

The Relationship of Adverse Childhood Experiences to Adult Health: Turning gold into lead

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Abstract

The Adverse Childhood Experiences (ACE) Study is a long term, in-depth analysis of over 17,000 adult Americans, matching their current health status against adverse childhood experiences that occurred on average a half-century earlier.

We found that such adverse childhood experiences are quite common although typically concealed and unrecognized; that they still have a profound effect a half century later, although now transmuted from psychosocial experience into organic disease; and that they are the main determinant of the health and social well-being of the nation.

Our findings are of direct importance to the everyday practice of medicine and psychiatry because they indicate that much of what is recognized as common in adult medicine is the result of what is not recognized in childhood.

The ACE Study challenges as superficial the current conceptions of depression and addiction, showing them to have a very strong dose-response relationship to antecedent life experiences.

Key words

Child Abuse – Sexual Abuse – Depression – Addiction – Chronic Disease – Suicide – Chronic Obstructive Pulmonary Disease – Hepatitis – Smoking – Drug Abuse

The question of what determines adult health and well-being is important to all countries. The Adverse Childhood Experiences (ACE) Study is a major American research project that poses the question of whether, and how, childhood experiences affect adult health decades later. This question is being answered with the ongoing collaboration of Robert Anda, MD, at the Centers for Disease Control (CDC) and the cooperation of 17,421 adults at Kaiser Permanente's Department of Preventive Medicine in San Diego, California. Kaiser Permanente is a multispecialty, prepaid, private health insurance system or Health Maintenance Organization [HMO]. The findings from the ACE study provide remarkable insight into how we become what we are as individuals and as a nation. They are important medically, socially, and economically.

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Indeed, they have given us reason to reconsider the very structure of primary care medical practice in America.

The ACE study reveals a powerful relationship between our emotional experiences as children and our physical and mental health as adults, as well as the major causes of adult mortality in the United States. It documents the conversion of traumatic emotional experiences in childhood into organic disease later in life. How does this happen, this reverse alchemy, turning the gold of a newborn infant into the lead of a depressed, diseased adult? The study makes it clear that time does not heal some of the adverse experiences we found so common in the childhoods of a large population of middle-aged, middle-class Americans. One does not 'just get over' some things, not even fifty years later.

The Adverse Childhood Experiences Study is an outgrowth of observations we made in the mid 1980s in an obesity program that had a high dropout rate. The first of many unexpected discoveries was that the majority of the dropouts actually were successfully losing weight. Accidentally and to our surprise, we learned from detailed life interviews of 286 such individuals that childhood abuse was remarkably common and, if present, always antedated the onset of their obesity. No one previously had sought this kind of medical information from them but many patients spoke of their conscious awareness of an association between abuse and obesity. Some told of infrequent instances where they had brought up their history of abuse only to have the information rejected by a physician as being in the distant past and hence of no relevance to current problems.

The counterintuitive aspect was that, for many people, obesity was not their problem; it was their protective solution to problems that previously had never been acknowledged to anyone. An early insight was the remark of a woman who was raped at age twenty-three and gained 105 pounds in the year subsequent: "Overweight is overlooked and that's the way I need to be." The contrast was striking between this statement and her desire to lose weight. Similarly, two men who were guards at the State Penitentiary became anxious after each losing over one hundred pounds. They said that they felt much safer going to work looking larger than life rather than normal size. In general, we found the simultaneous presence of strong opposing forces to be common in our obese patients. Many were driving with one foot on the brakes and one on the gas, wanting to lose weight but fearful of the change in social and sexual expectations that would be brought about by major weight loss.

Researchers at the Centers for Disease Control (CDC) recognized the importance of these clinical observations and helped design a large epidemiological study that would provide definitive proof of our findings and of their significance. The Adverse Childhood Experiences Study was carried out in Kaiser Permanente's Department of Preventive Medicine in San Diego.

This was an ideal setting because for many years we had performed detailed biomedical, psychological, and social (biopsychosocial) evaluations of over 55,000 adult Kaiser Health Plan members each year. Moreover, the patients were from a typical middle-class American population. We asked 26,000 consecutive adults evaluated in the Department if they would be interested in helping us understand how childhood events might affect adult health status. Seventy-one percent agreed.

