lead exposure.

The issue of health care is doubly crucial because it has been well-documented that children absent from school more often tend to have lower test scores than those who attend regularly (for example, see: **Revision:** nonfunctioning link removed).

There are many reasons why children might be absent from class, but the predominant one is because the child is sick. Low-income families that lack healthcare insurance tend to be sick more often and to have more serious illnesses because they lack medical intervention. Poor sanitation practices, often accompanying low-income status, contribute to more frequent illnesses from food poisoning and disease transmission. But lead poisoning itself produces a chronic illness that interferes with attendance.

The Tucson Citizen newspaper published an editorial by David Murray, director of the national Statistical Assessment Service, on June 28, 2000, which listed "seven lessons" for parents to improve their children's academic performance in school. The first was

> Get your child to school every day. Obvious, sure, but attendance counts. A recent University of Minnesota study found attendance to be a better predictor of test scores than poverty. Those with 93 percent attendance aced the standardized tests. Those who attended only 85 percent of the time found their scores plummeting.

Perhaps not so "obvious" to Murray is that poisoned children with lead induced "somatic complaints" may need more than a prompting to go to school.

In addition, low-income children often attend school as a family unit: the older sibling assists the younger siblings in school attendance and after-school supervision. If the older sibling is ill, the younger siblings may not attend, and if the younger siblings are ill, the older sibling may need to stay home to supervise. Thus in low-income families with four children, these children may be twice as likely to become ill due to health and sanitation issues, and thus eight times as likely to miss school because all four children will miss school if one becomes ill.

More affluent parents will see fewer illnesses in their children, be able to take "family leave" if a child is ill, and able to pay for well-care to have sick children supervised. As a consequence, affluent children attend school more days than low-income children and are more likely to be cured and healthy when they return than low-income children. Many low-income children may be in attendance with pain from colds, allergies, asthma, ear infections, sore throats, abdominal upsets, and tooth decay that more affluent children do not endure. But then, of course, there is lead poisoning with its constant agitation and typical symptoms of "stomach cramps, vomiting, muscle cramps."

There is no question that poverty, by itself, creates a menagerie of difficulties for children. Yet, as troubling as the "lions and tigers and bears" of other social problems are, there is mounting evidence that environmental lead poisoning among the "hardcore poor" is an enormously larger problem, a metaphorical Tyrannosaur, erroneously believed by many to be extinct, stalking low-income neighborhoods and schools.

Environmental lead can be considered a predatory poison that primarily stalks the children of the hardcore poor, while more affluent children tend to be immune. Affluent families generally live in newer homes built after lead paint was banned. Even if the affluent live in older homes, the lead is typically covered by layers of new paint. The older the home, and the less it is maintained, the more likely the paint is to flake, chip, and powder. Low-income families tend to occupy these older "run down" homes because they are cheaper. Even so, children whose diets are high in calcium (milk, fresh greens, etc.) tend to excrete lead, but in children without adequate diets, lead replaces the missing calcium in bones, teeth and brain structures.

Thus lead exposure is unlikely to occur in affluent neighborhoods and even so, well-fed affluent children would excrete most of what little lead they encounter in life. In short, lead poisoning requires a combination of circumstances to exist. Even in neighborhoods infested with the "lions, tigers and bears" of normal poverty, only certain children will be

mauled by the Tyrannosaur of lead poisoning. For all but the "hardcore poor, " environmental lead "doesn't exist." But for a very large percentage of the low-income children in America, this metaphorical monster does exist, and it is all too real.

When analyzing the comparatively mediocre performance of American students in the Third International Math and Science Study (TIMSS), researchers have noted that most other industrialized nations have anti-poverty programs for children, while an inordinately large number of American students live in poverty compared to the other nations. Researchers have noted that affluent American schools outperformed most international schools on tests of math and science, but that low-income schools in the United States do not.

Education Week newspaper (April 11, 2001) ran a story titled "A World-Class Education Eludes Many in the U.S." which began:

> "It's official," a suburban Chicago school district proclaimed last week. "Naperville Community Unit School District 203 is the best school district in the world." …. The 18,900-student Naperville district, due west of Chicago, scored at about the same place as the top-scoring countries in both subjects. The First in the World Consortium, a group of suburban Chicago districts, also ranked near the top, as did the Academy School District No. 20 in Colorado Springs, Colo., and the Michigan Invitational Group in suburban Detroit. The districts are characterized by low poverty and relatively low enrollments of minority students.
>
> The 140,500-student Montgomery County, Md., district in suburban Washington also ranked near the top in mathematics, but toward the middle of the pack in science. Though some of the wealthiest neighborhoods in the United States are in the county, half its school district's enrollment is made up of minority students, and about one-fourth of its students live in poverty.
>
> On the other hand, the school districts in Chicago, Miami-Dade County, Rochester, N.Y., and Jersey City, N.J., all scored at or near the bottom—in the same range as such countries as Chile, the Philippines, Morocco, and South Africa. All the low-performing districts have high levels of poverty and minority enrollment.
>
> The TIMSS-R results show that 90 percent of the students in the high-achieving areas scored above the international average, while only 30 percent of the students in the low-performing districts reached that level, according to Gordon M. Ambach, the executive director of the Council of Chief State School Officers.

Experts who research test scores in the United States have frequently noted the clear correlation between low-income and low test scores. Most experts spend their efforts

arguing over whether it's a minority problem with genetics, or a cultural problem with family support, or an income problem with differing resources, but no one seems to consider it could be beyond that: a consequence of lead-induced brain damage.

Consider, for example, even when comparing European students with American students of similar poverty levels, what no one has pointed out, hiding in the statistical shadows, is that most European countries outlawed the use of lead paint long before the United States.

The January, 2000, American Journal of Public Health (Volume 90, No. 1, pp. 36-46) published an article "'Cater to the children': the role of the lead industry in a public health tragedy, 1900-1955" on the history of lead in paint. It noted:

> Outside the United States, the dangers represented by lead paint manufacturing and application led to many countries enacting bans or restrictions on the use of white lead for interior paint: France, Belgium, and Austria in 1909; Tunisia and Greece in 1922; Czechoslovakia in 1924; Great Britain, Sweden, and Belgium in 1926; Poland in 1927; Spain and Yugoslavia in 1931; and Cuba in 1934. In 1922, the Third International Labor Conference of the League of Nations recommended the banning of white lead for interior use. (See: http://www.ajph.org/content/vol90/issue1/)

Therefore, even the smaller proportions of impoverished children living in dilapidated housing in France, Sweden, Great Britain, Australia, etc., are not poisoned like similarly impoverished children living in the "Chicago, Miami-Dade County, Rochester, N.Y., and Jersey City, N.J." housing mentioned in the TIMSS comparison. With "socialized medicine" in most of those foreign countries, even where lead poisoning exists, the European children would be treated.

Thus international studies comparing academic achievement, such as the TIMSS test scores, compare poisoned and ill American children without adequate health care to unpoisoned healthy children in other countries and conclude the deficit is because of "failing schools." But there is a Tyrannosaur sized difference between impoverished children with healthy brains and those impoverished children suffering brain damage from environmental lead.

In January, 2002, the National Academy of Sciences' Commission on Behavioral and Social Sciences and Education released its report titled "Minority Students in Special and Gifted Education." The committee was assigned the task of investigating why minorities were found to be over-represented in Special Education for learning disabilities and under-represented in gifted programs. The Executive Summary (see: http://www.nap.edu/books/0309074398/html/) noted in its first paragraph that

> In the low incidence categories (deaf, blind, orthopedic impairment, etc.) in which the problem is observable outside the school context and is

> typically diagnosed by medical professionals, no marked disproportion exists. The representation of minority students occurs in the high-incidence categories of mild mental retardation (MMR), emotional disturbance (ED), and to a lesser extent learning disabilities (LD), categories in which the problem is often diagnosed first in the school context and the disability diagnosis is typically given without confirmation of an organic cause.

In other words, the committee found that minority children were diagnosed with problems symptomatic of lead poisoning by educators who were ignorant of lead poisoning and made the diagnosis on the basis of the symptoms "without confirmation of an organic cause." The education community may be oblivious to lead poisoning, but the committee was not. Page three of the Executive Summary states:

> The committee's goal, then, was to determine why disproportion occurs. To address our charge, the committee asked four questions, the first of which was:
>
> "Is there reason to believe that there is currently a higher incidence of special needs or giftedness among some racial/ethnic groups? Specifically, are there biological and social or contextual contributors to early development that differ by race or ethnicity?"
>
> Our answer to that question is a definitive 'yes.' We know that minority children are disproportionately poor, and poverty is associated with higher rates of exposure to harmful toxins, including lead, alcohol and tobacco in early stages of development.

The committee disproved the allegation that educators were prejudicially referring minority children to special education. On page four of the Executive Summary the committee noted:

> For example, research that has compared groups of students who are referred by teachers find that minority students actually have greater academic and behavior problems than their majority counterparts.

The committee then stated the obvious for which educators have proved oblivious: the problem begins before the children enter school. On page five, in the paragraph just before the "Conclusions and Recommendations" section, the Executive Summary reports:

> The 'earlier is better' principle applies even before the K-12 years. The more effective we are at curtailing early biological harms and injuries and providing children with the supports for normal cognitive and behavioral development in the earliest years of life, the fewer children will arrive at school at risk for failure.

In the committee's "Conclusions and Recommendations" section, after several recommendations for dealing with the existing problems, the Executive Summary avers:

> **Biological and Social Risk Factors in Early Childhood**
> Existing intervention programs to address early biological harms and injuries have demonstrated the potential to substantially improve developmental outcomes. The committee concludes that the number of children, particularly minority children, who require special education can be reduced if resources are devoted to this end. In particular, the committee calls attention to the recommendation of the President's Task Force on Environmental Health Risks and Safety Risks to Children to eliminate lead from the housing stock by 2010.

This was a National Academy of Sciences committee assigned to investigate why minorities were over-represented in special education, and the scientists concluded it was lead poisoning in the housing stock. Although the education community appears oblivious to the devastating consequences of lead in the neighborhoods surrounding "failing schools," increasingly they are becoming the only ones to ignore the obvious.

There are reasons why children exposed to environmental lead can't learn. They can't learn because their brains have been damaged by lead. They can't learn because lead poisoning interferes with paying attention and causes discomfort. They can't learn because lead-induced ills force them to attend school less often than healthy children. Scientific evidence has documented that environmental lead causes academic failure.

Indeed, the characteristic signature of lead poisoning recognized by pyschiatrists is "... especially if the child can't seem to learn, no matter how hard he or she tries." Unfortunately, it turns out that academic failure may be the least of the problems induced by environmental lead.

A Stranger Ignorance

(Chapter 3 of A Strange Ignorance)

On the website of the Gruter Institute for Law and Behavioral Research (http://www.gruterinstitute.org/) there is a Report of a Symposium on Biology, Behavior, and The Criminal Law held in April of 1997 (Reported by Oliver Goodenough). After Roger D. Masters presented his association between lead and crime (noted below):

> "Professor Deborah Denno drew on her Philadelphia data once again to argue for *The Unfamiliar Link Between Lead and Crime.* Her work also shows a highly significant link between observed lead toxicity and the likelihood of criminal activity. The rich nature of the data allowed her to explore some 3,000 factors for links to criminal behavior in 1000 children who were followed from birth to age 22. The researchers found that the best predictor (when the children are 7 years old) for aggressive behavior in school, juvenile delinquency, and eventual criminal violence is the degree of lead poisoning. The second best predictor was anemia, which, being related to deficits in calcium, zinc and other essential minerals, is associated with uptake of toxins from the environment."

Of course, anemia itself is a common symptom of lead poisoning. Denno, a law professor at Fordham University, conducted her research in the 1970s and in 1990 published her findings that concluded most criminal and violent behavior can be prevented because they have environmental origins that can be eliminated ("Biology and Violence : From Birth to Adulthood" November 1990, Cambridge University Press; ISBN: 0521362199).

It is difficult to understand why educators seem unable to comprehend that misbehavior in school is only the tip of a lead-induced iceberg of violence that extends far beyond classrooms. But people in other professions have been noting this for years. Researcher Roger D. Masters and his co-workers attempted to explain the wide discrepancy in crime rates among cities by performing statistical comparisons of EPA records of toxic metal releases and FBI data on violent crime in all U.S. counties. They found a strong correlation between violent crime and toxic metal pollution. Masters was quoted in a New Scientist magazine article titled "Pollution May Lead to a Life of Crime" (154:2084, May 31, 1997, pg 4) as attributing violent crime to brain damage from neurotoxins: "It's the breakdown of the inhibition mechanism that's the key to violent behavior."

He was referring to the "breakdown" of the biochemical "inhibition mechanisms" in the frontal lobe of the brain that control behavior. One section of the brain stimulates excitement and impulsiveness while another section of the brain inhibits actions on those stimuli. Normally the brain balances those dynamic pressures but in brains damaged by lead poisoning, they become imbalanced.

In a study published in the May 2000 Environmental Research Journal (Vol. 83, No. 1, pp. 1-22), Rick Nevin performed a statistical analysis of childhood lead exposure and violent crime rates and unwed pregnancies. Childhood lead exposure explained 88% of

the variation in the violent crime rates from 1960 to 1998. Childhood lead exposure explained 90% of the unwed pregnancy rates for women aged 15 to 19. Nevin also demonstrated that childhood lead exposure explained the so-called "Flynn Effect" of changing IQ scores in twenty nations during the 1900s.

In May of 2001, the American Medical Association published a study titled "The Relationship Between Lead Exposure and Homicide" by Paul B. Stretesky, PhD. and Michael J. Lynch, PhD. (Arch Pediatr Adolesc Med. 2001;155:579-582) which reported:

> Numerous behavioral, neuropsychological, and biological studies suggest that sufficient exposure to lead, a metallic neurotoxin, can promote brain dysfunction. Called the *neurotoxicity hypothesi*s, this position states that lead exposure alters neurotransmitter and hormonal systems and may induce aggressive and violent behavior. ….
>
> The major finding of this study is that there is an association between air lead concentrations and homicide rates in the contiguous United States in 1990. At this time, however, it is not possible to say that the observed relationship is causal. Nevertheless, the finding of an association between lead exposure and homicide is consistent with the few individual-level studies examining the role of lead exposure in delinquency and aggression. Moreover, the results of this study contribute to the emerging and controversial issue concerning the role of lead exposure in predisposing some individuals to committing crime and displaying violent behaviors. ….
>
> For much of the 20th century, lead's deleterious effects on health were widely accepted. Often, however, these affects were only associated with extreme cases of lead exposure that occurred through occupational exposure or lead paint ingestion by children. In recent years, research has pointed toward the neurotoxicity and behavioral effects of lead at subclinical levels and through a variety of environmental mediums. The results of our ecological study indicate that these additional environmental pathways may be more ubiquitous than imagined, affecting patterns of serious forms of violence such as homicide.

