

Supplementary Information

Adverse childhood experiences and long-term health in women: Accumulation of multi-morbidity

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Supplementary Table 1. Cumulative incidence of 18 chronic conditions considered separately by ACE score

Chronic condition	ACE score ≥ 2			ACE score 0 ^a			Models ^b	
	N at risk	Person-years	N of events	N at risk	Person-years	N of events	HR (95% CI)	P value
Mental health disorders								
Depression	118	1,592	61	582	10,158	113	3.26 (2.38-4.48)	<0.001
Schizophrenia	177	3,520	5	631	12,404	4	4.25 (1.13-15.9)	0.03
Dementia	181	3,650	5	631	12,407	8	2.25 (0.74-6.79)	0.15
Substance abuse disorders	160	3,065	27	627	12,202	33	3.35 (2.01-5.58)	<0.001
Cardiovascular and metabolic conditions								
Hypertension	168	2,533	64	593	9,354	180	1.33 (1.00-1.78)	0.050
Hyperlipidemia	162	2,262	74	587	8,607	227	1.28 (0.98-1.68)	0.08
Diabetes	177	2,970	54	621	10,610	159	1.26 (0.92-1.71)	0.15
Arrhythmias	175	3,074	52	616	10,713	134	1.39 (1.01-1.91)	0.04
Coronary artery disease	182	3,507	19	629	12,199	25	2.72 (1.50-4.94)	<0.001
Congestive heart failure	182	3,609	9	631	12,398	10	3.30 (1.35-8.04)	0.009
Stroke	180	3,637	2	630	12,294	20	0.37 (0.09-1.57)	0.18
Other somatic conditions								
Asthma	168	3,027	27	604	11,295	40	2.41 (1.48-3.93)	<0.001
COPD	145	2,431	34	560	10,018	58	2.33 (1.51-3.58)	<0.001
Arthritis	173	2,397	90	616	9,887	201	2.02 (1.56-2.60)	<0.001
Osteoporosis	180	3,516	17	629	11,629	68	0.83 (0.49-1.40)	0.48
Hepatitis	179	3,614	3	627	12,272	9	1.22 (0.33-4.53)	0.76
Chronic kidney disease	181	3,477	23	625	11,975	43	1.95 (1.17-3.25)	0.01
Cancer	169	3,149	29	603	10,833	88	1.12 (0.73-1.69)	0.61

ACE, adverse childhood experience; HR, hazard ratio; CI, confidence interval; COPD, chronic obstructive pulmonary disease.

^a Women with ACE score of 1 (n=212) were excluded from these analyses.

^b Hazard ratios were calculated using Cox proportional hazards models with age as the time scale.

