

**A PSYCHO-ECONOMIC CASE IN PUBLIC HEALTH:
DEVELOPMENTAL TRAUMA DISORDER DIAGNOSIS AND
TRAUMA-INFORMED POLICY**

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ABSTRACT

Negative experiences in human development can settle symptoms of disease or life span disorder. Developmental trauma is a hidden pandemic leading to a multi-layered array of negative outcomes across the lifespan, including critical health conditions and increased healthcare utilization. Such a scenario represents a major socio-economic burden with costs for health and social care and for society as a whole. A trauma-informed public health approach puts childhood adversities at the core of treatment and service provision. It becomes important to outline how a trauma-informed public health approach embedding the recognition of the Developmental Trauma Disorder diagnosis represents a major shift to conceptualizing health and social care provision and to recognizing the pervasiveness of adverse experiences. A projective cost analysis is elaborated to illustrate how the societal, health and social care costs would be reduced if trauma-related policies were implemented. A multidisciplinary view – which includes an economic case aspect – could strengthen ACEs prevention efforts: it could raise awareness of this issue, and adopt useful health and social policies in an integrated perspective.

Keywords: Developmental Trauma Disorder, Child abuse and maltreatment, Trauma-informed approach, Public Health, Economic costs, Health Policy.

1.0 INTRODUCTION: A PUBLIC HEALTH APPROACH TO CHILDHOOD TRAUMA

Psychological and behavioural features of coping are the adaptive results of adopting strategies to manage specific external or internal demands exceeding individual resources. Interpersonal stressors orient this mechanism throughout increasing risks for depression, anxiety and trauma-relates symptoms or syndromes as they represent a coping failure. They are defined as stressful episodes between two (or more) people that involve quarrels, arguments, negative attitude and/or behavior, uncomfortable or stressful atmosphere during activities (i.e. familiar context,

school, work) (Lazarus and Folkman, 1984). If those “episodes” become too frequent, in particular during the earlier developmental phases, it allows individuals to “chronic stress” and this becomes a risk factor of next traumatogenic experiences.

Children who have been exposed to interpersonal and chronic stress and trauma develop a broad spectrum of psychopathological outcomes beyond the most known PTSD clusters that do not fully capture the impact of trauma on children who been exposed to ongoing danger, disruptive caregiving and difficult attachment systems. Consequently, most children with trauma-related psychopathology go undetected and do not access to an appropriate treatment.

Developmental trauma is a multilayered and cumulative form of trauma, usually of an interpersonal and abusive nature representing serious psychosocial, medical, and policy issues for both the victims and the society. Global community surveys show high prevalence rates of physical (22.9%), emotional (29.1%), and sexual (9.6%) abuse, as well as physical (16.6%) and emotional neglect (18.4%). Through a comparison of a series of meta-analyses, Stoltenborgh and colleagues (Stoltenborg et al., 2015) found the overall estimated prevalence rate for CSA to be 12.7 %: 7.6 % among boys and 18% among girls globally. For this reason, billions of children are under the attention of the child welfare system for abuse and neglect; daily, services deal with the sequelae of childhood trauma, that often persist for decades (Thöma et al., 2021) and intergenerationally (Greene et al., 2020) with long- lasting effects on child’s neurodevelopment, relationships, learning, and health (D’Andrea et al., 2012; Teicher & Samson, 2016).

The paper addresses the unmet needs of traumatized children within a public health framework. Such a framework elaborates on three interrelated aspects: 1) the importance of the proposed new diagnosis of Developmental Trauma Disorder (Spinazzola, van der Kolk & Ford, 2021) to identify the complex clinical presentation of long-lasting consequences of child adversities; 2) the need for a universal trauma-informed policy to sustain prevention and treatment of childhood trauma within the systems of care and 3) cost reductions as a consequence of less misdiagnosis or underdiagnosis leading to ineffective treatment and overload of public services, criminal justice systems, hospitals (Danese et al., 2020).