We asked these 18,000 volunteers to help us study eight categories of childhood abuse and household dysfunction. The abuse categories were: recurrent physical abuse, recurrent emotional abuse, and sexual abuse. The five categories of household dysfunction were: growing up in a household where someone was in prison; where the mother was treated violently; with an alcoholic or a drug user; where someone was chronically depressed, mentally ill, or suicidal; and where at least one biological parent was lost to the patient during childhood - regardless of the cause. An individual exposed to none of the categories had an ACE score of 0; an individual exposed to any four had an ACE score of 4, etc. In addition, a prospective arm of the study is following the cohort for at least 5 years to compare childhood experiences against later emergency department use, doctor's office visits, medication costs, hospitalization, and death.

Dr. Anda, my co-principal investigator at the CDC, designed with great skill the massive data management and retrospective and prospective components of the study. Because the average participant was 57 years old, we actually were measuring the effect of childhood experiences on adult health status a half-century later. The full text of our initial report is at http://www.meddevel.com/site.mash?left=/library.exe&m1=4&m2=1&right=/library.exe&action=search_form&search.mode=simple&site=AJPM&jcode=AMEPRE

Our two most important findings are that adverse childhood experiences:

- are vastly more common than recognized or acknowledged and
- have a powerful relation to adult health a half-century later.

This combination makes them important to the nation's health and to medical practice. Slightly more than half of our middle-class population of Kaiser members experienced one or more of the categories of adverse childhood experience that we studied. One in four were exposed to two categories of abusive experience, one in 16 were exposed to four categories. Given an exposure to one category, there is 80% likelihood of exposure to another category. Of course, all this is well shielded by social taboos against seeking or obtaining this information. Furthermore, one may miss the forest for the trees if one studies these categories individually. They do not occur in isolation; for instance, a child does not grow up with an alcoholic parent or with domestic violence in an otherwise well-functioning household. The question to ask is: How will these

childhood experiences play out decades later in a doctor's office? To study that, we can categorize outcomes into organic disease and emotional disorder.

Organic disease

We shall first look at the relationship of adverse childhood experiences to smoking. Smoking underlies some of the most important causes of death in America; there has been a strong public health effort to eradicate smoking in California. In spite of initial success in significantly reducing the number of smokers, there has been no further net decrease in recent years although the efforts against smoking have continued. Because of this, smoking in the face of California's strong social pressures against it is often attributed to 'addiction'. The usual concept of tobacco addiction implies that it is attributable to characteristics that are intrinsic within the molecular structure of nicotine. However, we found that the higher the ACE score, the greater the likelihood of current smoking. In other words, current smoking is strongly related in a progressive dose-response manner to what happened decades ago in childhood. Finding 'addiction' attributable to characteristics that are intrinsic in early life experiences challenges the conventional concept of addiction. The psychoactive benefits of nicotine are well established in the medical literature although they are now little remembered. Are smoking and its related diseases the result of self-treatment of concealed problems that occurred in childhood?

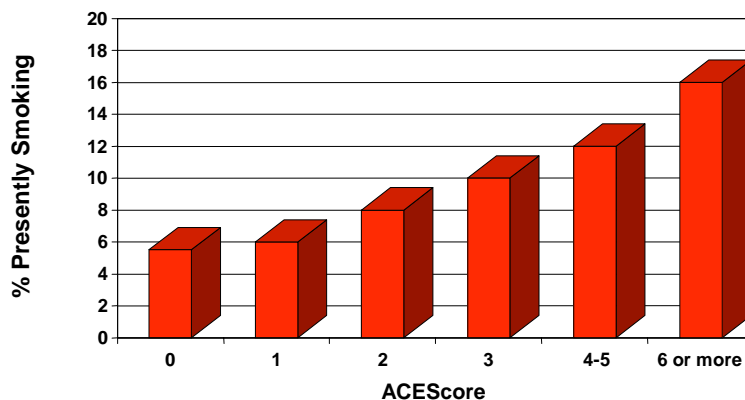


Figure 1: ACE Score and Smoking

Chronic obstructive pulmonary disease (COPD) also has a strong relationship to the ACE score, as does the early onset of regular smoking. A person with an ACE score of 4 is 390% more likely to have COPD than is a person with an ACE score of 0. This relationship has the same graded, dose-response effect that is present for *all* the associations we found. Moreover, all the relationships have a p value of .001 or stronger. If early emotional stresses predict COPD, is COPD properly understood as a psychosomatic condition?

