



Research Article

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Violent Youth Mortality (15-24) in 21st Century- Suicides, Assaults, Transport Deaths in USA and other Western Countries.

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Abstract

Introduction: Adolescence is characterized by impetuosity, which can lead to fatalities- suicide, assault, and transport deaths, the key being access to lethal means. This population- based study examines violent deaths in the 21st Century by comparing America with nineteen Other Western Countries' (OWC).

Method: All mortality data is drawn from WHO latest report, comparing bases- line years 2000-02 to index years 2013-15 for Youth (15-24years) of both sexes. Changes in Youth rates per million (pm) of these three types of violent deaths are calculated and for Total mortality the Age-Standardized-Deaths-Rates (ASDR). Chi square test are used to compare each OWC with the USA outcomes. Based upon the world- small- arms survey national gun ownership per thousand persons (ptp) are examined and rank order correlations used to determine any possible association.

Results: Over the period USA Suicide rates increased for Youth by 16%, the average in OWC was a 22% fall. American Youth Assault rate was almost double the Total ASDR (99pm to 55pm respectively) and Youth and ASDR rates were more than eight times the OWC average. USA Youth Transport deaths at 158pm were double the average of other countries. USA gun ownership far exceeded OWC, correlating with Youth suicide.

Conclusions: USA Youth Violent death rates are worse compared with most OWCs, especially increased suicide, which correlated with gun ownership. Youth Assaults and Suicide this century numbered 142,784 or 8,924pa. There is a specific need for specific public health focus on American Youth violent deaths which are even higher than recent US military losses.

Keywords: Youth, Suicide, Violent Deaths America, International Text [2496], Owcs, Juliet Kill, Disproportionately, Juxtaposition, Null-Hypothesis, Grieving Parents, WHO

Introduction

Of the many facets of adolescence is the intensity of the present-when NOW feels like forever. This is wonderfully portrayed in Romeo and Juliet, where youth's bravado with play-full use of lethal weapons unintentionally ends in a fatal duel and at the crisis point of seemingly unbearable anguish, Romeo and Juliet kill themselves. In modern times the impetuosity of youth is reflected in the high motor insurance premiums of Youth (15-24) as they are disproportionately over-represented in motor accidents, be it the bravado of the cyclist or the less experienced driver, almost

attracted by the risk [1-3]. This population- based comparative study explores the outcomes of these risks. We build upon an earlier study that examined the extent of gun violence in the USA, with a special focus upon Youths aged 15-24 years old [4], as it is known this is an age of peak violence both as victims and perpetrators [5-6]. Moreover, it is known firearms are a major method of completed suicide in America even including under 18-year-olds [7-12]. The juxtaposition of transport deaths, seen here as a form of violent death may be challenged as such deaths were unintentional, yet it



could be argued that many Youth suicides and assault deaths were not primarily intentional but a result of a situation that had got out of control.

Furthermore, due to the relatively high rates of transport casualties in every Western country, this form of 'violent' category should not be ignored. One feature often ignored is that Youth (15-24) deaths, be they suicides, homicides or transport deaths all have a sequel, namely life-long grieving parents. This is the nightmare of every parent- that their child should predecease them, more horrendous when their child dies by their own hand [13-15], especially when the child used the parent's own weapons [12]. Given the above, it is imperative that we need to confront the extent to which Youth are vulnerable to violent death and for society to respond with adequate public health measures. This is an annual toll that seems to go on virtually unremarked by either media or policy makers. This population-based study examines the three violent Youth death categories in the USA and nineteen Other Western Countries (OWC). It provides an up-to-date analysis of the situation during the 21st century 2000-2015 to explore whether Youth (15-24) violent deaths in the USA are markedly different from Other Western Countries (OWC). There is one working null-hypothesis. That there will be no significant differences in the patterns of suicide, assault, and transport deaths since the beginning of the century in America compared with the OWC.