Early experiences of stressful and/or traumatic events made during the childhood are resumed in the acronym of ACE (Adverse Childhood Experiences) and they have been investigated for the life-span time of influence on individual life as a risk factor for mental and medical health. The so-called ‘ACEs study’ uncovered the public health burden of childhood trauma. The investigation was a major retrospective study involving 17,337 middle-aged, middle class adults, matching their biomedical and mental health, social function against 10 categories of adverse childhood experiences during infancy, childhood or adolescence (Felitti et al., 1998). The authors explained this association as an indirect relationship between the stressful conditions and mortality risk factors including health-related behaviors. The underlying hypothesis was that ‘stressful or traumatic childhood experiences have negative neurodevelopmental impacts that persist across development and lifespan and that increase the risk of a variety of health and social problems (Felitti et al., 1998). The ACEs study reported associations between adversity and lung cancer (Brown et al., 2010), risk of suicide (Dube et al., 2001), depressive disorders (Chapman et al., 2004), ischemic heart disease (Dong et al., 2004), amongst other effects. Meta-analyses have now been conducted to examine the

consistency of findings (Hughes et al., 2017; Holman et al., 2016). Hughes and colleagues (2017) conducted a meta-analysis of 37 studies measuring associations between multiple ACEs and health outcomes. Their analysis supported substantially increased health risks to adults who reported multiple exposure to childhood trauma.

The impact on the body's adaptive systems when faced with toxic stress and adverse childhood experiences can lead to allostatic load and extreme behavioral and physiological reactions (McEwen, 2018). In addition, traumatized children develop over time an attentional bias toward threat, threat sensitization, and heightened stress reactivity, modifying their ability to engage in the cognitive appraisal process described by Lazarus and Folkman (Lazarus & Folkman, 1984) as important to coping. Multiple dangerous events may also appear to be a greater threat, unless there is also an appraisal of adequate inner and outer resources to respond to the events. These mind- body processes, taking place across development within person-environment interactions, help to explain some of the correlations between early adversity and later life health challenges, as well as why the accumulation of risks can increase the likelihood of more risks.

The prevalence of ACEs was found to be so common, once they were routinely assessed in clinical practice, and their powerful, dose-related relationship to various damaging outcomes was found to be so strong, that one can only wonder why the relationship of life experiences in the developmental years to adult functionality, disease, and life span was not recognized long ago. Probably, there is a taboo to openly talk about childhood sexual abuse and other forms of maltreatment by parents, thus effectively blocking our ability to detect and to fully understand certain difficult and intractable public health problems. Furthermore, there is the potential for a "public health paradox": many health issues are attempted and unconscious personal coping strategies to handle problems the system cannot comfortably detect leading to increased costs for individuals, healthcare and the whole society (Fletcher & Wolfe, 2009; Kendall-Tackett, 2002; Springer et al., 2003; Norman et al., 2012).

A Public-Health policy approach which is only oriented to treating specific health outcomes, or to changing health risk behaviors - that are also coping mechanisms - cannot sustain effective strategies as it focuses on taking away an attempted solution to deal with problems related to major long- term risks without unacknowledging short-term benefits. For example, people often continue to smoke even when public health policies make it complicated and even after the onset of smoking-related symptoms and illness (Edwards et al., 2007). A better knowledge of adverse childhood experiences and mind- body coping processes can inform policies to support families and individual development. For example, the American Academy of Pediatrics (AAP) (2018) released a Technical Report and Policy Statement on Childhood Toxic Stress (AAP, 2012a; 2012b). The documents guide ethical action to address and prevent childhood adversities and includes language about the importance of screening for ACEs and trauma. Furthermore, the social science literature suggests that preventing and treating child abuse and neglect requires comprehensive research, assessment, and treatment involving professionals across practice fields offering early intervention to at- risk families in school, medical, and other program settings.

In line with this view, a more effective policy framework should include a trauma-informed-perspective and the new proposed diagnosis of Developmental Trauma Disorder to strengthen

the strategies to tackle and to address the impact of adverse childhood experiences both in clinical and preventive actions.

2.0 DEVELOPMENTAL TRAUMA DISORDER AND TRAUMA-INFORMED PERSPECTIVE

The formulation of Developmental Trauma Disorder (DTD) integrates the trauma-related psychopathological spectrum in order to collect the consequences of childhood trauma just a few out of the set of PTSD symptoms. DTD symptoms reveal a complex combination which is not fully responding to PTSD diagnosis but already clinically significant and has to be defined to choose relevant treatment and prevention strategies for each individual (van der Kolk, 2014).