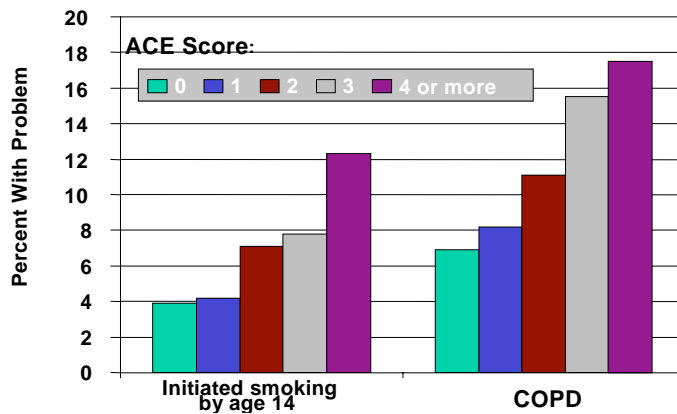


Figure 2: ACE Score and COPD

When we compared hepatitis in ACE score 0 patients with hepatitis in ACE score 4 patients, there was a 240% increase in prevalence. A progressive dose response effect was present with every increase in the ACE score. Similarly, with regard to sexually transmitted disease, comparison of the adjusted odds ratio for sexually transmitted disease in these same two groups showed a 250% increase at ACE score 4 compared to ACE score 0.

In the United States, intravenous drug use is a major public health problem with which little progress has been made. It is widely recognized as a cause of several life-threatening diseases. We found that the relationship of i.v. drug use to adverse childhood experiences is powerful and graded at every step; it provides a perfect dose-response curve.

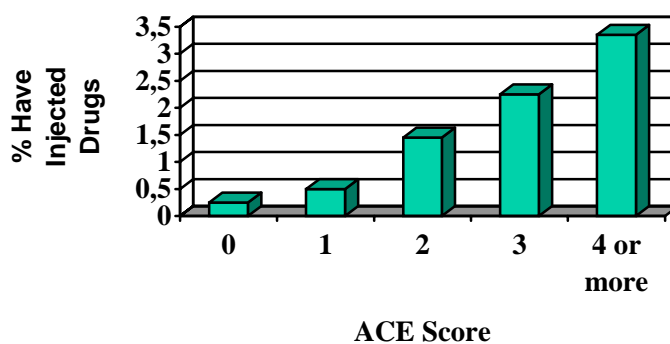


Figure 3: ACE Score and Intravenous Drug Use

In epidemiology, these results are almost unique in their magnitude. For example, a male child with an ACE score of 6 has a 4,600% increase in the likelihood of later becoming an i.v. drug user when compared to a male child with an ACE score of 0. Since no one injects heroin to get endocarditis or AIDS, why *is* it used? Might heroin be used for the relief of profound anguish

dating back to childhood experiences? Might it be the best coping device that an individual can find? Is intravenous drug use properly viewed as a personal *solution* to problems that are well concealed by social niceties and taboo? If so, is intravenous drug use a public health problem or a personal solution? Is it both? How often are public health problems personal solutions? Is drug abuse self-destructive or is it a desperate attempt at self-healing, albeit while accepting a significant future risk? This is an important point because primary prevention is far more difficult than anticipated. Is this because non- recognition of the *benefits* of health risk behaviors leads them to be viewed as irrational and as solely having damaging consequences? Does this leave us speaking in platitudes instead of understanding the causal basis of our intractable public health problems?

Emotional disorders

When we looked at purely emotional outcomes such as self-defined current depression or self-reported suicide attempts, we find equally powerful effects. For instance, we found that an individual with an ACE score of 4 or more was 460% more likely to be suffering from depression than an individual with an ACE score of 0. Should one doubt the reliability of this, we found that there was a 1,220% increase in attempted suicide between these two groups. At higher ACE scores, the prevalence of attempted suicide increases 30-51 fold (3,000-5,100%)! Our article describing this staggering effect was published in a recent issue of the Journal of the American Medical Association. Overall, using the technique of population attributable risk, we found that between two-thirds and 80% of all attempted suicides could be attributed to adverse childhood experiences.