The Canadian website for the organization "Lead Environmental Awareness and Detection" has several pages on violence associated with lead. The webpage titled "Urban Crime Versus Rural Crime" (linked from http://www.nrtco.net/~lead/bbhead.htm#Urban), which references the Masters research, notes:

> Another interesting finding is the fact that crime rates have always been "higher in urban areas than in the countryside, and … higher within central cities than in the suburban towns surrounding them." Or as the US Bureau of Justice Statistics reports, "Central cities, particularly those with

> populations between 250,000 and 499,999 have the highest per capita rates of violent crime." For the first time in three decades, however, United States homicide rates fell to their lowest level (1999), and much of this decline occurred in the most heavily populated areas. Those cities with more than 1 million inhabitants saw the homicide rate fall from 35.5 per homicides per 100,000 people in 1991 to 20.3 murders per 100,000 people in 1997. The reason for this decrease, as offered by the US Department of Justice is, "The sharp increase in homicides in the late 1980s and much of the subsequent decline is attributable to a rise and fall in gun violence by juveniles and young adults." A more likely explanation for the diminishing crime rate is a rise and fall in urban blood lead levels.

The fall in urban blood lead levels resulted primarily from the ban on leaded gasoline, due in large part to the research of Dr. Needleman and others concerned about the toxic effects of lead in the environment. As leaded gasoline was phased out in the heavily commuted cities, blood lead levels of their denizens declined dramatically, and violent crime declined at the same time.

The connection between lead exposure and violence is not something educators can afford to ignore. The slogan "All Children Can Learn" seems to eerily replicate the misperception of behavior explained in a speech given by William Walsh at the Annual Meeting of the American Psychiatric Association on May 9, 1996 (as summarized by a 1996 Crime-Times article: Volume 2, No. 3, pg 6):

> In 1975, William J. Walsh and fellow energy researchers at the Argonne National Laboratories organized an ex-offender program for prisoners leaving Statesville Penitentiary. The effort, undertaken as a community service, wound up changing Walsh's line of work - and his beliefs about crime.
>
> "We did the usual do-gooder things," Walsh said later, "believing as most people did at the time that criminals were the product of their past life and family nurturing." But, Walsh says, it didn't take long for him to realize that the group's efforts were misdirected.
>
> "After we had spent a year or two working with dozens of violent people," he says, "we discovered that we were completely wrong about our basic beliefs. We realized that these people were different from the rest of the population, and the difference is physiological."
>
> A controlled study by Walsh et al of 192 violent and non-violent males found the same pattern: 92 of 96 violent subjects had type A or type B biochemical profiles, while only five of the 96 non-violent subjects had abnormal profiles.

Both the type A and type B profiles in the Walsh study included "elevated lead levels" differing primarily in their copper-to-sodium ratio. Type A "was seen in subjects who exhibited episodic violence" while type B "was found in psychopathic subjects who showed no conscience or remorse."

The connection between lead poisoning and violence has become apparent to nearly everyone except educators. Investigators seeking the bio-chemical origins of criminal behavior frequently point to the clear involvement of lead poisoning as a contributor to, if not a cause of, Attention Deficit Hyperactivity Disorder (ADHD).

"Exposure to lead ... has been associated with ADHD."

-National Academy of

A National Academy of Sciences report titled "Understanding and Preventing Violence, Volume 2: Biobehavioral Influences" issued in 1994 by the Commission on Behavioral and Social Sciences and Education linked lead exposure to both ADHD and juvenile delinquency. The section of the report titled "**Nutrition and Violent Behavior"** (Page 535) reads:

> It has recently been found that lead poisoning during childhood can have long-term detrimental effects on behavior. Exposure to lead, which most frequently occurs when young children consume lead-based paints, has been associated with ADHD. As previously mentioned, ADHD is a well-established risk factor for later antisocial behavior. … The relation between lead exposure and delinquency has not yet been systematically studied, but clues suggest that this relationship should be given serious consideration. (see: http://books.nap.edu/books/0309046491/html/535.html#pagetop)

That was in 1994, but now the systematic studies have started to come in. In the journal Neurotoxicology and Teratology (Volume 23, No. 6, November-December 2001, 511-8), a study team led by Kim N. Dietrich of the Department of Environmental Health, Division of Epidemiology and Biostatistics, University of Cincinnati College of Medicine, reported on a cohort of 195 urban, inner-city adolescents recruited between 1979 and 1985. Their report titled "Early exposure to lead and juvenile delinquency" confirmed earlier clinical observations and recent retrospective studies that have linked Pb exposure with antisocial behavior in children and adolescents and stated:

> "It appears that the neurodevelopmental effects of this avoidable environmental disease of childhood may not be limited to declines in IQ or academic abilities."

More importantly, from an educational point of view, Crime-Times, an Arizona based national newsletter devoted to "Linking Brain Dysfunction to Aberrant/Criminal/Psychopathic Behavior," reported in 1996 (Volume 2, No. 4, pg. 7):

A new study by Robert Tuthill links even slightly elevated lead levels to attention deficit disorder, itself a strong risk factor for criminal behavior. Tuthill analyzed lead levels in the hair of 277 first-graders from eight Massachusetts schools, and found a striking dose-response relationship between hair lead levels and symptoms of attention deficit disorder as reported by teachers. This relationship remained strong, he says, even after age, ethnicity, gender, and socioeconomic status were taken into account. "An even stronger relationship existed between physician-diagnosed attention-deficit hyperactivity disorder and hair lead in the same children," he adds.

Tuthill also found that "there was no apparent `safe' threshold for lead," with even low exposure increasing the likelihood of attention deficits - a disturbing finding, since approximately three million children in the United States are estimated to have at least mildly elevated lead levels. ("Hair lead levels related to children's classroom attention-deficit behavior," Robert Tuthill, Archives of Environmental Health, Vol. 51, No. 3, May-June 1996, pp. 214-220)

Notice that Tuthill's work found "a striking dose-response relationship between hair lead" and teacher reported ADHD but "an even stronger relationship" with "physician-diagnosed" ADHD. In simple terms, this means the more certain they were of ADHD the more certain they were that lead was involved. And although this is only a correlation, the fact that "even after age, ethnicity, gender and socioeconomic status were taken into account" the ADHD relationship to lead remained, is extremely suggestive that ADD and ADHD may simply be symptoms of brain damage from exposure to lead in the early years of a child's life.

A 2000 Crime-Times newsletter (Volume 6, No. 3, pg 5) states:

> Research shows a strong link between childhood attention deficit hyperactivity disorder (ADHD) and adult violence and social failure, even when ADHD is not accompanied by conduct problems. While the causes of ADHD remain unclear, new research points to brain abnormalities early in life. F. Xavier Castellanos et al report that large-scale brain imaging studies of ADHD children reveal reduced cerebral volume compared to control subjects. … Comparisons of medicated and unmedicated ADHD subjects indicate that the changes are not due to stimulant medications but rather most likely stem from genetic, prenatal, or early-childhood environmental insults.

Lead is easily the most widespread "early-childhood environmental insult" linked to brain damage and therefore the most likely culprit in causing ADHD. The affects of ADD and ADHD are very commonly misunderstood and their impact on classroom performance seriously underestimated. Dr. Joseph Biederman and Stephen Faraone, Ph.D., both of Massachusetts General Hospital, wrote in the Harvard Mahoney Neuroscience Institute Letter (Winter 1996):

> ADHD children with learning disabilities showed motor impairment and had extremely slow reading speed, suggesting irregularities in communication between brain structures that deal with reading material. (See at: http://www.med.harvard.edu/publications/On_The_Brain/Volume5/Number1/ADD.html)

In 1996, Eric Taylor and colleagues reported in the Journal of the American Academy of Child and Adolescent Psychiatry (Volume 35, No. 9, September 1996, pp. 1213-1226) on a nine-year follow-up study on children between 16 and 18 years old who had previously been categorized either as

1. not having Conduct Disorder but having ADHD,
2. having Conduct Disorder but not ADHD,
3. those with both, and
4. those with neither.

(errata: first category originally mis-stated)

They reported that ADHD

> … is predictive of violence, both by self-report and parental account, and of defiant and disruptive behaviors; and it is often followed by poor relationships with age peers, a lack of involvement in social activities, a lack of engagement in constructive activities generally, and poor academic achievement. (See: Crime-Times Volume 3, No. 3, pp. 1&2)

There seems to be a common misconception that ADHD is merely an excuse concocted by teachers with poor classroom management skills or that it's only a new name for rambunctious children. Both are erroneous. Children with ADD/ADHD are not simply 'rambunctious.' Their brains are unable to concentrate and they suffer from uncontrollable impulsiveness. In addition, it doesn't only affect children. Many adults struggle with ADD/ADHD, often unaware that it exists in adults. Indeed, the American Psychological Association recently published a book "The Hidden Disorder" (by Robert J. Resnick, PhD) about adult ADHD.

In the Harvard Mahoney Neuroscience Institute Letter (Winter 1996) Dr. Joseph Biederman and Stephen Faraone, Ph.D., both of Massachusetts General Hospital, reported on a follow-up study four years after a previous study of ADHD in male Caucasian children. They reported

> For many years ADHD was considered a childhood diagnosis that was outgrown in adulthood. … we demonstrated the validity of adult ADHD by showing: 1) that its psychiatric and neuropsychological features mirror the well known correlates of childhood ADHD; 2) that the children of ADHD adults are at very high risk for ADHD; and 3) that in carefully designed studies, adult ADHD shows the same therapeutic response to

> ADHD medications as does the childhood form. (See: http://www.med.harvard.edu/publications/On_The_Brain/Volume5/Number1/ADD.html)

In the book "ADHD in Adulthood: a Guide to Current Theory, Diagnosis, and Treatment" (Johns Hopkins University Press, 1999) the authors note:

> The vicissitudes of the degree of impairment resulting from adult ADHD vary enormously, dependent on numbers of symptoms, severity of symptoms, and the nature of comorbidity. The most disabled individuals are in jail, abuse drugs and/or alcohol, or are living isolated lives on social assistance.

There is also strong evidence that some use of illegal drugs is simply self-medication by undiagnosed ADHD sufferers. An article in the National Institute of Drug Abuse Notes Research News (Volume 14, Number 4, November, 1999) titled "Medications Reduce Incidence of Substance Abuse Among ADHD Patients" reported on a study that compared children previously diagnosed with ADHD who had received medication with those who had not received medication and a control group:

> While 75 percent of the unmedicated ADHD boys had started abusing these substances [marijuana, alcohol, hallucinogens, stimulants, or cocaine] in the previous 4 years, this was true of only 25 percent of the medicated ADHD boys and 18 percent of the boys without ADHD. The researchers calculated that treating ADHD with medications reduced the risk of substance abuse or dependence by 84 percent. (See: "Pediatrics" 104(2):e20 1999 "Pharmacotherapy of attention deficit/hyperactivity disorder reduces risk for substance use disorder")

The NIDA article's author, Steven Stocker, stated

> Other researchers have reported that some adult cocaine abusers with childhood histories of ADHD state that when they first started using cocaine, the drug initially improved their ADHD symptoms. Their concentration improved, they were less impulsive, and they felt calmer. This would suggest that young people with ADHD who abuse cocaine and other stimulants may be doing so to self-medicate their ADHD symptoms rather than to treat depression resulting from rejection and failure.

Frances R. Levin, M.D., in an article titled "Substance Abuse and Adult ADHD" in Psychiatric Times (Volume XVII Issue 2, February 2000) wrote:

> Another possibility is that some individuals may use cocaine or other substances to self-medicate their ADHD symptoms (Khantzian, 1985; Weiss et al., 1988). … Even if cocaine or other substances initially alleviate ADHD symptoms, however, this effect often does not last.

> Instead, continued use of these substances tends to exacerbate ADHD symptoms. (see revised link: http://www.psychiatrictimes.com/p000260.html)

A study by B.R. Horner and K.E. Scheibe in the Journal of the American Academy of Child and Adolescent Psychiatry (Volume 36, No. 1, January 1997, pp. 30-36) indicated

> … that drug abusers may be alleviating symptoms rather than seeking a 'high.' Of 30 adolescent drug abusers studied, fifty percent exhibited hyperactivity and attention deficits.

The report was quoted by Crime-Times (Volume 3, No. 3, pg 4) as stating those fifty percent

> … began drug use at an earlier age, had more severe substance abuse, and had a more negative self-image prior to drug use and improved self-image with drug use.

The researchers concluded these adolescents began "drug use for self-medication."

Another study by neuropsychiatrist Sydney Walker III and colleagues at the Southern California Neuropsychiatric Institute (as reported in the same Crime-Times issue) compared 20 drug abusers between the ages of 20 and 35 with 20 drug-free adults matched for age, sex, and social class. None of the drug-free adults reported chronic childhood physical symptoms and none had a history of childhood prescription drug use for behavioral symptoms. Nineteen of the 20 drug users were using drugs to treat physical symptoms such as headaches, dizziness, and fatigue and fifteen of the 20 had serious criminal records, often stemming from crimes linked to their drug abuse.

> All reported having the same symptoms as children, and many had been prescribed Ritalin or similar drugs for behavioral symptoms such as hyperactivity, inattention, or impulsiveness. …. When they discontinue these drugs, they then, as teenagers, turn to other remedies such as street drugs and/or alcohol to relieve their symptoms.

The researchers concluded "a large percentage of drug abusers appear to be self-medicating undiagnosed physical disorders."

Biederman and Faraone (see above) also participated in a study by Timothy Wilens, published in the Journal of Nervous and Mental Disease (Volume 185, No. 8, August 1997, pp. 475-482) which studied 120 adults diagnosed with ADHD in childhood. According to a 1997 Crime-Times newsletter (Volume 3, No. 4, pg 7), that study reported

> ADHD substance abusers tend to develop drug or alcohol problems about three years earlier than non-ADHD substance abusers. Wilens et al say that because early-onset substance abuse is the hardest to treat, and

> because the onset of hyperactivity generally precedes the development of drug problems by many years, "our findings highlight the importance of targeting preventive and early intervention strategies at children with ADHD." … The researchers suggest that individuals with ADHD or other psychiatric disorders "may have less appreciation of the consequences of substance abuse, more difficulty in the cessation of substances, poorer judgement in peer group selection, and more tendency to self-medicate."

Crime-Times also reported in 2000 (Volume 6, No. 4, pg 5) that a study by D.G. Amen in the Journal of the Psychoactive Drugs (Volume 31, No. 4, October-December 1999, pp. 389-393) of a 20-year-old man who "frequently became violent after drinking alcohol" concluded

> This man may have been 'self-medicating' an overactive brain, but in the process induced a state that increased the likelihood for aggressive violence.

lead poisoning may ultimately be behind much of the plague of drug abuse and alcoholism in public schools

These studies show that lead poisoning may ultimately be behind much of the plague of drug abuse and alcoholism in public schools that parent and non-parents specifically identified in polls as one of the biggest problems facing public schools. To the extent that research shows ADHD symptoms are actually symptoms of brain damage initiated by early age lead poisoning, the problems of drug abuse and alcoholism in "failing schools" are strongly linked to sufferers who are self-medicating ADHD symptoms.