Partially informed by ACE science, the underlying principles of Trauma- Informed-Care paradigm attempt to respond to the aforementioned public health paradox (SAMHSA, 2014). Such principles include: realizing that trauma is widespread; recognizing symptoms of trauma; responding without further escalation and re-traumatization. Trauma-informed approach recognizes the need for ACEs and trauma screening and then a more focused follow-up assessment without labeling, or judging, but providing a new perspective to understanding the human experience when impacted by trauma.

Public health action often requires a rapid, yet careful response with the available evidence (PHLS, 2002). In the case of ACEs, the real threat is not taking action, given the known short-term and long-term consequences of childhood trauma. While it is true that research is needed to identify evidence- based interventions to address and prevent ACEs, it may take time to realize. It will be imperative that ACEs science be incorporated into medical and allied health training to better prepare future generations of practitioners. Second, we need to conceptualize universal ACEs screening not as a diagnostic tool, but as a powerful surveillance tool that can transform the healthcare culture to be more trauma-informed. Thus, ACEs data can increase recognition that trauma is widespread and associated with numerous health problems across different clinical settings and patient populations.

Victims of neglect, child abuse, and maltreatment live often on the edge of society and depend on social services for most of their lives. Failures at school and in youth welfare institutions are common. Several studies have addressed the enormous healthcare costs arising from traumatization, as described in the following paragraphs, such as medical treatment costs, early retirement, inability to work, need for social benefits, and even imprisonment. If the consequences of childhood traumatization were better detected and represented in the official diagnostic systems this would assist patients in obtaining compensation and legal support (court, victim aid) and more appropriate treatment.

The conceptualization of Developmental Trauma Disorder attempts to address the point with a specific focus on the mental health consequences and with the goal of providing more possibilities for adequate treatment of childhood trauma. Many abused children do not meet the criteria for a PTSD diagnosis (van der Kolk, 2014); conversely, DTD captures the complex combination of symptoms and traits of child traumatization by adopting a transdiagnostic model. Van der Kolk and colleagues (2009) proposed diagnostic criteria organized into three clusters in addition to the defined symptoms of PTSD: symptoms of emotional and

physiological regulation/dissociation; problems with conduct and attention regulation; difficulties with self-esteem regulation and in managing social connections. Chronic activation of neurobiological systems involved in the regulation of stress and emotion appears to potentiate activation of the relevant neurotransmitters and neuroendocrinological systems. This has also been implicated in severe emotional dysregulation (Finkelhor et al., 2014; Dubowitz et al., 2009). Several studies reported clear differences in the aptitude of children with and without trauma in regulation and recognition of emotion (Meehan et al., 2020; Walden & Smith, 1997; Mavranezouli et al., 2020). Individuals with emotion regulation vulnerabilities react faster and more fiercely to emotional stimuli and require more time to calm down after an emotional reaction. This was particularly evident in studies with adult borderline patients (McLaughlin et al., 2020; Schore, 2003; Purgato et al., 2018). Moreover, negative emotional reactions in everyday life seem to be more easily triggered in those patients (El-Khodary & Samara, 2020; Ebner- Priemer et al., 2008): see table 1 below for the DTD diagnostic criteria (Spinazzola, van der Kolk & Ford, 2021).

Table 1. Proposed diagnostic criteria for DTD

Criteria	Subcriteria
Criterion A: lifetime contemporaneous exposures to both types of developmental trauma	A1: traumatic interpersonal victimization A2: traumatic disruption in attachment bonding with primary caregiver(s)
Criterion B: current emotion or somatic dysregulation (4 items; 3 required for DTD)	B1: emotion dysregulation B2: somatic dysregulation B3: impaired access to emotion and somatic feelings B4: impaired verbal mediation of emotion or somatic feelings
Criterion C: Current attentional or behavioural dysregulation (5 items; 2 required for DTD)	C1: attention bias toward or away from threat C2: impaired self-protection C3: maladaptive self-soothing C4: non-suicidal self-injury C5: impaired ability to initiate or sustain goal- directed behaviour
Criterion D: current relational – or self-dysregulation (6 items; 2 required for DTD)	D1: self-loathing or self-viewed as irreparably damaged and defective D2: attachment insecurity and disorganisation D3. betrayal-based relational schemas D4: reactive verbal or physical aggression D5: impaired psychological boundaries D6: impaired interpersonal empathy

Source: Authors from Spinazzola et al. (2021).