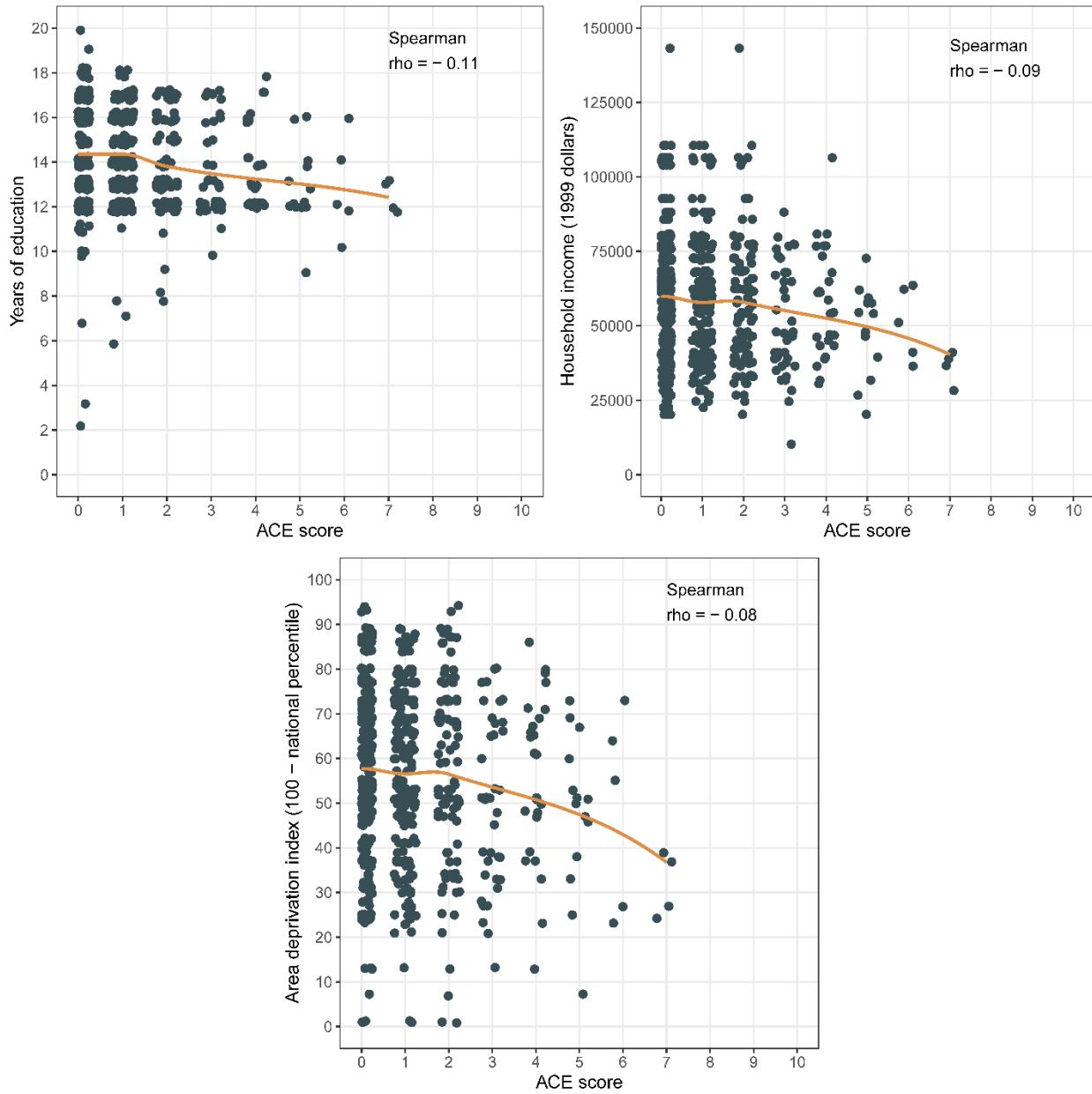
Supplementary Table 2. Derivation of the ACE score from information obtained via medical records abstraction in a medical records-linkage system