Even low levels of lead poisoning are known to cause reductions in physical stature, to cause brain damage, and to be implicated in ADHD and criminal behavior in humans. Experiments show significant brain damage in rats from "low doses of lead" as well. One website about ADHD reported:

> For the experiment, researchers added low doses of lead to a mother rat's drinking water for 10 days after she gave birth and examined structural changes in the brains of the nursing rat pups. Compared with a control group, the rat pups exposed to low doses of lead showed up to 12% diminished size in barrel field area - the basic information processing units. The larger the dose of lead, the more this area of brain development was stunted. (See: http://www.healing-arts.org/children/ADHD/lead.htm)

Similarly, Idit Trope, et al, reported in the June, 1998, Pediatrics Journal (Vol. 101, No. 6, p. e7) that a magnetic resonance comparison of the pre-frontal brain structure of a normal ten-year-old boy with a similar child exposed to lead showed of the lead exposed child:

> … the lowered NAA/Cr ratio in MC is suggestive of significant neuronal loss in the region examined. There is no indication in MC's developmental history of any event other than lead exposure that would result in loss of brain neurons. Therefore the reduction in NAA/Cr ratio may be a direct result of his elevated lead levels.

The irreversible brain damage caused by exposure to environmental lead was also recently linked to violent criminal behavior. The prefrontal cortex of the brain is known to be damaged by exposure to lead in the first three years of a child's life. It has long been known that traumatic brain damage is associated with violent criminal behavior. Wired Magazine touched on this in a 1999 story titled "Inside the Mind of a Criminal." Wired quoted assistant professor of neurology Antoine Bechara at the University of Iowa:

> Now, researchers at the University of Iowa have found that damage to the prefrontal cortex early in life could be the reason behind antisocial behavior such as delinquency, irresponsibility, and criminal activity.
>
> The Iowa team found that children who suffered damage to that region of their brains before the age of 16 months were unable to learn and follow social and moral codes of conduct through adulthood.
>
> "This is going to shed new light on the underlying basis of these abnormal behaviors," said assistant professor of neurology Antoine Bechara, who helped conduct the study. "It does not explain the cold-blooded killer, but it does explain a lot of antisocial behavior."
>
> Though the research is still in its early stages, Bechara said that the origin of antisocial or criminal behavior could be linked to a dysfunction or biochemical abnormality present in the prefrontal cortex of the brain. "This area of the brain makes the link [for] how we develop our social and moral values. When this area is dysfunctional, you never form that link," he said. (see at: http://www.wired.com/news/print/1,1294,31989,00.html)

On July 21, 2001, the New York Times reported ("Damaged Brains and the Death Penalty" by Laura Mansnerus) on research by a professor of psychiatry at New York University, Dr. Dorothy Otnow Lewis:

> Almost without exception, Dr. Lewis has found in evaluating dozens of death-row inmates, they have damaged brains. Most were also the victims of vicious batterings and often sexual abuse as children. … She concludes that most murderers are shaped by the combination of damage to the brain, particularly to the frontal lobes, which control aggression and impulsiveness, and the even more complex damage visited by repeated, violent child abuse.

Not only is lead poisoning implicated in "damage to the brain, particularly to the frontal lobes," but lead poisoning has also been found to be complicit in child abuse. The Department of Pediatrics at the Children's Hospital of the Harvard Medical School found (J Pediatr 1993 May:122, pp. 719-720) that

> Children suspected of having been physically abused had significantly higher venous blood lead levels than a comparison group. Abused children were 27-fold more likely to have lead levels greater than 20 micrograms/dL.

Suggestively, Biederman and Faraone, in their report on ADHD noted:

> We also found that chronic family conflict, family disunity, and exposure of children to parents' mental illness were frequent in ADHD families. (See at: http://www.med.harvard.edu/publications/On_The_Brain/Volume5/Number1/ADD.html)

The National Center for Education in Maternal and Child Health reported on a study (cited as: http://www.pediatrics.org/cgi/content/full/107/5/e81) in their May 25, 2001, MCH Alert newsletter (see: http://www.ncemch.org/alert/alert052501.htm) that

> At 19 to 24 months, 53% of all children with initial lead screening before foster care placement had blood lead levels greater than or equal to 20 micrograms/dL, compared with 12% of those tested after foster care placement.

Paradoxically, the MCH Alert newsletter authors concluded "The study suggests that removing children from unfit home situations and placing them in foster care may reduce their risk of lead exposure." They seemed oblivious to the concept that removing the lead from the lead-laced environment of both the poisoned parents and the children might obviate any need for foster placement.

A Research report titled "Dysfunction in the neural circuitry of emotion regulation—a possible prelude to violence" by Richard Davidson, et al, published in the July 28, 2000, issue of Science (Volume 289, No. 5479, pp. 591-594) was summarized by Crime Times:

> The researchers analyzed data from brain imaging studies involving more than 500 violent subjects, including convicted murderers, people with childhood brain injuries, and people with aggressive personality disorders. The evidence, they say, indicates that defects in neural circuitry involving the prefrontal cortex, anterior cingulate cortex (ACC), and amygdala may cause some people to commit violent assaults for little or no reason.
>
> "Normal individuals are able to voluntarily regulate their negative affect and can also profit from restraint-producing cues in their environment,

such as facial and vocal signs of anger or fear, that also serve a regulatory role," the researchers say. "We suggest that individuals predisposed to aggression and violence have an abnormality in the central circuitry responsible for these adaptive behavioral strategies."

Davidson et al. hypothesize that the prefrontal cortex normally inhibits violent responses by modulating the activity of the amygdala, a brain region activated in response to fearful or emotional situations. The ACC plays a role as well, by recruiting other brain areas to respond during conflicts. Defects in any of these areas, they say, could lead to impulsive violence. (See: Crime-Times newsletter Volume 6, No. 4, 2000, Pg. 4)

Crime-Times (Volume 6, No. 2, 2000, pp. 1&2) also reported on a study linking anti-social disorders to minimal brain damage (Archives of General Psychiatry, Vol. 57, No. 2, pp. 119-127)

People diagnosed with antisocial personality disorder (APD) fill thousands of America's prison cells, and even those who aren't convicted of crimes cause serious problems due to their deceitfulness, recklessness, impulsiveness, irresponsibility, and lack of remorse and empathy. For decades, psychiatrists and sociologists blamed APD almost solely on sociological influences including poverty and poor upbringing. A new study by Adrian Raine and colleagues, however, adds to a growing body of evidence implicating brain abnormalities as a primary cause of APD.

Raine and colleagues used magnetic resonance imaging (MRI) to study the brains of 21 non-incarcerated men with APD, 34 healthy male controls, and 26 male controls with substance dependence. In addition, they compared APD subjects to individuals in either control group who had been diagnosed with psychiatric illnesses other than APD. The researchers also evaluated subjects' autonomic nervous system function by measuring skin conductance and heart rates during a stressful activity (preparing and giving a speech).

The researchers report that the APD group showed an 11 percent reduction in prefrontal gray matter volume, when compared with normal controls. This reduction could not be accounted for by substance abuse or mental illness. In addition, APD subjects showed significantly reduced autonomic activity compared to the control groups.

While prior research has demonstrated a link between prefrontal damage and antisocial or psychopathic behavior, Raine et al. say their findings extend this research by showing that even slight, visually imperceptible reductions in prefrontal gray matter volume can cause antisocial behavior.

The "11 percent reduction in prefrontal gray matter volume" corresponds to Idit Trope's confirming a "… loss of brain neurons" in the pre-frontal brain structure in lead exposed children and is remarkably similar to the "12% diminished size in barrel field area - the basic information processing units" in the brains of rats exposed to "low doses of lead." Lead causes brain damage. When that damage occurs, the brain does not function correctly, possibly because of chemical imbalances between offsetting sections of the brain that control behavior. Research clearly shows that damage to the prefrontal cortex of the brain is a critical influence in violent criminal behavior. There is mounting evidence, however, that the "even slight, visually imperceptible reductions in prefrontal gray matter" necessary to trigger this violence may be a consequence of lead poisoning.

In the Harvard Mahoney Neuroscience Institute Letter (Winter 1996) (See: http://www.med.harvard.edu/publications/On_The_Brain/Volume5/Number1/ADD.html) Dr. Joseph Biederman and Stephen Faraone, Ph.D., both of Massachusetts General Hospital, wrote:

> Although we do not know from what specific parts of the brain ADHD arises, current hypotheses associate it with abnormalities of connections in the outermost layer at the front of the brain; it may involve faulty regulation of certain brain chemical messenger systems, predominantly those that use dopamine and norepinephrine.
>
> In the brain, ADHD is commonly associated with malfunction of frontal networks, but research on its underlying neuropsychology has so far failed to produce consistent results. Our studies found that boys with ADHD were significantly more impaired on neuropsychological tests that explore frontal lobe functioning, and those with a family history of ADHD were most impaired.
>
> The ADHD children performed worse on various tasks of attention, executive function, learning and memory. ADHD children with learning disabilities showed motor impairment and had extremely slow reading speed, suggesting irregularities in communication between brain structures that deal with reading material. These neuropsychological impairments in the children we studied could not be attributed to co-morbid psychiatric conditions, learning disabilities or medication, and we concluded that they were features of ADHD and not of its complications.

The role of lead in damaging "the frontal lobes, which control aggression and impulsiveness" provides an intriguing explanation for many of the puzzling misbehaviors noted in society. For example, a Malaysian New Sunday Times columnist who referred to the role of lead poisoning in juvenile delinquency also ranted in the same column against violent video games. Defenders of the games cite the huge numbers of people who play them without aggressive violence.

But if children exposed to lead at an early age suffered damage to the portion of the brain which regulates aggression, meaning "certain brain chemical messenger systems" (per Biederman and Faraone) that suppress violence, then the virtual violence of video games would have no effect on normal children whose frontal lobes would regulate the violence stimulated by the games, but lead-damaged brains would be unable to suppress the stimulated violence. As researcher Roger Masters concluded about finding a correlation between lead pollution and violent crime: "It's the breakdown of the inhibition mechanism that's the key to violent behavior."

Crime-Times (Volume 6, No. 3, 2000 Pg 5) also reported on a study linking post-traumatic stress disorder (PTSD) and violence to minimal brain damage (Archives of General Psychiatry, Vol. 57, No. 2, February 2000, pp. 181-186)

> While PTSD is becoming a common defense in the courtroom, however, it remains a medical mystery: why do some people develop severe psychiatric symptoms following traumatic experiences, while others weather them well? New research hints that many PTSD sufferers may be inherently vulnerable, well before suffering trauma or abuse.
>
> Tamara Gurvits and colleagues studied 21 adult women who were sexually abused as children, and 38 veterans of the Vietnam War. Each group contained subjects with and without symptoms of PTSD. When the researchers performed neurological and psychological tests on their subjects, they found that "subjects with PTSD reported more neurodevelopmental problems and more childhood attention deficit hyperactivity disorder symptoms and had lower IQs, all of which were significantly correlated with neurologic soft signs." These results remained true after the researchers accounted for alcoholism or head injury.

Thus the puzzle of why identical stimuli would trigger violence in some people but not in others was specifically linked to "childhood attention deficit hyperactivity disorder symptoms and … lower IQs" that are symptoms suggestive of lead poisoning. Compare that with the puzzle of why seemingly identical poverty would trigger academic failure in some students, but not in others, and why many imprisoned for violent crimes have learning disabilities and poor academic records, and the role of lead poisoning becomes even more suggestive.

If early-age lead poisoning is known to cause prefrontal brain damage even in extremely low doses, and "even slight visually imperceptible" prefrontal brain damage is known to cause antisocial behavior, then a causal chain explaining the violent consequences of low-level lead exposure has been established to explain Denno's research findings that the presence of lead in children at age 7 is the best predictor of violent crimes in later years (as noted above).

It also explains the incessant violence and poor academic achievement of children in "failing schools" located in lead-laced low-income neighborhoods. Recall also that

researchers reported "that drug abusers may be alleviating symptoms rather than seeking a 'high.'" Combine that with the researchers that reported "some adult cocaine abusers … state that when they first started using cocaine, …. Their concentration improved, they were less impulsive, and they felt calmer." The evidence becomes clear that students with "asymptomatic" lead poisoning account for virtually all of the classic symptoms of "failing schools." Mystery solved.

The only remaining mystery is why educators and politicians continue to chant that "All Children Can Learn." It's as if they can just ignore these brain damaged children, as if they don't exist, as if their brain damage has no consequences, as if the children can just ignore their suffering from the brain damage induced by early exposure to lead. Why do educators and politicians continue their strange practice of willfully ignoring an entire spectrum of research by medical and psychiatric expertise? A very strange ignorance indeed.

What Makes a Failing School?

(Chapter 4 of A Strange Ignorance)

There is a sinister disconnect between what actually troubles "failing schools" and what politicians blame them for. The allegation that public schools have major academic problems was debunked long ago as a "Manufactured Crisis" by Berliner and Biddle in their book of that name.

So, what exactly is a "failing school?" Is it a school where students have lower scores on achievement tests? The public doesn't think so. They understand the affects of poverty on student achievement. The politicians seem to think so, but much of their rhetoric points to a more fundamental problem. The problem of school violence.

The Arizona legislature has made a concerted effort in recent years to avoid funding anything related to children. In fiscal year 1987 per-pupil spending in Arizona ranked thirty-first in the nation, but now only one state spends less per student. As the Executive Director of the Center for Law in the Public Interest, lawyer Tim Hogan, spelled out in an Arizona Republic newspaper guest column:

"Legislators castigated public schools; one even referred to them as 'criminal production factories.'"

Newspaper guest editorial

> Arizona has sunk to almost last among the 50 states in funding per student. This resulted from large tax cuts and an unprecedented anti-public-education sentiment at the Arizona Legislature. Legislators castigated public schools; one even referred to them as 'criminal production factories.' Meanwhile, education funding declined.

"An unprecedented anti-public-education sentiment" accompanied by the allegation that public schools have become "criminal production factories" epitomizes the political image of public schools. The so-called "criminal production factories" that legislators blame on public schools are, as noted in the previous chapter, productions of the legislators themselves. Much of the epidemic of crime, seen by Talibanic legislators as failures in moral development, has been documented by scientists as failures in brain development due to the epidemic presence of low-levels of neurotoxins that damage children's brains. This damage has been scientifically verified, has been statistically linked to criminal behavior, and is wholly preventable by legislative action.