Symptoms clusters extend the symptoms of PTSD (Ford et al., 2018) and follow upon the structure of CPTSD diagnostic criteria in the 11th revision of the International Classification of Diseases (WHO, 2019; Haselgruber et al., 2020). However, DTD – compared to CPTSD diagnosis -embraces the developmental psychology of childhood and adolescence (e.g., assessing self-other boundary confusion and reactive aggression, negative self- appraisals and relational detachment). Although DTD was proposed as a diagnosis in the fifth edition of the

Diagnostic and Statistical Manual of Mental Disorders DSM-5 (APA, 2013), it was rejected due to a lack of empirical evidence at that time. However, evidence of the construct validity and its utility for differentiating clinical features from PTSD were supported by emerging studies (Spinazzola, van der Kolk & Ford, 2018).

First of all, there is substantial evidence indicates that traumatized children are at risk for developing all types of biopsychosocial dysregulations – as outlined in DTD - in addition to, and in the absence of, PTSD (D'Andrea et al., 2012) and that the polysymptomatic outlook of these children cannot be accounted for fully by PTSD or other psychiatric disorders (Ford, et al., 2010a; Ford et al., 2010b) in addition to the clinical utility of the proposed diagnosis (First, 2005). In a study aiming to test face validity of DTD by surveying clinicians, developmental trauma disorder symptoms rated as distinguishable from PTSD were: impaired positive and negative affect, affect tolerance and expression, emotion regulation, and bodily functions and pain). Other developmental trauma disorder symptoms distinguishable from PTSD were: risky behaviour, self-harm, self-soothing, impaired physical and emotional boundaries and expectancy of irresolvable loss. Generally, existing evidence-based treatments were rated as generally effective for only 39% (9 of 23) of the developmental trauma disorder symptoms (Ford et al., 2013). Although clinician ratings are not sufficient to validate a diagnosis, they are a guide for indicators mostly used in practice (Cloitre et al., 2011); this study concluded that clinicians considered Developmental trauma disorder as distinguishable from PTSD criterion A. In a recent literature review, 21 articles reported the evaluation of DTD symptom criteria using objective, empirical methods (e.g., factor analysis, comorbidity with other diagnostic constructs, associations with trauma exposure type, clinician ratings of utility). Data supported the DTD construct and its clinical utility with the need of further replication in larger samples (Morelli & Villodas, 2022). As for the existing investigations, two trials supported the validity of DTD as a unifying diagnosis for traumatized children highlighting the value of putting together a wide spectrum of post-traumatic outcomes and the hope for more effective treatments if this diagnosis was considered (van der Kolk, Ford & Spinazzola, 2019).

The existence of specific and validated DTD diagnostic criteria may sensitize professionals and the general public to the drastic consequences of child abuse, neglect, and traumatization. Furthermore, children are far more likely to exhibit resilience to childhood trauma when child-serving programs, institutions, and service systems understand the impact of childhood trauma, share common ways to talk and think about trauma, and thoroughly integrate effective practices and policies to address it: an approach often, as explained above, referred to as trauma-informed care (TIC).

3.0 THE ECONOMIC IMPACT OF ADVERSE CHILDHOOD EXPERIENCES

The impact of ACEs and Toxic Stress has been evaluated as an economic issue for social, mental and health policies. Consequences create significant costs for systems, individuals and families: healthcare system has to prevent or mitigate the impact on society as individuals lose productive and healthy years of life. ACEs associated health conditions can be represented by cancer, diabetes, cardiovascular and/or respiratory diseases, harmful alcohol and/or drug use/abuse. Mental health ones can include mood disorder, PTSD, cPTSD and psychopathological diseases (i.e. ADHD, behavioural disorders, personality disorders). Social