ACE questions	Derivation (examples of text in medical records)
<p>Q1 – verbal or emotional abuse:</p> <p>Did a parent or other adult in the household often ... Swear at you, insult you, put you down, or humiliate you? or Act in a way that made you afraid that you might be physically hurt?</p>	<ul style="list-style-type: none"> When he/she came home drunk, he/she used to swear at all of us. I dreaded seeing him/her. Was very distant but had outbursts of anger when he/she thought things were not done his/her way. Very mean to us for no reason, my siblings and I did not know what was in his/her mind. Patient stated she was emotionally abused.
<p>Q2 – physical abuse:</p> <p>Did a parent or other adult in the household often ... Push, grab, slap, or throw something at you? or Ever hit you so hard that you had marks or were injured?</p>	<ul style="list-style-type: none"> Several times a week we had a brawl. I was so scared but I had no way to avoid it. He/she would hit me with a belt for stupid reason or throw me against the wall; I had to go to the emergency room. Patient stated she was physically abused.
<p>Q3 – sexual abuse:</p> <p>Did an adult or person at least 5 years older than you ever... Touch or fondle you or have you touch their body in a sexual way? or Try to or actually have oral, anal, or vaginal sex with you?</p>	<ul style="list-style-type: none"> I was drugged and intoxicated, I would wake up naked with pain in my vagina or anus. I was very young and he would fondle me (older brother, father, stepfather, boyfriend of my mother). I did not know what to do even though it happened for years, many times a week. He would come to my room many times a week and do what he wanted to me. Patient mentioned sexual abuse or rape but did not give further details.
<p>Q4 – emotional neglect:</p> <p>Did you often feel that ... No one in your family loved you or thought you were important or special? or Your family didn't look out for each other, feel close to each other, or support each other?</p>	<ul style="list-style-type: none"> My father had 2 jobs to maintain his drug or alcohol abuse, or the substance abuse of my mother, or of both. They were never here for us children. My parents were absent most of the time. I had to go to my grandmother's home. He/she always put my sibling before me. My mother was always commenting of me being flawed (obese or not good looking). I never felt loved or attached. They were too aloof. I could never express my feelings they were so "buttoned up".
<p>Q5 – physical neglect:</p> <p>Did you often feel that ... You didn't have enough to eat, had to wear dirty clothes, and had no one to protect you? or Your parents were too drunk or high to take care of you or take you to the doctor if you needed it?</p>	<ul style="list-style-type: none"> Most of the time when I was sick, my parents were not there or were too self-centered. I would go to the doctor with a friend and then I was reprimanded for that. As a child I would count every penny for food, clothes, and shoes, for my siblings and myself. Father/mother were physically disabled/abusing alcohol or drugs; my siblings and I were dirty and poor, and left to ourselves. Father and mother came from a very impoverished background but we were never able to get out of that and seeing us suffer did not make things better.

Supplementary Table 2. Continued

ACE questions	Derivation (examples of text in medical records)
Q6 – parental separation: Were your parents ever separated or divorced?	<ul style="list-style-type: none"> • Father died in car accident, and we had many years of a very difficult time to get by. • My father/mother left us and never showed up again. It was difficult to get by without explanations. • My parents divorced, and the situation after that was very complex. • My parents divorced and my mother had a new boyfriend not very attentive to us; we felt we were a nuisance. • My father died suddenly of liver disease, and we found out he was a closet alcoholic....such a bad time.
Q7 – witness domestic violence: Was your mother or stepmother: Often pushed, grabbed, slapped, or had something thrown at her? <i>or</i> Sometimes or often kicked, bitten, hit with a fist, or hit with something hard? <i>or</i> Ever repeatedly hit over at least a few minutes or threatened with a gun or knife?	<ul style="list-style-type: none"> • Father used to come home drunk and hit my mother. • He lost his temper very quickly and hit my mother for no reason. He scared us to death, and still now I can't forgive him. • One night he hit my mother then left. A few days later I learned that he was engaged and planned to marry his young secretary.
Q8 – substance abuse: Did you live with anyone who was a problem drinker or alcoholic or who used street drugs?	<ul style="list-style-type: none"> • Alcoholic all his/her life. • Closet alcoholic. Died young of liver disease. • Patient stated that a family member was an alcoholic (no additional detail) or a drug user (no additional details).
Q9 – mental illness: Was a household member depressed or mentally ill or did a household member attempt suicide?	<ul style="list-style-type: none"> • Severe depression or persistent depressive disorder with or without delusional features. • Bipolar disorder or exacerbation of it. • Depression and anxiety with nervous breakdown that required hospitalization. • Suicide attempt and hospitalizations. • Schizophrenia.
Q10 – incarceration: Did a household member go to prison?	Reported in the medical records.

ACE, adverse childhood experiences.



Supplementary Figure 1. Correlations between adverse childhood experience (ACE) score and certain socioeconomic variables.

For consistency with years of education and household income, the area deprivation index was inverted with higher values corresponding to less deprivation. The orange lines represent smoothed curves between ACE score and each variable and were created using loess methodology.