In the December, 1999, Phi Delta Kappan magazine for educators, "a Kappan Special Section On Urban Schools" included an article by a Detroit high school principal titled "Urban Schools: Forced to Fail" where, without once mentioning lead poisoning, the author lamented:

> Most people agree that the central goal of the public schools is to teach students to read, write, and compute. Urban schools today simply have too

> many other things to accomplish under too many unfavorable conditions. .... There are demands for safety and surveillance, including fire rules and drills and protection against intrusion, robbery, assault, and vandalism. And there are gangs and the problems that come with drugs. Special education is the fastest-growing element in the urban schools. And it is an element for which urban schools are poorly prepared. Delinquent behavior is too mild a term to describe a problem that can be devastating for urban schools.

Politicians, who ostensibly reflect their constituents, are completely out of step with the public perception of the problems confronting "failing schools." The public does not view academic achievement as being a major problem with public schools. When the 33rd Annual Phi Delta Kappa (PDK)/Gallup Poll of the Public's Attitudes Toward the Public Schools (see: http://www.pdkintl.org/kappan/k0109gal.htm) specifically asked "what do you think are the biggest problems with which the public schools of your community must deal?" academic achievement or incompetent teaching was not a concern, but violence was. In fact, "Quality of teaching" was ranked last as a problem by both parents and non-parents in the poll.

Non-parents (respondents who did not have children in school) saw "Lack of discipline/more control" as the biggest problem facing schools (17% both this year and last year) and parents ranked it third at 10%, almost the same as last year's 9% but substantially below the 15% of 1999. Both parents and non-parents ranked "Fighting/violence/gangs" and "Use of drugs/dope" at similar levels, a combined 20% for non-parents and 19% for parents, approximately the same as last year but substantially down from the 32% for parents in 1998.

The biggest single problem perceived by the parents of school children was easily "Lack of financial support" with 17% of public school parents choosing it (compared to 19% last year), while non-parents ranked it second at 15% (down from 17% last year). Parents ranked "Overcrowded schools" second at 15% (compared to 14% last year), but non-parents ranked "Overcrowded schools" next to last at 7%.

In other words, while politicians focus on the concocted academic failings of public schools, what the public actually perceives as the major problems facing public schools are violence and drugs and politicians, with politicians ranking first. Exactly how high-stakes testing is going to address the violence and drugs of "failing" public schools is unexplained by politicians, but these are not symptoms of academic issues. However, as we will soon see, "violence" and "use of drugs/dope" are well-documented symptoms of lead poisoning.

Jim Haner, a Baltimore Sun newspaper reporter, noted in a May 9, 2000, article about new "Studies suggest link between lead, violence":

> Lead has been shown to increase aggressive behavior in humans in repeated studies since at least 1943, when doctors at Boston's Children's

> Hospital first noted a tendency toward "cruel impulsive behavior" and "irritability" in children exposed to lead. (see: http://www.sunspot.net/news/local/bal-te.lead09may09.story)

One of the studies, by the Kennedy Krieger Institute, reported the results of lead exposure in rats. Haner wrote:

> In Baltimore, the Kennedy Krieger Institute on Broadway is the primary treatment facility for the hardest-hit kids, an oasis amid the city's worst slums.
>
> "Their new research is totally consistent with a growing body of literature that strongly suggests that the relatively low levels of lead exposure now considered safe - or at least not seriously damaging - may not be safe at all," said Dr. Deborah Cory- Slechta of the University of Rochester in New York.
>
> A leading expert on animal research into the hazards of lead, Cory-Slechta has overseen multiple studies in rat colonies demonstrating that low levels of the toxin can disrupt key brain chemistry that controls inhibition, learning and impulsiveness.
>
> "We see it in rats, we see it in monkeys, and we see something very much like it in children," Cory-Slechta said.
>
> "There is a persistent tendency among lead-dosed organisms to have problems of control, adaptability and discernment, even at very low doses." (ibid)

Crime-Times, an Arizona based national newsletter devoted to "Linking Brain Dysfunction to Aberrant/Criminal/Psychopathic Behavior," summarized a 1996 study linking environmental lead to juvenile delinquency:

> The new study, published in the Journal of the American Medical Association (JAMA, Vol. 275, No. 5, Feb. 7, 1996) by Crime Times Advisory Board member Herbert Needleman and colleagues, followed 212 boys in the Pittsburgh public schools from age 7 through age 11. None of the children had any overt signs of lead toxicity. The researchers calculated the boys' bone lead concentrations using a technique called K x-ray fluorescence, which measures cumulative exposure to lead.
>
> During the four-year study, teachers and parents periodically filled out questionnaires evaluating the children for aggression, delinquency, and other behavioral problems. In addition, the boys themselves were asked to report whether or not they had engaged in antisocial behavior.

> Only a slight association between lead levels and behavior was seen at age 7. But at age 11, the researchers report, the children with elevated lead levels were judged by both parents and teachers "to be more aggressive, have higher delinquent scores, and have more somatic complaints than their low-lead counterparts," and "the subjects themselves reported lead-related increases in antisocial acts." Other problems associated with high lead levels included anxiety, depression, social problems, attention deficits, and somatic complaints. Needleman and colleagues say their findings agree with clinical observations linking lead poisoning to disturbed behavior, and 'extend the relationship downward in dose to asymptomatic youths with elevated body burdens.'
>
> The researchers say their findings held true even when they controlled for nine different measures of maternal intelligence, socioeconomic status, and quality of child rearing. "It is possible, of course, that some unmeasured socioeconomic factor is influencing outcome and is associated with lead," they say, "[but] it is unlikely that such a factor would not be correlated with any of the nine socioeconomic variates for which we controlled."
>
> Needleman et al. conclude that "lead exposure is associated with increased risk for antisocial and delinquent behavior, and the effect follows a developmental course." They add that "if [our] findings are found to extend to the population of US children, the contribution of lead to delinquent behavior would be substantial."
>
> Needleman's study was praised as "ground-breaking" by lead expert Kim Dietrich, professor of environmental health at the University of Cincinnati, who says that it is "the first rigorous study to demonstrate a significant association between lead and antisocial behavior." And lead researcher David Bellinger of Boston Children's Hospital, while cautioning that "criminality and violence [are] a final pathway for many different processes," comments that the study "opens the possibility that some of the violence in our society could be the result of preventable environmental pollution." (Crime Times, Volume 2, No. 2, pg 1)

In May of 2000 at a joint conference of the American Academy of Pediatrics and Pediatric Academic Societies (where another researcher, Dr. Lanphear, also presented research showing that math and reading scores declined even with low blood lead levels), Dr. Herbert Needleman of the University of Pittsburgh presented another paper linking lead exposure to crime. The Medical College of Wisconsin HealthLink website summarizes this paper:

> Dr. Needleman, known for his groundbreaking studies on the effects of lead exposure on children that were instrumental in nationwide government bans on lead from paint, gasoline and food and beverage cans,

> examined 216 youths convicted in the Juvenile Court of Allegheny County, Pa., and 201 non-delinquent controls - students from high schools in Pittsburgh. Bone lead levels, measured by K X-ray fluorescence spectroscopy of the tibia, showed that the delinquent youths had significantly higher mean concentrations of lead in their bones -- 13.7 parts per million (pm) -- compared to the control group. Those results were true for both whites and African Americans and males and females.
>
> "This study provides further evidence that delinquent behavior can be caused, in part, by childhood exposure to lead," said Dr. Needleman. "Of all the causes of juvenile delinquency, lead exposure is perhaps the most preventable. These results should be a call to action for legislators to protect our children by requiring landlords to not simply disclose known instances of lead paint in their properties, but to remove it."
>
> While this study is the first to show that lead exposure is higher in arrested delinquents, it is part of a growing body of evidence linking lead to cognitive and behavioral problems in children. In 1996, Dr. Needleman published a study of 300 boys in Pittsburgh public schools and found that those with relatively high levels of lead in their bones were more likely to engage in antisocial activities like bullying, vandalism, truancy and shoplifting. In 1979, Dr. Needleman, using measurements of lead in children's teeth, concluded that children with high lead levels in their teeth, but no outward signs of lead poisoning, had lower IQ scores, poorer attention and poorer language skills. (see: http://healthlink.mcw.edu/article/962133830.html)

The distinction between these three studies by Needleman can be instructive. The 1979 study found that if you took a group of children with "no outward signs of lead poisoning" and used x-rays to separate them into a group with "high lead levels in their teeth" and children with low lead levels, you simultaneously separated them into a group that "had lower IQ scores, poorer attention and poorer language skills" than the low-lead group. In 1996, Needleman took a group of seven-year-old boys without "any overt signs of lead toxicity" and used an x-ray machine to separate them into a high-lead burden group and a low-lead burden group, and again found that by age eleven the high-lead burden group exhibited significantly higher levels of "anxiety, depression, social problems, attention deficits, and somatic complaints" ("somatic complaints" means feeling ill). In 2000, Needleman went the other direction. In this study he took children who had already been adjudicated as delinquent and compared them to similar non-delinquent peers, and found the delinquents had a higher lead burden.

The 1979 study showed that knowing which students had the most lead also told you who had the most academic problems. The 1996 study showed that knowing which students had the most lead also told you who had the most behavior problems. The 2000 study showed that knowing which students were convicted of crimes also told you who had the most lead. These were all among students who ostensibly were not lead poisoned, with

"no outward signs of lead poisoning" or "any overt signs of lead toxicity." In other words, you could not tell the difference between them and other students without an x-ray machine, but once you had the x-rays the story was clear. They were seemingly ordinary children in "failing schools" where politicians claim "All Children Can Learn."

"Delinquent behavior is too mild a term to describe a problem that can be devastating for urban schools."
-urban school principal

This clear connection between academic problems, behavioral problems, and lead poisoning becomes relevant when any rational examination of the problems confronting inner-city "failing schools" reveals that "juvenile delinquency" is the dominant problem rather than academic deficiencies. There is every indication that when the Detroit urban school principal quoted in the Kappan magazine article stated "Delinquent behavior is too mild a term to describe a problem that can be devastating for urban schools." he was referring exactly to the "antisocial activities like bullying, vandalism, truancy and shoplifting" linked to lead poisoning in 1996 by Dr. Needleman's published study of boys in Pittsburgh public schools. It is precisely the overwhelming violence that is symptomatic of lead poisoning that is plaguing "failing schools" and creating the academic deficits.

Although American journalists enthralled by the testocratic Taliban seem oblivious to the implications that these studies have for explaining the many problems afflicting "failing schools," others have taken note. It was this Needleman paper which prompted Professor Dzulkifli Abdul Razak, a columnist for the Malaysian New Sunday Times, to write in their June 11, 2000, edition:

> When the issue of 'gangsterism' among youngsters, especially in schools, made the headlines early this year, it seemed a relevant topic for this column. … Conventionally one would think in terms of peer pressure, poor self-esteem, lack of discipline and also education, as well as poverty. … With the scientific evidence available today, the association between 'problematic' students (in the academic sense) and that of 'violent' behaviour (such as burning the school) is too much of a coincidence to be overlooked. Last week, this column reviewed the association between environmental pollutants, including lead, and IQ. This week, it will dwell on new research findings suggesting that not only millions more children than previously thought might have lead-linked mental impairment, but that there is also a strong link between lead exposure and juvenile delinquency. (See revised link: http://www.prn2.usm.my/mainsite/bulletin/nst/2000/nst23.html)

America's "criminal production factories" merely attempt to manage the conveyor belt of tragedy that begins well before children ever enter schools because of lead-laced environments the children are forced to grow up in. An environment strangely ignored by educators and politicians alike. Even though if you ask state Health officials they can show you where the lead is found.

The presence of "violence" and "use of drugs/dope" in "failing schools" is not exactly unexpected news to teachers, of course. The New York Times (September 1, 2000) reported on the problem of getting good teachers for low-income schools. After noting "… a court order issued last week compels the Board of Education to assign all newly hired certified teachers to the city's 94 lowest-performing schools until about 400 vacancies there are filled" the reporter quoted a newly certified teacher applying for employment:

> She said she would never work in a failing school, because most are in neighborhoods that she considers dangerous and because the demands are overwhelming. "You have to be a combination of a social worker and Mother Teresa to work in those schools," Lisa said, "Those kids deserve a decent education, but we as teachers deserve a decent work atmosphere. We deserve to be safe."

Consider again the factsheet on Lead Poisoning, mentioned in the beginning of this report, prepared by the Center for Children's Health and the Environment of the Mount Sinai School of Medicine in New York City which read:

> Lead is the most well-studied example of an environmental contaminant that interferes with learning. Lead causes reductions in IQ. In addition, exposure to lead has been linked to disruptive classroom behavior and reduced ability to pay attention. Lead exposure has been shown to be correlated with failure to graduate from high school, as well as a tendency toward violence, addictive behaviors and other behavioral and emotional problems.

This is from medical research, on a hospital website, strangely ignored by educators and politicians. Students who have had their minds warped by exposure to brain damaging neurotoxins are almost certainly what the public perceives as the second biggest problem facing public schools, ranking only behind politicians. But as we will see, the ability to ignore the obvious represents the biggest clue that politicians are the primary problem.

The Philadelphia Experiment

(Chapter 5 of A Strange Ignorance)

In Philadelphia, Pennsylvania, the governing board of its local schools was dismissed in a power play involving politicians chanting "All Children Can Learn" and for-profit businesses hoping to cash-in on the schools' travail. The disconnect between academics and discipline in the hotly contested travail of Philadelphia schools serves to illustrate how the real issue of lead poisoning goes completely undetected.

Under the threat of a state takeover of its "failing schools," Philadelphia was in the process of hiring a private firm that operated "alternative disciplinary" campuses for the Houston (Texas) Independent School District (HISD) where disruptive students were sent to remove them from district schools. The Philadelphia Inquirer (January 19, 2000) published a story titled "A study in teaching the toughest" which reviewed how the Houston Independent School District under its then Superintendent, now U.S. Secretary of Education, Rod Paige handled "its most disruptive students." The article told of visiting 'alternative' campuses in Houston:

> Officials of the Houston Independent School District cite a 30 percent drop in violent crime on district campuses since the two disciplinary campuses opened, one in 1997, the other in 1998. …. At the Houston schools, there is no homework, few certified teachers, and little traditional teaching. The program will be costly - Houston pays about $9 million a year. It is so new its long-term success rates aren't available. ….
>
> Amid the stream of students arriving for school at the Ferndale campus …. Monitors pat students from head to toe, even reaching into pockets. They check shoes for weapons and drugs before students walk through a metal detector. …. Students remain in one classroom most of the day. …. The classrooms are arranged in quads, with a central area where students - one class at a time - eat lunch. "It's like a prison!" complained Francine Dennington, 16. But, she acknowledged, it's easier to focus on schoolwork. Added Sonya Garcia, 17, who was harassed by gangs in her previous school: "I don't have to worry about somebody coming in here with a 12-gauge and shooting me in the back." And in Houston's public schools, robbery, theft, weapons offenses, assaults, and disorderly conduct have decreased, Superintendent Rod Paige said. "It's a win-win," he said. ….
>
> Once placed in a class, students mostly work independently on computers and with books and are tested regularly. …. For highly disruptive students, computer-based learning offers a viable solution, some experts say. "These kids have learned such negative disruptive behavior patterns that to put them in a classroom and try to lockstep them along doesn't work," said Robert D. Barr, senior analyst at the Center for School Improvement at Boise State University. ….