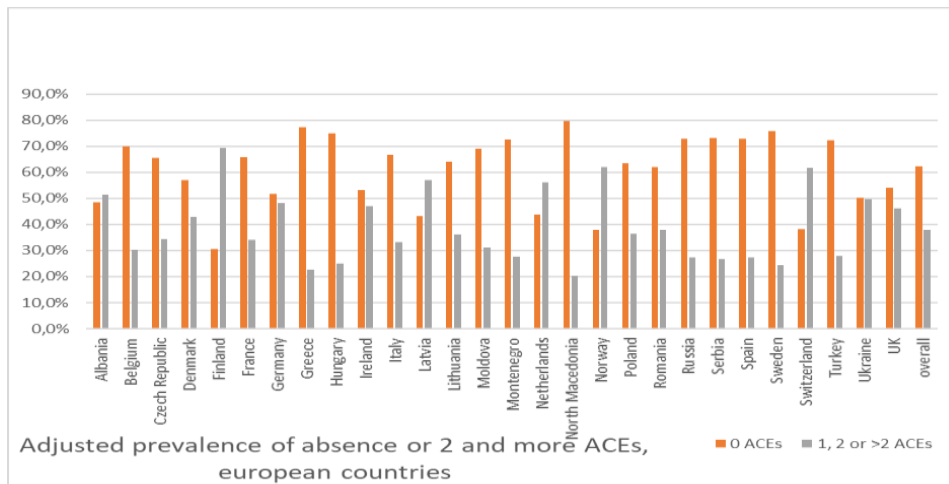
impact of abuse and neglect has to be searched out of child welfare, criminal justice, education services and life-span individual social care.

Until recently, little data was available on the economic dimension of ACE-induced costs and the relevant health and social policy issues that are closely related to ACE. The costs to society on this front (specifically trauma follow-up costs) are almost unknown. However, recent studies (Hughes et al., 2019; 2021) has estimated the annual economic cost of ACE exposure, relative to 12 between risk factors and causes of ill health (i.e. harmful alcohol abuse, smoking, illicit drug use, high BMI (body-mass index); the considered causes of ill health are: depression, anxiety, interpersonal violence, cancer, type 2 diabetes, cardiovascular disease, stroke, respiratory disease), with exorbitant figures for Europe and North America: US\$581 billion in the former case (2.7% of GDP) and US\$748 billion in the latter case (3.5% of GDP). However, there is a need, despite this large cost dimension, for more detailed data at the national level in order to implement the development of appropriate policies to prevent the phenomenon.

Although much of the research focuses on the North American area (incidence-based studies) (Fang et al., 2012; Peterson et al., 2018), there are studies from an increasing number of countries, including several European countries (Sethi et al., 2013; Habetha et al., 2012; Lloyd-Williams, Spencer & Eduards, 2022), Australia (McCarthy et al., 2016) and Asia (Fang et al., 2015). The very recent work by Hughes and colleagues (2021) offers an estimate of the annual economic cost attributable to ACE for as many as 28 European countries. It is not the intention of this work to go into the merits of the methodology adopted, but to give an assessment of the results obtained. However, some essential methodological features should be recalled: the authors use country-level population attributable fractions (so called PAFs) for 12 health outcomes attributable to ACEs. They obtain this result from pooled estimates of the possible association between ACEs and health status, and from estimates of the prevalence of ACEs within each single country. Then, for each country, PAFs are applied to the total economic cost for each health outcome, and costs for all outcomes associated with ACEs are summed.

The selection of studies from which the prevalence estimates were extracted was carried out according to specific criteria by the authors (Hughes et al., 2021). What emerges from the 32 selected studies is an adjusted prevalence value of 37.8%, referring jointly to one and two or more ACEs (Figure 1). There are 28 European countries considered and adjusted ACEs were calculated from available study data.

Figure 1. Adjusted prevalence Adverse Childhood Experiences



Source: Authors from Hughes et al. (2021).

The reported values have an informative function and cannot be assumed to be completely representative of the country. Therefore, a certain amount of care is also required when comparing countries, both because of differences in the methodology used and the characteristics of the sample taken. At the individual country level, the highest value is found in Finland with 69.4%, and the lowest in North Macedonia with 20.4%. When only the adjusted prevalence of two or more ACEs is taken into account, the highest value is again shown by Finland, 38.8%, and the lowest by Greece, 4.2%. Another relevant piece of information from the above-mentioned study concerns the largest shares of PAFs due to ACEs in relation to causes of death: in first place there is interpersonal violence, followed by harmful use of alcohol, illicit drug use and anxiety. A low impact is exerted by BMI (body-mass index), for all countries.

The following Table 2 presents ACE-attributable DALYs (Disability Adjusted Life Years: years lost due to illness, disability or early death), the costs associated with all outcomes for each country, together with the level of GDP per capita. The equivalent proportion of GDP is then presented as following.