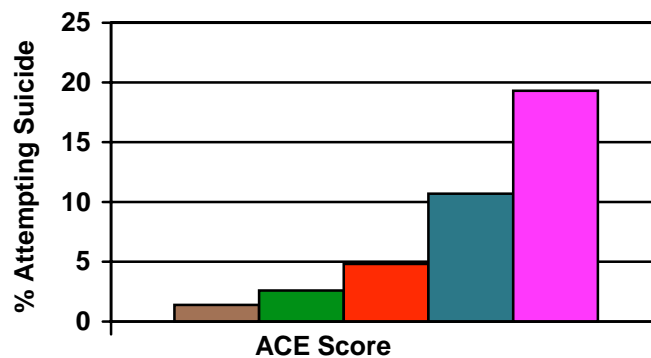


Figure 4: ACE Score and Attempting Suicide

In addition to these examples, we found many other measures of adult health have a strong, graded relationship to what happened in childhood: heart disease, fractures, diabetes, obesity,

unintended pregnancy, sexually transmitted diseases, and alcoholism were more frequent. Occupational health and job performance worsened progressively as the ACE score increased. Some of these results are yet to be published, as is all the data from the prospective arm of the study that will relate adverse childhood experiences to medical care costs, disease, and death a half-century later.

Clearly, we have shown that adverse childhood experiences are common, destructive, and have an effect that often lasts for a lifetime. They are the most important determinant of the health and well-being of our nation. Unfortunately, these problems are painful to recognize and difficult to deal with. Most physicians would far rather deal with traditional organic disease. Certainly, it is easier to do so, but that approach also leads to troubling treatment failures and the frustration of expensive diagnostic quandaries where everything is ruled out but nothing is ruled in.

Our usual approach to many adult chronic diseases reminds one of the relationships of smoke to fire. For a person unfamiliar with fires, it would initially be tempting to treat the smoke because that is the most visible aspect of the problem. Fortunately, fire departments learned long ago to distinguish cause from effect; else, they would carry fans rather than water hoses to their work. What we have learned in the ACE study represents the underlying fire in medical practice where we often treat symptoms rather than underlying causes.

If the treatment implications of what we found in the ACE study are far-reaching, the prevention aspects are positively daunting. The very nature of the material is such as to make one uncomfortable. Why would one want to leave the relative comfort of traditional organic disease and enter this area of threatening uncertainty that none of us has been trained to deal with? And yet, literally as I am writing these words, I am interrupted to consult on a 70-year-old woman who is diabetic and hypertensive. The initial description given to me left out the fact that she is morbidly obese (one doesn't go out of one's way to identify what one can't handle). Review of her chart shows her to be chronically depressed, never married, and, because we routinely ask the question of 57,000 adults a year, to have been raped by her older brother six decades ago when she was ten. That brother molested her sister who is said also to be leading a troubled life.

We found that 22% of our Kaiser members were sexually abused as children. How does that affect a person later in life? How does it show up in our offices? What does it mean that sexual abuse is never spoken of? Most of us initially are uncomfortable about obtaining or using such information, but we find it useful routinely to pose such questions to all patients by questionnaire. Our "Yes" response rates are quite high, as the ACE study indicates. We then ask patients acknowledging such experience, "*How did that affect you later in life?*" This question is easy to ask and is neither judgmental nor threatening to hear. It works well and you should

remember to use it. It typically provides profoundly important information, and does so concisely. It often gives one a clear idea where to go with treatment.

What then is this woman's diagnosis? Is she just another hypertensive, diabetic old woman or is there more to the practice of medicine? Here is the way we conceptualized her problems:

Childhood sexual abuse

Chronic depression

Morbid obesity

Diabetes mellitus

Hypertension

Hyperlipidemia

Coronary artery disease

Macular degeneration

Psoriasis

This is not a comfortable diagnostic formulation because it points out that our attention is typically focused on tertiary consequences, far downstream. It reveals that the primary issues are well protected by social convention and taboo. It points out that we physicians have limited ourselves to the smallest part of the problem, that part where we are comfortable as mere prescribers of medication. Which diagnostic choice shall we make? Who shall make it? And, if not now, when?

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