> Luis Contreras, 18, is among a group of students facing the wall at a long table along the perimeter of the room. He is reading a textbook. In the room's center, other students work on a dozen computers. There are eight televisions for video- and audio-based work, too. Also within each class is a small room with windows, where teachers can take a student for discipline or help and still be able to monitor the class. The classroom is designed to minimize distractions and allow students to work independently. ….
>
> Monitoring work and answering questions is classroom teacher Kelsan Shaw, a former social worker with a bachelor's degree in political science and communications but no teaching certification. Only about 15 percent of classroom teachers are certified, though many are enrolled in education programs. All are required to have bachelor's degrees. …. Some are former corrections officers or counselors. …. The staff also includes behavior specialists, truancy officers, and university mentors. A justice of the peace holds court at the schools and metes out punishment to truants and disruptive students. The aggressive truancy policy helped the schools achieve 82.5 percent average attendance last year ….
>
> The Philadelphia School District has identified a pool of 5,000 students for a Community Education Partners program - including the 1,200 who return to the city's schools annually from incarceration or who are weapons offenders, and disruptive youths, or severe academic stragglers. ….
>
> The [Houston] district pays Community Education Partners $8,950 per pupil - about $3,000 less than the cost of the district's in-house alternative programs, Paige said. (In Philadelphia, the … city's three discipline schools cost about $10,500 per pupil - about $3,500 more than regular education.)

In other words, their existing "disruptive students" cost Philadelphia 50% more per student than regular students and Philadelphia already pays nearly 50% more per student on regular students than Arizona does on all students. In Houston, removing these disruptive students to "a prison" without teachers results in only an 82.5 percent average attendance, meaning these students are absent, on average, one day of every week of school. And the authorities in Houston admit "its long-term success rates aren't available."

More significantly, there was nothing in the article that indicated these students were learning anything. Nothing that indicated this program had any academic purpose. For a problem that ostensibly involves poor test scores, they hired "corrections officers" instead of academic specialists. There was nothing in this news story about how well these students did on tests after they were subject to these extreme measures. The newspaper reported instead on the decline in student violence. Yet even these extreme measures

produced only a "30 percent drop in violent crime on district campuses" such as "robbery, theft, weapons offenses, assaults, and disorderly conduct."

There was not a single mention of lead poisoning in this article on "alternative disciplinary" campuses. No mention of blood lead level screening. No K X-ray fluorescence spectroscopy tests to measure lead burden. Seventy percent of the violent crime in the schools remained even after these students were removed. However, from the description of their symptoms, it would appear that a more extensive screening and treatment for lead poisoning and ADD/ADHD would result in a larger reduction than 30 percent.

It is strange that one newspaper reporter could detail the symptoms of lead poisoning in one story, while another reporter for the same newspaper detailed almost the same symptoms of "failing schools" without either connecting the two.

The chilling horror of this newspaper story, to anyone knowledgeable about lead poisoning, is the specter that these children are suffering from environmental lead. These children are displaying the classic symptoms of lead poisoning and ADD/ADHD, only to have their suffering compounded by institutionalized abuse in prison-like "alternative disciplinary schools" instead of having their ailments directly addressed. These warped peg students are simply being pounded into square prison cells labeled as educational holes rather than receiving any real education.

There is no question the lead was there. On April 8, 1993, The Houston Chronicle reported in a story titled "Study of lead poison offers hope for project" that:

> Since October, the city has screened about 3,000 children for lead poisoning. Up to 20 percent were discovered to have potentially dangerous levels of lead in their bloodstream. …. Stahl said 15 to 20 percent of the 3,000 children screened since October -- in clinics, Head Start programs and daycare centers -- had more than 10 micrograms of lead per deciliter of blood.

Robert Stahl was Houston's project coordinator in 1993 for their "Childhood Lead Poisoning Prevention Project" who estimated that there were 124,000 children "thought to be at risk here." There was no mention in the story what effect this population of lead poisoned children would have when they reached Houston's schools in future years. But the children were being poisoned with a neurotoxin whose documented symptoms are precisely the symptoms described for the students in the disciplinary campuses.

The extent of lead poisoning in Houston remains enormous. I talked to Stahl's successor in Houston about the problem. He said that the lead abatement program in Houston had initially focused on children who were found with blood lead levels in excess of 20 micrograms per deciliter. In the late 1990s they were finding fewer such cases than they could handle and therefore officials decided to drop their standard to 17 micrograms per

deciliter. They were inundated with so many new cases that they had to raise the standard to 19 micrograms per deciliter.

Yet the currently recognized level of lead that causes brain damage and behavioral problems is documented at half the level that overwhelmed them. The children of Houston continue to be poisoned, continue to be ignored, continue to suffer brain damage, continue on to public school failure, and no one seems to connect this conveyor belt of tragedy with the "failing schools" that propelled its superintendent to national prominence. The official in Houston lamented to me that he regularly sees the poisoned children of new Hispanic immigrants in Houston whose parents' entrepreneurial spirit leads them to buy and renovate old homes, unknowing that in the process they are destroying their children's lives.

His lament reminded me of the 1991 Newsweek article on "Lead and your Kids" which began with an example of inadvertently poisoned children:

> When Helene and Bruce Tackling found their two-story house in New London, Conn., in December, 1989, they called it 'our Christmas miracle.' It seemed perfect. On the very same street where Bruce grew up, it had two parks nearby, a big backyard and enough space so their 2-year-old, Jessica, and the baby on the way could have their own bedrooms. It needed some renovation, but Bruce was handy with a Spackle knife and the family moved in on March 1, 1990.
>
> Bruce immediately went to work, scraping the old paint off the pantry and sanding the bathroom walls down to the original wood. The place was looking sharp. But within months of moving in, the children had become increasingly demanding and irritable. Nicholas, the new baby, wouldn't stop crying, his voice sometimes locking into a continual eerie scream, "like he wasn't even awake," says Helene. Doctors said it was colic, and nurses told her to feed him bananas and rice. Jessica kept complaining of stomachaches, but checkups found nothing wrong. ….
>
> But this April, the Tacklings learned that … Jessica and Nicholas had lead poisoning. They probably got it not from eating paint chips but from fine paint dust --- stirred up in part by the renovations Bruce did to make the house just like new and the vacuuming Helene did to make it pristine. Helene consoled herself by thinking they had caught it early enough so doctors could cure her kids. Doctors had to repeatedly tell the disbelieving mother the disturbing news: damage from regular exposure to lead is usually irreversible.

"The disbelieving mother" epitomizes the attitude of those who blame educators for "failing schools" in low-income neighborhoods where nearly all "failing schools" are found. Disbelief that such a horrible irreversible consequence is widespread in inner-city neighborhoods. Disbelief that a potent neurotoxin would be found in children's homes.

Disbelief that children exposed to environmental lead might not be able to overcome the irreversible damage to their brains. Disbelief that schools cannot educate these children. No matter how hard they try.

On May 9, 2001, the Philadelphia Inquirer reported on Philadelphia's new "disciplinary campus" imported from Houston in a story titled "District finds promise in disciplinary school run by firm":

> "Community Education Partners, a private company that is based in Nashville and runs schools in Houston and Dallas, has become the latest weapon in fighting one of Philadelphia School District's major problems - disruptive students. The Philadelphia school board, impressed with CEP's track record in Texas, hired the national company last year at the urging of state officials. …. CEP's per-pupil cost in Philadelphia is about $13,000 a year; the district pays its average cost, nearly $7,000, and the state covers the rest of the tab." (see: **Revision:** article is available at http://www.philly.com/mld/philly/archives/)

The lengthy article by Susan Snyder, identified as an "Inquirer Staff Writer," detailed the operation of the school as a response to student crime:

> "The school district grapples with serious discipline problems each year. About 1,200 students return from incarceration to the 210,000-student district annually. Last school year, officials confiscated 1,196 weapons, ranging from penknives to guns, on school property. According to a 1998-99 state report - the most recent year available - the district also reported more than 1,500 arrests and 1,700 assaults."

Ironically, there was nothing in this lengthy article about lead poisoning even though Susan Fitzgerald, a fellow "Inquirer Staff Writer," had reported only six months before on November 21, 2000, in a story titled "District: Unsafe lead levels found in 20 pct of water outlets" that:

> Testing of drinking water for lead has been conducted at all but one of 298 of Philadelphia's older school buildings, and so far, about 20 percent of the nearly 14,000 water outlets sampled have unsafe lead levels. …. As reported by The Inquirer earlier, the school district knew several years ago that there was a problem with lead in the drinking water at some city schools.
>
> Lead is a toxic metal that can accumulate in the body and is particularly dangerous to the developing brains of children. At even low levels of lead exposure, children may experience a drop in IQ, reduced attention span, hearing impairment, and other problems.

> In written testimony, an official from the federal Environmental Protection Agency said that records supplied to the agency by the school district showed that sampling of water for lead took place in at least 60 schools between 1991 and 1994. But the EPA knew nothing about the results until 1998.
>
> Bradley M. Campbell, the EPA's regional administrator, testified that in March 1998, the EPA was contacted by a citizen about the drinking water at Bache-Martin Middle School in North Philadelphia. He said that person supplied lead-test results from 1993. When the EPA asked the school district if it had corrected the drinking-water problem at the school, the district did not respond, Campbell testified. And when EPA officials asked to take samples at the school and review testing records, they were told to get a search warrant, he said. Eventually, the district agreed to allow the agency to review records of lead tests from about 100 schools. (see: **Revision:** article is available at http://www.philly.com/mld/philly/archives/)

In other words, one out of every five drinking fountains in the Philadelphia school district was poisoning the students with lead. The very school district that implemented an extreme solution for "disruptive students" was continuously poisoning those students with a substance known to cause disruptive behavior. Some of the "other problems" that this Inquirer news story cited as symptoms of lead poisoning were very likely the same behavioral and criminal problems cited in the other Inquirer news story as the reason for bringing in the CEP program.

It is strange that one newspaper reporter could detail the symptoms of lead poisoning in one story, while another reporter for the same newspaper detailed almost the same symptoms of "failing schools" without either connecting the two. But there was nothing that connected the lead poisoning to the district's problems with violence in this news story, nor in a more extensive earlier story on October 15, 2000, (see: **Revision:** Tom Ferrick column of 10/15/2000 link no longer functioning).

Even more unsettling is the fact that a 1997 medical study of lead poisoning in 817 inner-city children in Philadelphia found "the highest reported prevalence in a U.S. general pediatric clinical population" of high blood lead levels. Shoshana Melman et al performed a retrospective analysis of blood lead levels of inner-city children in Philadelphia who were tested during routine checkups in 1992, and excluded any children previously identified as having high blood lead levels.

They found "More than two-thirds (68%) of the study patients had a blood lead level of over 10 micrograms per deciliter." (see: http://ehpnet1.niehs.nih.gov/docs/1998/106p655-657melman/abstract.html) And even that study was cited by Crime Times (Vol. 4, No. 4, 1998, pg. 1) as merely echoing a 1995 study by J.F. Wiley of Philadelphia's St. Christopher's Hospital for Children that found "71% of the children seen at one hospital, and 50% of children seen at the second hospital, exhibited high lead levels."

Educators and politicians alike ignore the fact that the overwhelming prevalence of lead poisoning in Philadelphia's "well baby" clinics documented in 1992 has to have some consequences ten years later in Philadelphia's schools. Nor that the documentation represents only a snapshot of a continuing conveyor belt of tragedy in a "criminal production factory" that existed before 1992 and continues unabated today. It's not like people haven't looked.

The City of Philadelphia's Childhood Lead Poisoning and Prevention Program conducted a survey of "88/89 births and first graders" in 1996 of "specific areas in the City where exposure to elevated lead is more likely, such as, lower-income areas with older, dilapidated housing" and found "of those screened, 64.2% had elevated blood lead levels." They also checked to see how many of those children met the "standards for promotion to the 2nd grade" and found that 21.7% of those with blood lead levels above 20 micrograms did not meet the standards compared to 15.8% of those with blood lead levels below 10 micrograms. As if blood lead levels below 10 micrograms had no effect.

Bruce Lanphear, M.D., M.P.H., a physician in Cincinnati Children's division of General and Community Pediatrics, reported in a paper presented at the joint conference of the American Academy of Pediatrics and Pediatric Academic Societies in May of 2000 that: "children's math and reading scores begin to decline at lead levels as low as 2.5 micrograms per deciliter." (See: Crime-Times Volume 6, No. 3 pg. 2)

Thus approximately two-thirds of the children in today's inner-city Philadelphia public schools were previously documented as being lead poisoned during early development at a level known to produce reading and math difficulties. Lead poisoning produces brain damage that has been documented to produce academic and behavioral problems. Supposedly, extreme measures have been taken to educate these children and still the Philadelphia schools are labeled as "failing schools." Politicians keep hammering the Philadelphia public schools with the slogan "All Children Can Learn" but at the same time they do next to nothing to prevent the lead poisoning, refusing even to fix the pipes that daily serve lead poisoned water to the students.

It's as if no one comprehends the travail of these students. Lead circulating in the blood (acute poisoning) has well-documented disabling effects and severe behavioral implications in terms of violence and attention deficits due to the agitation it produces. Prevention Magazine, in September, 1991, (pp. 106-113) related the story of an adult case of environmental lead which can serve to illustrate the problems that children with acute lead poisoning can face. The first paragraph reads:

> Fran Wallace was dying. Her frail body was so sensitive that even a light robe brushing her legs brought her excruciating pain. She had severe stomach cramps, and even a sip of water triggered violent vomiting. Her husband, Don, had to carry her into the hospital where the doctors, who had diagnosed her with a rare, genetic blood disease called porphyria, said this was a fatal attack. It was two years earlier, in 1979, when Fran came down with the first symptoms. "I thought it was the flu," she says.

The Prevention article noted that at one time during those two years, her husband Don was forced to work from his home directing relief operations after a hurricane. He was the senior U.S. Air Force officer in the Dominican Republic. The article quotes Don:

> "I was drinking lots of coffee at home. I dropped 35 pounds. I also became very irritable. My personality changed from 'diplomatic' to aggressive."

The Prevention article relates:

> In fact, his personality altered so dramatically that Don eventually asked for and received early retirement from the Air Force. Here was a man who had flown 133 combat missions in Vietnam and yet, he says, "I suddenly couldn't cope. I was a basket case." He and Fran went home to Seattle where Don had to start casting about for a new career.