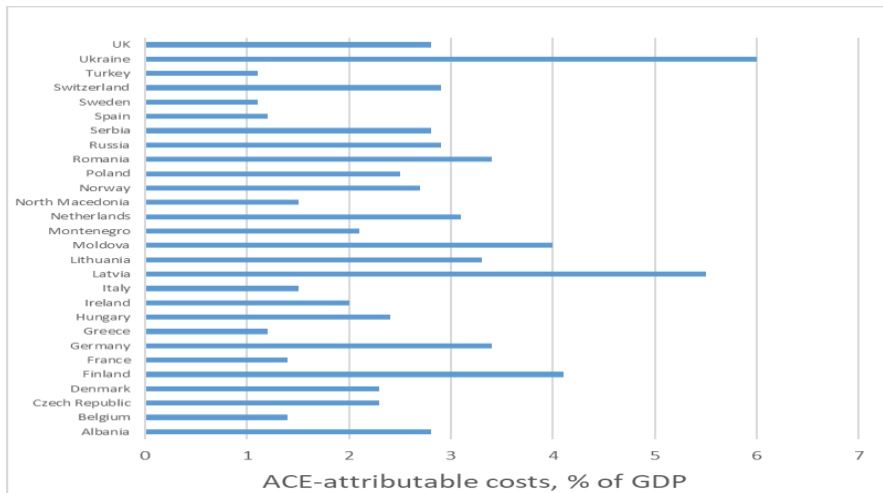
Table 2. ACE-related DALYs and costs (European countries)

Country	GDP per capita, US\$ 2019	ACE-attributable DALYs (thousands)	ACE-attributable costs (US\$ billions)
Albania	5352.90	79.7	0.4
Belgium	46116.7	162.6	7.5
Czech Republic	23101.8	246.5	5.7
Denmark	59822.1	136.0	8.1
Finland	48685.9	225.2	11.0
France	40493.9	939.4	38.0
Germany	46258.9	2796.6	129.4
Greece	19582.5	123.8	2.4
Hungary	16475.7	239.1	3.9
Ireland	78661.0	97.8	7.7
Italy	33189.6	916.2	30.4
Latvia	17836.4	105.0	1.9
Lithuania	19455.5	93.0	1.8
Moldova	4498.5	107.6	0.5
Montenegro	8832.0	13.0	0.1
Netherlands	52447.8	536.2	28.1
North Macedonia	6093.1	31.6	0.2
Norway	75419.6	145.7	11.0
Poland	15595.2	941.5	14.7
Romania	12919.5	660.5	8.5
Russia	11585.0	4312.4	50.0
Serbia	7402.4	191.9	1.4
Spain	29613.7	565.9	16.8
Sweden	51610.1	117.9	56.1
Switzerland	81993.7	250.5	20.5
Turkey	9042.5	926.5	8.4
Ukraine	3659.0	2538.9	9.3
UK	42300.3	1858.7	78.6

Source: Authors from Hughes et al. (2021).

The range of variation in the number of DALYs attributable to ACEs is quite wide, ranging from low numbers such as those of Montenegro and North Macedonia (13.0 and 31.6 respectively) to much higher values such as those of Germany and Russia (2796.6 and 4312.4). The ACE-attributable costs range from 0.2 US\$ billion in Montenegro to 129.4 in Germany. Obviously, this evidence cannot be considered directly comparable, as the studies and the samples from which they are derived are quite differentiated in methodologies. However, the analysis of the share absorbed by these costs in terms of GDP is extremely interesting (Figure 2): Ukraine, Latvia and Finland show the highest percentages, with values of 6%, 5.5% and 4.1%, Sweden and Turkey the lowest value (1.1%).

Figure 2. Adverse Childhood Experiences attributable costs



Source: Hughes et al. (2021).

The median proportion among the considered countries is 2.6% and this is also confirmed by other data from another study (Bellis et al., 2019), as shown in Table 3, where costs are disaggregated by risk factors and causes of ill health.

The highest rates are for illicit drug use (North America, with 0,80%) smoking and alcohol abuse, in Europe and North America (0.76% in both areas for the former risk factor, 0.65% and 0.34% for the latter). Cardiovascular disease and cancer are the ill health items with the highest costs, again attributable to ACEs, with values around 0.9% and 0.5% for both areas.