The doctors had told Don that his wife's disease puzzled them because she was suffering from anemia "which did not dovetail with the porphyria diagnosis." Don had been an aircraft-accident investigator in the Air Force and that anomalous anemia caught his attention because it did not fit the logic of porphyria. Going to the library to research anemia and porphyria, he discovered a textbook that noted

> … lead poisoning often masquerades as porphyria. They have almost exactly the same symptoms --- weight loss, stomach cramps, vomiting, muscle cramps --- the very symptoms Fran had. But lead poisoning sometimes has one more symptom that most forms of porphyria do not: anemia.

Blood tests eventually confirmed the lead poisoning, but doctors initially scoffed because, as Prevention magazine quoted a Veterans Affairs Medical Center doctor, "the issues of occupational and environmental disease are out of the mainstream of medicine. It's left to the public health departments."

Prevention noted:

> … it has become common knowledge that children can be poisoned by eating chips of old leaded paint or its dust. The problem generally surfaces in substandard or renovated housing. Such children can suffer irreversible IQ reduction and behavior problems.

Fran and Don simply did not fit into those circumstances. But the source was eventually traced to a set of lead-glazed Italian ceramicware cups that leached lead into the coffee and tea they had been drinking. Simply drinking from cups that had traces of lead diminished their capacity to function. But why does no one comprehend the travail of the students in Philadelphia (and other places) even though "it has become common knowledge" the children should be exhibiting these symptoms?

Fran and Don were educated affluent adults with mature brains, much older than children attending public schools, and yet the tiny amount of lead poisoning sipped from lead-glazed cups crippled them. Forced a senior fighter pilot to retire. So what about low-income children with acute lead poisoning attending school with "almost exactly the same symptoms --- weight loss, stomach cramps, vomiting, muscle cramps ---" that Prevention noted were symptoms of lead poisoning? Can we glibly assume, as politicians do, that all of these children can learn? Even though Don "… suddenly couldn't cope. I was a basket case."

Those children are not likely to quietly attend school with their full faculties devoted to academic achievement. Instead, they will adopt behaviors that ameliorate their suffering in ways that may be counter-productive in the long term, but quite successful in the short term. The research is clear that students who self-medicate their symptoms with illegal drugs do, in fact, find that the drugs make them less anxious and more stable. They, in turn, can offer empirical testimonials to other students about the benefits of illegal drug use. Children who find solace in illegal drugs from the irritation of lead poisoning will offer a pernicious example for other students. The students who lack the irritation of lead poisoning will not find these evident benefits and consequently will turn to larger doses in an attempt to achieve the benefits posited by the lead poisoned students.

At the same time, the beneficial effects of the illegal drug use by lead poisoned children actually improves their behavior and makes it easier for them to participate in school without detection. This introduces the regular presence and influence of illegal drug use in the school. The presence of a small coterie of obviously benefited students who establish and maintain a supply of illegal drugs for other emulating students can be greatly reduced when lead poisoned students disappear. Although the general use of illegal drugs is unlikely to disappear entirely even with a healthy student body, the introduction of drugs into the school is subject to greater dissuasion when students do not have the evangelists of lead poisoned students.

The irritation of lead poisoning coupled with the frustration of learning disabilities engendered by the lead poisoning compels many students to "act out" their emotions. It is extremely difficult for students constantly irritated by lead poisoning to sit calmly while muscles twitch and mental impulses abound. At the same time, to mask their own disappointment in their learning abilities they succumb rather easily to the discrediting of learning as having any importance. Students who try hard and succeed are far more likely to subsequently try hard than students who try hard and fail with mental circuitry that does not respond to the effort.

These frustrated students, in turn, have a higher propensity to disrupt classes with inappropriate behavior if for no other reason than to participate in classroom activities in the only way possible. Locked then in a classroom management struggle with the teacher, students for whom regular classroom activity is counter-productive will strive to assert themselves with inappropriate behavior. This, in turn, disrupts the orderly classroom for other students.

The Des Moines Register, Monday, June 24, 2002, in a newspaper article about teachers leaving the profession in their first years of teaching, interviewed two teachers who complained mostly of classroom disruption.

> Jennings and Gloe said unruly and disrespectful students compose less than 10 percent of the enrollment at their schools. Still, both said they see little being done to alleviate problems caused by those youngsters.
>
> "We've got to have parents understand that their child is destroying the educational development of other children in the building," Gloe said. "That's not happening."

These teachers claim less than ten percent of the students can drive off teachers and destroy the educational development of the other children. Lead poisoning does not have to infest a student body to become a major influence in academic achievement among the other students.

To the Testocratic Taliban of school reformers, however, not paying attention in class, misbehaving in class, and other symptoms of lead poisoned children are not due to the physical presence of a neurotoxin interrupting the chemistry of the brain: it is all a matter of moral infidelity that requires "Character Education."

Recently the Houston Independent School District has been trumpeting its "Character Education" program to deal with disruptive students. Dot Woodfin, the director of HISD's "Character Education" program was featured in a Houston Chronicle news story even though the reporter wrote:

> "While Woodfin says there is no way to measure the effectiveness of the program, she says she can feel and hear the difference."

Another desperate program to deal with disruptive children carries the caveat of having no evidence that it actually works. The Chronicle reporter did include one telling quote however:

> "Twenty percent of kids keep coming through the discipline process," Woodfin said. "And it's the same kids. They don't understand how to make it stop because no one in the process has ever taught them how." (See at: http://www.chron.com/cs/CDA/story.hts/metropolitan/education/1415105)

There was nothing in the story about lead poisoning. Nothing to indicate "the same kids" might be those who were previously documented as being lead poisoned in Houston. In the ultimate irony, however, the reporter quoted Woodfin as complaining that "Teachers are under so much pressure for the TAAS test" that they don't have time to teach character education.

In the two most notorious school districts in the United States, where public attention has made each a virtual "poster child" for "failing schools," it turns out that each is also an actual "poster child" for lead poisoning. The widespread presence of lead in the children at those schools had previously been independently identified by public health researchers. The children in those schools are known to be brain damaged; the children should be expected to exhibit the classic symptoms of lead poisoning; and those classic symptoms are almost exactly the symptoms used to label a school as "failing." The "failure" is simply that public schools cannot overcome the damage done to these children by the presence of environmental lead.

Ignorance Is Not Bliss

(Chapter 6 of A Strange Ignorance)

Although the education community appears oblivious to the devastating consequences of lead in the neighborhoods surrounding "failing schools," increasingly they are becoming the only ones to ignore the obvious.

Early in 2000, the wife of the then Vice-President of the United States, Tipper Gore, honorary chair of the Campaign for a Lead Safe America, unveiled what the Health and Human Services department called:

> a comprehensive government-wide strategy prepared by the President's Task Force on Environmental Health Risks and Safety Risks to Children outlining efforts to achieve a virtual end to childhood lead poisoning in American within ten years.

A "Task Force" of experts convinced the highest levels of government in the United States that lead poisoning was a serious problem for children. The report of the task-force is available at: http://www.hud.gov/lea/leadhaz.pdf which is linked off of the HHS Office of Healthy Homes and Lead Hazard Control website where extensive information about the federal effort is available at: http://www.hud.gov/offices/lead/index.cfm. There does not appear to be anything comparable on the U.S. Department of Education website. **Revision:** the report is no longer available on the HUD website but may be available at: http://yosemite.epa.gov/ochp/ochpweb.nsf/content/TaskForceSummary1.htm/$file/TaskForceSummary1.pdf

"... few Medicaid children are screened for blood-lead levels."

-1999 GAO report

The Department of Housing and Urban Development (HUD) issued a press release on October 24, 2001, announcing "over $67 million in grants aimed at protecting children in low-income households from lead-based paint…." The grants were "$59 million in Lead Hazard Control grants to remove lead hazards from approximately 7,000 privately owned homes in 16 states" and $8 million in grants to fund local projects under HUD's Healthy Homes Program for

> Blood testing for children living in low-income housing; Removal of lead-based paint hazards from privately owned low-income homes and apartments; Inspecting and testing low-income housing for the presence of lead hazards; Temporarily relocating families during lead control work; Community education and outreach; Job training for lead hazard control workers; and, Collecting and analyzing data to identify housing with lead hazards.

The federal Lead Hazard Reduction Act of 1992 already requires landlords to notify tenants of the presence and hazards associated with lead-based paints. Until recently the law has been largely ignored. However, on July 11, 2001, the federal Department of

Housing and Urban Development (HUD) issued a press release announcing that David D. Nuyen, a Washington, D.C., area landlord, pleaded guilty for

> … his failure to notify tenants of the presence and hazards associated with lead-based paint. The case is the first-ever criminal prosecution in the United States related to lead hazard warnings that are required by the federal Lead Hazard Reduction Act of 1992. ….
>
> Nuyen will serve two years in prison under the terms of the agreement. "The dangers of lead poisoning have been known for years, but too many children continue to be exposed to lead hazards," said John Cruden, the Acting Assistant Attorney General in charge of the Justice Department's Environment Division. "We will vigorously enforce the federal lead disclosure requirements to protect the public and our children from these unnecessary health risks."

The Vice President of the United States understands the lead poisoning problem. The Department of Health and Human Services has a major anti-lead effort. The United States Department of Justice has instructed U.S. Attorneys to focus on the problem. The United States Department of Education? It is a criminal offense for landlords to remain ignorant of the devastating effects of lead poisoning. Not so for educators. Yet.

Civilian juries seem to understand the problem. On November 7, 2001, the Baltimore Sun reported that a jury awarded $2.16 million to a "19-year-old Baltimore man who suffered lead poisoning as a child" after he sued the landlords who owned the buildings he was raised in. The Sun noted:

> As an infant and toddler in the 1980s, Kendall Baker lived in two East Baltimore houses where his blood lead levels rose to four times the level now considered safe by the Centers for Disease Control and Prevention…. As a result, Baker has language and cognitive problems. He dropped out of high school and works as a gravedigger, making $7.50 an hour….
> (**Revision:** non-functioning link removed)

On July 10, 2001, Kweisi Mfume, President & CEO of the National Association for the Advancement of Colored People (NAACP) issued a press release titled MFUME CALLS LEAD PAINT POISONING "THE SILENT EPIDEMIC" that noted:

> Ruth Ann Norton, Executive Director, of the Coalition to End Childhood Lead Poisoning, said: "Lead is a neurotoxin that damages the reading and reasoning ability of children. Children who are poisoned by lead are seven times more likely to drop out of school but they also have a preponderance to be more violent, to have Attention Deficit Disorder, to have hearing loss and therefore they have a handicap of being able to compete fairly."

The NAACP issued another press release on October 4, 2001, which stated:

> Mfume has been meeting with officials from several states to begin a coordinated action against the lead paint industry. He is asking the states to join the NAACP, which may file a class action lawsuit against the industry to end the threat of lead poisoning in children.

In November, 2000, California voters defeated Proposition 37 (dubbed by opponents the "polluter protection act") partly because the real Erin Brockovich, who was the subject of the Academy Award-winning Hollywood movie about corporate polluters, campaigned against the proposition. The California Catholic Conference provided this pre-election summary of the ballot proposition:

> In 1991 the Legislature authorized the collection of 'mitigation fees' from a paint company to pay for a lead poisoning prevention program. In 1997 the California Supreme Court upheld the collection of such fees. The sponsors of Proposition 37 want to reclassify such fees as taxes, a more stringent threshold (requiring a two-thirds vote of the Legislature or voters).

This "lead poisoning prevention program," as described by The San Diego Union-Tribune, "involved a surcharge on paint to offset the cost of screening children for lead contamination." The California Chamber of Commerce, California Taxpayers Association, and California Manufacturers and Technology Association supported Proposition 37 to stop the surcharges that would fund the screening of children for lead, but the proposition was opposed by the American Cancer Society, California Nurses Association, League of California Cities, and the League of Women Voters.

Soon after the voters rejected this "polluter protection act" a San Francisco judge ordered the California Department of Health Services to begin implementing the lead screening of Medicaid children in California (see: http://www.sfgate.com/cgi-bin/article.cgi?file=/chronicle/archive/2000/12/01/MNL36289.DTL). Although there is already a federal requirement that Medicaid children be screened for lead poisoning, not much actual screening occurs.

In January, 1999, the United States General Accounting Office released a report titled "LEAD POISONING, Federal Health Care Programs Are Not Effectively Reaching At-Risk Children." The New York Times reported (August 22, 1999, pg. A1)

> Federal investigators say most states are flouting a 1989 law requiring that young children on Medicaid be tested for lead poisoning. … The General Accounting Office [GAO], an investigative arm of Congress, found that 'few Medicaid children are screened for blood-lead levels,' even though the problem of lead poisoning is concentrated among low-income children on Medicaid.

In fact, the GAO report noted that Centers for Disease Control (CDC) statistics show

> More than 8 percent of the surveyed children aged 1 through 5 who were served by federal health care programs had a harmful blood lead level, a rate almost five times the rate for children who were not in these federal programs. Despite federal policies, most children in or targeted by federal health care programs have not been screened. For nearly, two-thirds of the surveyed children aged 1 through 5 identified by CDC as having elevated lead levels, the blood lead test conducted as part of the CDC survey was the first such test they had received.

Read that carefully: nearly two-thirds of the children actually found to be poisoned and who by law were supposed to be screened by federal programs "have not been screened." Conversely it means that for every child found to be lead poisoned by federal programs, there are at least two other poisoned children unidentified. Or put more simply, it means that the actual rate of lead poisoning among children is at least three times the official rate. The GAO report noted

> One underlying reason for low screening rates is the widespread belief among providers that lead exposure is no longer a problem in their communities. Most state officials GAO contacted lacked reliable, representative data on the prevalence of elevated blood lead levels and the extent of screening in their states. Another problem is that many children are not receiving adequate preventive health care services, visiting the doctor only when they are sick.

The Arizona Health Care Cost Containment System (AHCCCS - pronounced "access") is the Medicaid provider for indigent children in Arizona. The Arizona Department of Health Services published a report in 2000 titled "Childhood Lead Poisoning Prevalence Rates in Children Enrolled in AHCCCS" on blood lead screening for children "ages five years and younger" which noted that AHCCCS only screened "11% of the AHCCCS population for this age group." In other words, slightly over one-tenth (11%) of those indigent children who managed to surmount the bureaucracy to actually qualify for AHCCCS were ultimately screened for lead poisoning.

Indigent children represent the population most likely to be affected by lead poisoning (five times as likely according to the GAO report). Yet only a minority will qualify for AHCCCS because surmounting the bureaucracy is not easy. In a weeklong Tucson Citizen newspaper series on children's health care in southern Arizona in May, 2000, a Tucson pediatrician wrote in a guest column:

> I know that our Medicaid system is held up as a national model of how to provide health care to the poor while containing costs. Yet, from my perspective, AHCCCS is a failure. It should be called BARRIER. Despite changes in the past few years, it still is very difficult to apply for AHCCCS and to maintain AHCCCS eligibility.