Table 3. Attributable costs for Risk factors (a) / Causes of ill health (b) / comparison (c): Europe and North America

	Risk factors (a)			
	harmful alcohol	illicit drug	Smoking	Obesity
Europe	0.65	0.21	0.76	0.18
North America	0.34	0.80	0.76	0.31

	Causes of ill health (b)					
	anxiety	depression	cancer	cardiovascular disease	diabetes	respiratory disease
Europe	0.10	0.13	0.54	0.85	0.07	0.21
North America	0.17	0.22	0.45	0.92	0.09	0.47

	Comparison on total score (c)		
	Risk factors	Causes of ill health	Total
Europe	1.80	1.90	3.70
North America	2.00	2.53	4.53

Source: Authors from Bellis et al. (2019).

The costs outlined appear to be enormous, and underline the importance of investing in a childhood that is safe and has the care and attention it needs. In general, adults exposed to ACEs are more likely to engage in behaviors that are risky to their health and develop physical and mental illnesses that reduce years of healthy working life. The highest proportions in terms of PAFs associated with ACEs are recorded for violence, alcohol abuse, illicit drug use and mental illness (anxiety and depression). In addition to representing a cost to individuals and society, these outcomes also represent ACEs for the offspring of adults, so one can speak of intergenerational effects of ACEs (Fang et al., 2015).

The values reported in terms of cost as a percentage of GDP may plausibly be an underestimate of the true value, because in addition to the impact on health conditions, there are many other costs at the societal level, such as low educational attainment, unemployment, crime and other states of social deprivation. The damage is manifested not only in adulthood, but from the earliest stages of life, as children show reduced social and cognitive development, poor school engagement, increased health risks and juvenile crime. Therefore, the health, as well as social and economic benefits of concrete actions to prevent and contain ACEs would materialize much earlier than adult health status (generally considered in studies).

With the advent of the pandemic, the conditions predisposing the occurrence of ACEs were exacerbated, and all resilience was lost as children were isolated in traumatic family contexts and all forms of support were cut off. Moreover, the pandemic diverted all resources used in services and activities aimed at preventing ACEs, such as parenting and socio-economic development programs, and youth support services. It is presumable that individuals with ACEs were particularly affected by the pandemic due to their more risky and critical health conditions, which made them vulnerable to severe COVID-19 disease effects, (of a respiratory nature), and other adverse effects associated with the pandemic, such as poor mental health.

Although it is difficult to quantify the differential impact that the pandemic had on people affected and not affected by ACEs, preventive actions in this sense could certainly reduce harmful health behaviors, limit susceptibility to new infections and thus reduce health risks in the event of future pandemics.

Beyond the limitations that the various studies in terms of the definition of outcome measurements, duration and severity of exposure to ACEs, the possible differences between countries in the association between outcomes and ACEs, the estimates should be interpreted as the best obtainable given the available data. In addition, the considered studies propose a methodology that could be replicated across countries by enhancing the collection of ACE data.

The shared need, for effective preventive actions, is to find homogeneous approach to both the measurement of ACEs and the methodology of research and compute. At the European level, ACE studies involving students in 13 countries have been carried out (Hughes et al., 2019), while ACE tools have often been included in routine population health surveys, as in the case of the USA. Critical issues include the use of different and smaller range of ACEs events and a basic approach to scoring. Certainly, the availability and comparability of evidence and adverse effects related to ACEs could play an important role in gaining political consensus to invest seriously in prevention. Population studies should cover ACEs events and therefore converge on how measure them and who can be involved by those ACEs actions.

4.0 DISCUSSION AND RECOMMENDATIONS: CARE TOWARDS TRAUMA-INFORMED POLICIES

The long-lasting consequences of childhood trauma and toxic stress for individuals and society demonstrate an impact on health and on economics. Data are collected throw-out countries not in a homogeneous way so leading research to different health policies and preventive strategies. Ethically speaking, we really cannot afford decades waiting for the needed actions of addressing and preventing ACEs. Policy context of ACEs recommend a collection and use of data in a non-diagnostic, multi-generational, trauma- informed, and including assessment of patient resiliency.

The ACE phenomenon is associated with very high health and economic costs, both nationally and internationally. Estimates from various studies indicate a percentage, in terms of GDP, of about 2.6% at the European level and 4.5% for North America. This is, of course, an underestimate, and the more data are available and comparable, the more accurate the value may be. In fact, the costs of ACEs go well beyond ill health, having a strong social and educational impact. The other important aspect is the influence these studies may have on decision-making processes. Even if the estimates presented reflect the health costs associated with ACEs (and presumably health costs are only a part), there would still be an enormous economic burden (even half of the costs associated with ACEs would amount to 0.6% of the GDP of the 28 European countries). Moreover, the total cost of ACEs includes other costs such as unemployment, youth delinquency and social deprivation. As stated in other studies (Bellis et al., 2019; Narayan, Lieberman & Masten, 2021), an early identification of the problem can bring huge savings for the health system, and only a precocious intervention can stop the escalation of all the direct and indirect costs correlated to ACEs.

The COVID-19 pandemic has further exacerbated inequalities, increased risk factors and diverted important resources away from prevention and containment. This can represent a multifactor risk on contemporary outgoing youth-COVID-generation as it seems that one third of US adolescents experienced almost a new ACEs between COVID waves (Hertz et al., 2023). In particular, American Academy of Pediatrics noted that early adolescents had higher number of ACEs between waves: 1 out of 6 experienced 1 additional ACE; 1 out of 20, 2 additional ACEs; 1 out of 50, 3 or more additional ACEs. Additionally, young adults had an increase of 30- 40% of symptoms relative to ACE's including rate of suicides and overdose deaths. This phenomenon is called "twindemic" for the impact on exacerbation of symptoms by ACEs epidemic during COVID-19 without having economic funds for mental and social care (Cahan, 2023). It has absorbed excessive resources, yet policymakers cannot reduce spending on ACEs prevention programs. Governments should strive for greater equity in health, and create a resilient population for future pandemics. Many studies show that when society does not care about safe child development, it then incurs very high costs, both individually and in the community. To support this endeavor, a service system transformation, community partnerships are warranted.

The service system can be transformed to support appropriate ACE responses with the recognition of the existence of a Developmental Trauma Disorder for better pathway to interrupt intergenerational patterns and promote effective interventions and treatments. This is in line with the increased recognition of the need for trauma-informed service (Rombaldoni,

2017; Ardino & Rombaldoni, 2017) with prevention-based programming offered through a variety of means: these are approaches in support of national health policy. For example, bonding to a healthy school environment is connected to reduced health risk behaviors as well as stronger social and academic skills (Harris & Fallot, 2001). In these ways, service systems could ideally facilitate community development and offer complementary prevention and intervention services within the local context. Raising awareness and increasing societal support are complementary to clinical interventions designed to support traumatized children.

If effective trauma-informed policies and DTD-based diagnoses are associated with trauma prevention and overall health, this suggests that services may lead to societal cost-savings (Finkelstein & Markoff, 2005; Catalano et al., 2004). However, just as there is a need for explicitly trauma-informed prevention and intervention research, there is also a need for empirical cost-effectiveness research on these activities. The cost savings associated with human capital development (Larkin & Records, 2007) highlights that effective health and social care practices are a worthwhile investment. The concept of human capital helps to explain the profitability of protecting children from adverse experiences and fostering development within the context of healthy environments and supportive relationships. A number of studies have already identified noteworthy returns from early intervention programs for disadvantaged children (Larkin & Records, 2004; Larkin, Felitti & Anda, 2014). For example, one study by the 2000 Nobelist in Economics, James Heckman, found that by the time a child was 27 years old, there was a return of \$5.70 on each dollar spent in childhood, with further returns over time. In addition to these individual returns, society is saved the expense of programs created to intervene with costly effects of adverse childhood experiences, and other members of society gain from more constructive social relations.

Individuals, families, schools, and all the other systems contribute to human capital development (Heckman, 2003; Karoly, Kilburb & Cannon, 2005). Developmental Trauma Disorder within a trauma-informed approach connects activities to national health policy through the evident role of a public health vision of trauma in health promotion and disease prevention. Integrating services and develop multidisciplinary DTD teams to streamline and increase service access (especially among disadvantaged communities) and evaluating the policies and programs coordinating these activities should enable clinical intervention, community development, prevention, and services research to protect children from trauma and to heal their wounds (Ford et al., 2022). Partner with economists to analyze cost-savings associated with trauma-informed prevention and intervention could also increase the possibilities of raising awareness of the generally hidden problem of adverse childhood experiences and their costs.

There is a need for implementing trauma-informed-care intervention and prevention research that attends to mind-body processes contributing to health, to developmental trauma consequences. Investments in effective child trauma prevention and intervention are likely to save notable human and economic costs, even more in post-pandemic to prevent diseases in youth generations and promote health care investing on present for future.

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