Children of parents who earn more than the limits to be ineligible for AHCCCS can be served by a federal matching-fund program implemented in Arizona as "KidsCare." A Tucson Citizen article on November 28, 2000, reported:

> Parents already face obstacles to enrolling their children in KidsCare, the state's 2-year-old health-care program for poor children, said Dana Wolfe Naimark, assistant director of the Children's Action Alliance. A lack of enrollment in KidsCare lost the state $76 million in federal matching funds for the program earlier this year. In particular, public schools are still banned from contracting with the state to do outreach for the program, Wolfe Naimark said. Outreach through the schools could add thousands of youngsters to the KidsCare program. Ironically, state law requires any child who would be covered under the program to go without health coverage entirely for six months before enrollment.

But even among the few eligible indigent children who did manage to qualify for AHCCCS, where blood lead screening is mandated by federal law, only 11% were actually screened. The AHCCCS Medicaid system in Arizona is funded in a manner that encourages doctors not to look for, nor find, medical problems. Arizona uses an "HMO" model for AHCCCS, and such "managed care" programs, according to a report by U.S. Surgeon General David Satcher, "may also lead to denial of needed treatment." Doctors are paid a fixed amount per patient from which to treat all ailments they discover.

Thus for doctors to discover asymptomatic ailments such as lead poisoning is economically foolhardy, a point made clear by Dr. Stephen Ragusea, a clinical psychologist at the Child, Adult, and Family Psychological Center in Pennsylvania in commenting on managed care in general: "So, the only incentive to us is to provide less care. My group thinks that's inherently unethical." (see: http://www.erasethestigma.org/stories/kids.html)

Compounding that, children in Arizona who are undocumented immigrants from Mexico are generally not eligible for low-income healthcare. Yet these children attend Arizona schools and are the most likely to be severely affected by lead poisoning. Not only do they have the exposure to lead paint in low-income housing, but they commonly bring lead-glazed ceramicware for food use with them from Mexico, and typically employ the lead-laced folk remedies Azarcon and Greta. Indeed the Arizona Department of Health Services has an active advertising campaign to dissuade Hispanics from using these remedies. In addition, Mexico has not outlawed leaded fuel and many immigrants have elevated blood lead levels absorbed from ambient air pollution.

Therefore the children most likely to be suffering from the preventable brain damage of lead poisoning that results in poor academics and disruptive behaviors in Arizona schools are excluded from the screening and treatment for lead poisoning. These same children are required to be taught by "failing schools" because politicians claim "All Children Can Learn" even though it is the politicians that determine these children are ineligible for health care that might detect the poisoning that prevents them from learning.

As a consequence, each actual case of lead poisoning detected in Arizona children likely resulted from only the 11% of the AHCCCS population that was screened. That, in turn, means for each child found to be lead poisoned there are likely nine more lead poisoned children among those 89% who were not screened. In addition, since only about one-third of the indigent population overcomes the bureaucratic barriers to qualify for healthcare, there are likely to be another twenty undetected lead poisoned children for each detected case of lead poisoning left unseen in the two-thirds of the eligible population that did not qualify. Therefore it is extremely likely there are actually 30 times more lead poisoned Arizona children than actually discovered.

But considering that the population of children most likely to be lead poisoned (from deteriorating paint, imported pottery, folk medicines and air pollution) are undocumented immigrants (a consequence of laborers and hospitality workers from Mexico being low-paid) who are not eligible for healthcare, there are far more than just 30 lead poisoned children in Arizona schools for each one actually discovered. The population where we know there are 30 times as many lead poisoned children as we actually find, does not include the population in Arizona schools most likely to be lead poisoned.

But ironically, even this vastly understates the problem. Detected cases of lead poisoning are defined as blood lead levels above the 10 microgram/dL level. Recent medical research has shown that the most damage from lead poisoning occurs at lead exposures BELOW the 10 microgram/dL level. Thus the children we find are only the extreme cases, a small percentage of those who actually suffer from lead poisoning. So even though those children found to be lead poisoned in Arizona represent only a tiny fraction (certainly less than one-thirtieth, maybe less than one percent) of those who likely are "officially" lead poisoned, even that greater group is only a tiny fraction of those who have brain damaging blood lead levels below that "official" level.

If we only count blood lead levels above 20 micrograms/dL we have a far smaller number of children than those with blood lead levels between 10-20 micrograms/dL because those above 20 micrograms/dL are extreme cases. Likewise, the number of children with blood lead levels between 1-10 micrograms/dL is a far larger population than those above 10 micrograms/dL. So the number of children who are officially designated as lead poisoned, even if we count the thirty times more we know exist from official surveys, and even if we count the children we know must be in the immigrant population that we do not count, that combined total is certainly smaller than the count of children who have brain damaging blood lead levels below 10 micrograms/dL. And all of these children will be concentrated in schools around low-income neighborhoods.

BUT, in addition, it is important to understand that blood lead levels only measure existing toxicity. As the 1991 Newsweek cover story noted "While it can be removed from the bloodstream through chelation, most of the lead that is absorbed into a child's brain sits there, literally, forever." Just because there is no lead detected in the blood of children when they are tested, does not mean it wasn't there creating irreversible damage during their early brain development. So, even though there may be a hundred times as many children with brain damaging blood lead levels equal to those actually "officially"

detected, and even though there may be a hundred times more than that with brain-damaging blood lead levels below that official standard, even that does not count those Arizona children whose brains have been permanently crippled by lead poisoning in their early development but who currently lack lead in their blood.

Thus for every single case of lead poisoning discovered among low-income children in Arizona, hundreds more have been overlooked and are attending public schools. And that population will not be spread evenly across the geography of Arizona schools. They will be concentrated in the low-income neighborhoods around schools that become labeled as "failing." These "asymptomatic" brain-damaged children will sit in ordinary classrooms with unsuspecting teachers and fail to learn. Schools staffed by professional educators using the most effective educational techniques on children whose brains are jammed with a neurotoxic metal that prevents them from learning, prevents them from paying attention, prevents them often from even attending, will not be able to overcome the physiological damage that occurred years before the children ever set foot in a school.

Thus for every single case of lead poisoning discovered among low-income children in Arizona, hundreds more have been overlooked and are attending public schools.

We know this has to be true because the lead is out there in the low-income housing environment, and it is foolish to think children in any low-income neighborhood are not being exposed to it. A federal Housing and Urban Development report issued in April, 2001, titled "National Survey of Lead and Allergens in Housing" concluded its executive summary with "one in three homes with resident children under 6 years old have significant lead-based paint hazards." This is an overall average, however, that would indicate the percentage in low-income housing is much higher: well over one-third of low-income children are exposed to environmental lead. But even if it only applies to low-income neighborhoods, one in three homes in those neighborhoods are crippling the brains of the children who reside in them. This is not speculation, "significant lead-based paint hazards" means that those homes which are not poisoning the children were not counted in the one-third statistic.

The City of Phoenix has an active "lead abatement" program. Virtually the entire central core of Phoenix (see: http://www.ci.phoenix.az.us/NSD/enterprise.html) and several neighborhood islands (see: http://www.ci.phoenix.az.us/NSD/nia.html), have been declared lead risk areas. The city has an active policy of remediating homes which house children under six years of age. However, even the City of Phoenix program exists only because the City receives special funding from the federal government. The City of Phoenix itself spends no money on lead abatement, expending only the federal grant money it receives.

By all measures, the City of Phoenix program is outstanding. Homes selected for lead abatement are pre-tested and post-tested both inside and outside to locate the problems

and ensure they have been remediated. In the last four years the City of Phoenix has completed lead abatement on 600 homes within the ten square mile area designated for lead abatement. They remediate approximately 6 to 8 homes a month.

The U.S. Department of Housing and Urban Development (HUD) cites the Phoenix program as exemplary and utilizes the City of Phoenix lead abatement training video. One of the bullets under the "Revitalization Division" in the Neighborhood Services homepage on the City of Phoenix website shows "Remediates lead hazards in privately owned low-income housing," and the webpage for the Revitalization Division has a link to "More information about Lead Hazard Control Program." However, the Phoenix program primarily "remediates" by covering the lead with new paint, only removing the lead-based paint on surfaces that are likely to be contacted by small children, such as window sills. This increases the efficacy of scarce dollars in protecting children, but much of the lead, though temporarily sequestered, remains.

Still, the Arizona Department of Health Services annual report on lead poisoning (see revised link: http://www.hs.state.az.us/phs/oeh/invsurv/lead/2000annualcon.htm for the 2000 report) lists two central Phoenix zip codes as having the most reported childhood lead poisoning cases in Arizona.

Among Arizona cities, however, the Phoenix abatement program appears to be an anomaly. Tucson has a housing program and Slum Abatement and Blight Enforcement Response (SABER) program. When asked what lead abatement programs were active in Tucson, a program manager involved in the SABER program said "None that I know of." The City website for Tucson's housing program states:

> The Community Services Department operates several programs to assist lower income homeowners to repair their homes. These include such programs as emergency home repair, home repair for elderly persons, deferred loans, and target neighborhoods. Together these programs assist approximately 200 families annually, and provide reinvestment in some of the community's poorest neighborhoods. (see revised link: http://www.ci.tucson.az.us/csd/Housing_Programs/Home_Repairs/home_repairs.html)

But there is no mention of lead poisoning or the hazards of rehabilitating older homes that contain lead paint.

Another page for the City of Tucson Housing Rehabilitation Collaboration page, posted in October, 2000, notes:

> DID YOU KNOW THAT ……
>
> 56,000 of the housing units within the City of Tucson are 50 years old or older. This is approximately 30% of the City's housing stock. By the year 2010, it is estimated that 87,000 units will be over 50 years old. While

> newer homes are being constructed outside the City center, many homes in the older urban neighborhoods are in need of repair. Many of the families living in these older homes do not have the resources to make necessary repairs and neighborhoods continue to decline. (see: http://www.ci.tucson.az.us/csd/Housing_Programs/Home_Repairs/Rehab_2000/rehab_2000.html)

Again, there is no reference to lead or lead abatement.

While children's history books tell them of the post-WWII housing boom, the explosion of tract housing ("Levittowns") and the transformation of America into a suburban society, it doesn't mention that these homes were painted with lead-based paints banned in other industrialized countries in the first quarter of the twentieth century. Paints that were not banned in the United States until the last quarter. Paints that were advertised for use in children's rooms that now are laced with lead. Paints that now, thirty or forty or fifty years later, are peeling and powdering in old neighborhoods where low-income infants crawl on floors and put their lead-dust encrusted fingers, as well as everything they find, in their mouths. And scientists say that lead paint chips have a sweet taste.

Maybe It's Beyond That

(Chapter 7 of A Strange Ignorance)

Perhaps the most cogent commentary I found on lead poisoning was in a study of tooth decay that reported "For children ages 5 to 17, an increased lead burden of 5 micrograms per deciliter of blood corresponded to an 80 percent jump in cavities." Mark E. Moss of the University of Rochester (N.Y.) Medical Center and his colleagues analyzed data from a nationally representative sample of 24,901 children, part of the Third National Health and Nutrition Examination Survey (NHANES III), and concluded:

> We've been thinking about tooth decay in a way that's almost like blaming the victim -- if your children have tooth decay, it's because you don't brush their teeth right, or maybe their snacking habits are bad. This study says that maybe its beyond that. (JAMA, Volume 281, No. 24, pp.2294-2298)

"Maybe it's beyond that" is what we need to understand about "All Children Can Learn." When children have normal teeth, where lead has not replaced the calcium, then issues like candy and tooth brushing are important. But when lead replaces the calcium in children's teeth, it goes beyond that. Similarly, when children have normal brains, where lead has not replaced the calcium necessary for intellectual functioning, then perhaps things like quality teachers and curriculum standards will make a difference. But like the dentists discovered with cavities, when environmental lead is creating irreversible damage before the schools (or the dentists) ever become involved, "Maybe it's beyond that."

"Lead is the most well-studied example of an environmental contaminant that interferes with learning."

-The Center for Children's Health and the Environment

What I find particularly puzzling is why school governing board members continue to allow public schools to be chastised, even condemned, for deficiencies that clearly are outside the control of the public schools. More importantly, how can people who have volunteered to supervise the education and welfare of children sit idly by when those children are clearly being irreversibly brain damaged by a well-known, well-documented widespread neurotoxin just a few months before entering their care? And even if they are that callous, how can they then stand by while highly trained and dedicated public school employees are scourged for not overcoming this irreversible brain damage?

Am I exaggerating the impact of environmental lead?

If so, why would a "public health" official, not even an educator, be quoted by a national newsmagazine lamenting the failure of educators to recognize "there's a very large number of kids who find it difficult to do analytical work or [even] line up in the cafeteria because their brains are laden with lead."? Why would The Center for Children's Health and the Environment of the Mount Sinai School of Medicine have a factsheet on its web

site that reads: "Lead is the most well-studied example of an environmental contaminant that interferes with learning."

Did I invent a presidential task force that committed the federal government to eliminate lead from children's lives within ten years? Did I somehow trick most other industrialized countries into banning lead paint twenty years before I was born? Did I secretly sneak my opinions into the Newsweek cover story *ten years ago* about lead poisoning? Was the health journal Prevention just spoofing us over the devastating effects of just drinking tea and coffee from a lead-glazed tea cup? Did I invent the research published in prestigious medical journals showing that lead poisoning creates brain damage that lowers IQs, makes children aggressive, triggers Attention Deficit Hyperactivity Disorder, and reduces even normal functioning of children? Were the mice and monkeys faking in the research that showed identical responses to lead in their diet?

What am I to make of the federal investigators in the congressional General Accounting Office who reported NOT that lead poisoning was being exaggerated, but rather reported "One underlying reason for low screening rates is the widespread belief among providers that lead exposure is no longer a problem in their communities." Or that a National Academy of Sciences panel looking into the over-representation of learning disabilities in minority children reported NOT that educators were prejudicially putting minorities into Special Education but rather that environmental lead poisoning was implicated?

As a statistical maven, what am I to make of the "coincidence" that failing schools seem to be located in lead-laced neighborhoods, or that children who are most abused by parents somehow coincidentally have high lead levels, or that juvenile delinquents have higher blood lead levels than non-delinquents, or that children treated with legal drugs for ADHD coincidentally avoid illegal drugs when they become adults, or that incredible coincidence where it turns out that the classic studies which showed children found with higher blood lead levels do poorly in academics were conducted on children in communities that today dominate national headlines over "failing schools?"

"A call to action for legislators to protect our children by requiring landlords to not simply disclose known instances of lead paint in their properties, but to remove it" issued over five years ago by Dr. Needleman when he demonstrated the pervasiveness of lead poisoning has gone unheeded nationwide (except for the 16 pilot states in the federal program).

Instead of testing for lead poisoning, Talibanic politicians simply test crippled children for academic deficits so that they can then label those trying to help them as "failing schools." They force schools into curricular burqas and require educators to chant "All Children Can Learn" like some Orwellian doublespeak "1984" nightmare where the salient feature of Talibanic legislation called "No Child Left Behind" is precisely to allow unpoisoned children who can learn to leave behind those lead-poisoned children who cannot.

I do not think I am exaggerating, but I am certain they are. All children cannot learn, not if they have been irreversibly intellectually crippled in their first three years of life by environmental lead poisoning. Lead is extremely toxic and even endangers workers attempting lead abatement. The Houston public health official explained that lead dust cannot simply be mopped up, as if the problem was simply poor housekeeping. In the May, 1989, American Journal of Public Health (Volume 79, No. 5, pp. 643-645) Dr. Needleman explained:

> … de-leading houses is dangerous business. Children must be removed from the premises, workers must be trained and supervised in the use of safe techniques, and the property must be scrupulously cleaned after de-leading.

I was told the same thing by Phoenix lead abatement officials who perform pre- and post-abatement testing.

It is becoming clear that there is no alternative to removing lead-based paint from housing, other than removing the housing. With the passage of time, the paint deteriorates and the poisoning increases. More tragically, unsuspecting young families just starting out move temporarily into these low-cost houses until they can find jobs before moving into better housing, but meanwhile their young children are permanently poisoned by lead dust; they move out and another unsuspecting young family moves in and a new child is permanently poisoned; and then another; and then another. And even after they leave, many of these children will go to good schools but be unable to learn. No matter how hard they try. Children pass through these poisoned homes ingesting brain-damaging neurotoxins like pop-bottles being filled in a bottling plant on a conveyor belt of tragedy.

"For too long, policy decisions about lead poisoning have ultimately favored the lead industry or economic concerns over children's health."

-Dr. Bruce P. Lanphear

Bruce P. Lanphear, one of the lead authors of studies demonstrating the cognitive damage of low-level lead poisoning, wrote an article titled "The Paradox of Lead Poisoning Prevention" in Science magazine's Policy Forum:

> Collectively, the results of these studies argue that efforts to prevent neurocognitive impairment associated with lead exposure should emphasize primary prevention -- the elimination of residential lead hazards before a child is unduly exposed. …. Because lead exposure is cumulative and its detrimental effects are irreversible, any strategy that is limited to screening children after an exposure has occurred is flawed. …. It is more critical to expand our efforts to identify and eliminate residential lead hazards before children are unduly exposed. …. National, state, and community surveys of housing need to be conducted to identify and

> prioritize the elimination of lead hazards before occupancy by children. …. Finally, it is necessary to develop a plan for the gradual elimination of lead hazards during renovation or demolition of older housing. …. For too long, policy decisions about lead poisoning have ultimately favored the lead industry or economic concerns over children's health. The lead industry has left a toxic legacy comparable with that of the tobacco industry -- yet it has contributed nothing to its resolution. It is time to establish a scientifically based strategy to eliminate subclinical lead toxicity by controlling residential lead hazards; it is within our grasp. (Volume 281, No. 5383, pp. 1617-1618, 11 September 1998)

In an editorial titled "Primary Prevention of Childhood Lead Poisoning -- The Only Solution" published in the May 10, 2001, issue of the New England Journal of Medicine (Volume 344, No. 19, pp. 1470-1471) Dr.s John F. Rosen and Paul Mushak of the Children's Hospital at Montefiore in New York comment on the failure of an attempt to medically reverse the effects of lead poisoning in children in a study by "Rogan et al." They note that the irreversible effects of lead poisoning

> … clearly cast doubt on the value of public health programs that rely primarily on treatment after lead poisoning has occurred. Rogan et al emphasize the importance of primary prevention of lead poisoning, which is the only satisfactory solution to this devastating problem. The predominant source of toxic exposure to lead for children in urban areas is lead paint, although some incremental but far less substantial toxicity may be due to other sources, such as tap water contaminated by lead pipes. For the primary prevention of lead poisoning from paint, we recommend permanent abatement -- that is, the complete removal or replacement of lead paint before a child lives in a home. In contrast, 'interim' measures, which were introduced for the short-term reduction of hazards associated with lead paint and which involve scraping and painting over deteriorated surfaces and controlling household dust, have been claimed by some to save substantial cost; however, there is no evidence of savings in terms of net benefit over cost in the long-term prevention of childhood lead poisoning. Lead-painted surfaces in good condition rarely remain so. What was once intact lead-based paint is the source of all lead-bearing dust and paint chips. Therefore, it is the presence of lead paint on surfaces that defines the hazard, not the condition of surfaces containing lead paint.

Bruce Lanphear in his Science Magazine Policy Forum article states:

> The costs of eliminating childhood lead poisoning from residential hazards are substantial. It has been estimated, for example, that the first-year cost of reducing residential lead hazards in federally owned or federally assisted housing would be $458 million. The overall estimated benefit, defined as increase in lifetime earnings of children who are protected from the detrimental effects of lead exposure, was $1.538 billion -- a net benefit

> of $1.08 billion. This estimate does not include other anticipated advantages, such as reduction in cardiovascular disease, behavioral problems, and delinquent behaviors.

As one lead abatement official in Houston, Texas, said of existing environmental lead policies,

> I think it's absolutely outrageous when someone says to wait until a child is poisoned before we do anything. The first seven micrograms has the highest potential for I.Q. damage. They wouldn't let garbage lie around until someone got cholera.

"They," of course, means politicians, and they, of course, allow environmental lead to "lie around" in low-income communities across the nation damaging children. Cholera, of course, can be cured even if we do let garbage lie around until the damage is done. The damage from lead, however, is irreversible.

And, of course, there is a tragic irony about schools being "criminal production factories" in these words from the author who demonstrated the connection between lead poisoning and juvenile delinquency:

> "This study provides further evidence that delinquent behavior can be caused, in part, by childhood exposure to lead," said Dr. Needleman. "Of all the causes of juvenile delinquency, lead exposure is perhaps the most preventable. These results should be a call to action for legislators to protect our children by requiring landlords to not simply disclose known instances of lead paint in their properties, but to remove it."

The roots of the political Taliban become apparent in Dr. Lanphear's words: "The costs of eliminating childhood lead poisoning from residential hazards are substantial ... For too long, policy decisions about lead poisoning have ultimately favored the lead industry or economic concerns over children's health." The alternative to substantial costs in dollars is to continue to allow small children to be permanently brain damaged.

No amount of "best practices" or educational fads or intensive instruction is going to make neurological connections between brain cells constructed of lead.

This is a dichotomy, plain and simple: the loss in IQ, the violence, the academic failure, the drug addiction, the *human costs* are easier to ignore than the financial costs. Ignoring science and chemistry while permanently damaging children is possible because it is easier for politicians to intimidate school officials and governing board members into curricular burqas and mandated test practice three times a day. And, nobody seemingly cares about the kids with their "somatic complaints" and their academic failure and their desperate self-

medication with illegal drugs and their inability to have careers and their eventual propensity toward violent impulsive criminal behavior.

Politicians piously shed crocodile tears for the victims of criminal behavior, while expending enormous sums of dollars on a "war on drugs" (part of their defacto "war on kids"), at the same time they offer vouchers to middle class voters to escape the "failing schools" where the strange ignorance of educators oblivious to lead poisoning encounters the accountability of academic standards forced upon the impoverished victims of lead poisoning.

Governing board members and educators in failing schools cannot simply look at "asymptomatic" children and assume they are normal. Even if a lead poisoned child is found to have a normal IQ and behavior, the reality is that this normal IQ is likely 10-15 points below what the child was born with and the child will still be struggling with inner demons due to impulsivity unleashed by lead. A child born with a 115 IQ has a right to a 115 IQ, and if the child now has an IQ of 100, that is NOT normal. If the lead is there, the child is brain damaged. Ignoring the damage is easy, but it does not mean it does not exist.

However, it would seem that we are at a rational confluence of forces to resolve this problem. Lead is unequivocally linked to "failing schools." Lead is also implicated in ADD/ADHD, violence, unemployment, crime, alcoholism, drug abuse and other social problems such as divorce, child abuse, and mental retardation. The lead and paint industry already face mitigation fees in California. The federal government has already mandated medical screening of children on Medicaid and its attendant health costs. And the legal system is beginning to recognize the inherent liability of landlords who rent lead-laced homes to families with children.

The political, economic, rational and moral forces are in place for a final confrontation over environmental lead. The key is to make the poisoning of young children too expensive to ignore any longer. Whenever a child is found to have any blood lead level at all, the community, including educators, need to bring lawsuits against the source of the lead. Let the politicians set blood lead levels at whatever they want, but show the trial juries the medical research on brain damage, educational failure, and subsequent earnings loss to that child. Sue for lost earnings on behalf of the child. Sue for educational costs to the schools for Special Education. Sue for the screening equipment costs. Sue for punitive damages because the presence of lead had to be known since the test is simple to perform.

Whenever a "failing school" is identified, the school should immediately demand lead screening of all students, through both blood lead level testing and bone screening through K X-ray fluorescence spectroscopy. Students identified as having been exposed to lead should receive a three-pronged intervention effort.

- First, the source of the lead should be determined and abated. If housing is implicated the landlords should be sued by the district for school intervention costs.
- Second, a school intervention program should ensure that children identified as having been exposed to lead immediately be evaluated by psychiatrists for learning and behavioral problems including ADD/ADHD and proper medical intervention strategies implemented.
- Third, all housing within the attendance area of the school should be evaluated for the presence of lead and community organizations should be vigilant to ensure that children are not allowed to occupy those homes. Curbs in front of all housing with lead hazards should be painted in "candy stripe" to warn of the hazard (sidewalks and curbs are public property).

There should be a "zero tolerance" for the presence of environmental lead contamination within any school attendance area that could endanger children. State statutes should make it a felony to knowingly rent or sell housing containing lead-based paint for the occupancy of children under three years-of-age, and a misdemeanor for children over that age. Contractors and subcontractors involved in housing renovation should be required to pass lead awareness training before licensing. Real Estate agents should be required to determine and disclose the presence of lead-based paint in all housing transactions.

Districts in conjunction with the overall community around "failing schools" need to demand that all children under three years-of-age be screened for lead exposure on a regular basis either through private or public health agencies. Lead exposure screening should be mandated before children can be enrolled in daycare or public school programs. More importantly, AHCCCS and KidsCare regulations should prevent "capitation" payments to physicians for children in their care who have not had annual blood lead screening.

But since the unlikely acquiescence of politicians would be required for those actions, educators and parents should form community alliances with social service agencies, public health activists, and public interest lawyers to ensure that lead poisoning of all children within their school boundaries becomes financially impossible. Schools should form alliances with community groups to monitor state AHCCCS or KidsCare populations for potential lead poisoning victims and sue on behalf of any children found to be exposed to lead through housing or other sources.

The precedent has already been set for occupants of lead-laced housing to sue the owners for damages whenever children suffer subsequent lead poisoning. If the landlord has also failed to notify low-income renters of the lead hazard, there could be a criminal prosecution as well. The liability for the damage that creates "failing schools" should be assessed through lawsuits on behalf of poisoned children.

Like the experience of public lawsuits against the asbestos and tobacco industries, politicians are likely to be an impediment to resolving the problems of lead poisoning but the courts will ultimately prevail. There are sufficient federal laws and tort opportunities

that can be utilized to make the costs of victimizing children too expensive for potential litigants to absorb. Only by making lead poisoning impossible will the severe costs to the community, to the schools, to the crime victims, and to the lead poisoning victims themselves be eradicated.

Finally, public service efforts to educate the general public about the dangers of low-level lead contamination should be instigated. Hardware stores' employees should be educated to warn those who purchase sand paper that sanding lead-based paint is very dangerous and that all painted surfaces should be tested for lead before sanding. Community organizations in older neighborhoods should be educated to watch carefully that housing renovations are properly conducted. Unless this is done successfully, all children will not be able to learn.

In this report I referenced a newspaper reporter in Baltimore who illustrated the problem of lead poisoning with a story of a suicidal twelve-year-old who "can barely read a word more than three letters long. He cannot do math at all, not even two plus two. He was in special education, but nothing the teachers tried or said seemed to stick." I referenced a newspaper reporter in Pensacola who matter-of-factly quoted "a child psychiatrist and medical director" as defining the signature of lead poisoning as "especially if the child can't seem to learn, no matter how hard he or she tries."

School district governing board members have to face the overwhelming evidence that all children cannot learn if they have been lead poisoned and thus if accountability for learning penalizes schools for not teaching children who have been poisoned, then schools have no alternative other than to take action against the poisoning. No amount of "best practices" or educational fads or intensive instruction is going to make neurological connections between brain cells constructed of lead. No amount of counseling and discipline will stop angry frustrated students embarrassed by punitive accountability measures from acting out their aggressions when the very brain circuits responsible for controlling "impulsivity" have been damaged by lead. No amount of counseling, threats and wall posters will stop drug abuse in schools where children find those drugs have a calming affect on lead induced agitation and ADHD symptoms.

Only actions that prevent children from being poisoned in their first three years of life will prevent schools in low-income neighborhoods from failing. As the houses age and the paint deteriorates further, more children in cradles will breathe and ingest lead dust like pop-bottles being filled in a bottling plant as they start down the conveyor belt of tragedy in the "criminal production factories" that only our strange ignorance allows to continue. The children will fail, the schools will fail, and the inevitable consequence of what science and chemistry adequately explain will continue to impact school districts across the nation.

School accountability means that governing boards and educators can no longer ignore lead intoxication. Society has decided that all children can learn. Even those poisoned by society with a brain crippling neurotoxin. If it is the responsibility of public schools that all children can learn, it is thus the responsibility of schools to stop the brain crippling

before it occurs. In time, all the children will have to learn, but that will only happen when the conveyor belt of tragedy is stopped in the beginning. Meanwhile, a few other things have to stop.

Stop automatically blaming the victims and the teachers and the schools when lead poisoned children fail. Stop chanting about reading by grade three when children are poisoned by age three. Stop chanting "Just say no to drugs" when drugs are the only respite the poisoned children have from lead poisoning. Stop testing brain damaged children to flaunt what society has done to them. Stop imputing moral and religious inadequacies upon children crippled by society's indifference. And stop the strange ignorance of their travail revealed by mountains of medical research.

As long as "The education community has not really understood the dimensions of this" continues, then the failure of public schools will mount, governing boards will be dismissed, the achievement gap will widen, violence will infest the schools, and more children will not be able to learn. No matter how hard they try. The problem is beyond them, beyond teacher competence, beyond funding shortages, beyond standards and testing and vouchers and every other ill-conceived rationalization that ignores lead poisoning. And there is no "maybe" about it.