Methodology

A key limitation to a comparative international study of adolescence, is that adolescence is usually defined as those aged between 13-18, however scientifically informed definitions based on neurocognitive, social, and emotional factors suggest a definitional period up to mid-20s is more appropriate. [16-17]. Moreover, international WHO data is only available in specific decade groupings hence we transpose adolescence into mortality of Youths aged 15-24 for this international analysis. All mortality data is drawn from WHO [6]. The three civil forms of violent death consist of suicide defined in the WHO category 'Intentional Self-Harm', coded X60-84 Y870 [928]; homicide is Assault coded X81-Y09, Y871 and Transport deaths coded VB01-V99. Transport deaths include every form of transport but mainly road accidents. Youth (15-24years) death rates are calculated from the numbers of deaths amongst those aged 15-24years, divided by that country's Youth (15-24) population from which a rate per million can be calculated. As a comparator, we also analyze WHO Age-Standardized-Deathrates (ASDR) per million (pm), which is the total death rate that controls for age, gender and population thus allowing us to compare countries of differing population sizes. The study examines 3year average baseline rates; 2000-02 to be contrasted against the 3year index years 2013-15. Most countries index years are 2013-15 but a few have earlier index years e.g., Canada and New Zealand 2011-13. Each country's index year is

given in the tables. However, Austria, the Netherlands and Sweden had data up to 2016 but for comparative consistency the index years of 2013-15 were used.

To compare differences between the mortalities of each country and the USA, chi-square tests are calculated using SPSS to determine any statistical difference, the probability level of <0.05 being taken as significant. As Assault rates are relatively very low, we calculate a ratio of each OWC to the USA Assault rates. A self-evident key feature in Youth risk of violent outcomes in conflict and psycho-social stress situations, is the availability and use of lethal methods, which can end fatally. The presence of firearms is highly lethal whenever or wherever used and known to be associated with young adult suicides in the USA, [7-11]. Moreover, this link between suicide and easy access of guns has long been known to be associated with gun bearing occupations in other Western countries [18-20] made especially dangerous by the impetuosity of Youth. Hence, we juxtapose gun ownership in the each of the countries, based upon the world small arms survey of the number of firearms per thousand persons (ptp) [21]. Spearman rank order correlations (Rho) are used to examine all twenty nations' mortalities, against each other, between Youth and Age-Standardized-Deathrates (ASDR), and the three mortalities and gun ownership. In mortality rates are statistics, which can appear detached from a practice perspective. To exemplify how actual numbers of deaths provide a different perspective, we report the numbers of deaths in the USA for 2015 and all in this century of the three violent categories.

Results

Suicides

Youths: Table 1 presents the changed pattern of Youth (15-24) suicides in the 21st Century.

Youth rates were highest in New Zealand at 204per million [pm], followed by Finland 130pm, and Ireland at 125pm, the USA was fifth highest at 116pm. Down to lows of 26pm in Greece, 27pm Portugal and 34pm in Italy. The overall Western average, minus the USA, fell from 99pm to 81pm a fall equivalent of 18% over the period, whilst Youth suicides in the USA increased from 100pm to 116pm - an increase of 16% over the period. Youth suicide rates also rose in Greece, the Netherlands and Sweden, increasing substantially (>10%). Comparing the average OWC suicide rate with the USA yielded an odds ratio of 1:1.43. Chi square results showed that rates in Austria, Belgium, Denmark, Ireland, Finland, Norway, Switzerland fell significantly more than the USA (<0.05).

Total Suicides ASDR

Total suicides, Age-Standardized-Deathrates were highest in Belgium 135pm, Finland 129pm and the USA120pm. Greece, Italy Portugal and Spain were lowest ranging from 39pm to 60pm. The OWC average was 92pm, which produced a OWC to USA ratio of

1:1.30. There was a positive correlation between all twenty country ranks between Youth and ASDR rates ($\rho=+0.7034$ $p<0.001$) (Table 1).

Assault Deaths

Youths: The highest Youth homicide deaths were in the USA at 99pm, followed by Canada

21pm and Sweden 18pm, the lowest being the UK at 2pm, Switzerland 3pm and Norway 4pm, indeed fifteen countries had rates of less than 10pm. It is noteworthy that every country rate fell over the period except in Sweden and Greece. American Youth assault deaths at 99pm, were a substantial fall of 23% over

the period. However, with such small actual rates, percentages exaggerate relatively small absolute differences and have a disproportionately high impact on the ratios. Youth average OWC assault deaths were 8pm, which produces an OWC to America ratio of 1: 13.4.

Total Assaults

The highest ASDR assaults rates were the USA at 55pm, Finland 14pm, and Canada and New Zealand at 13pm, whilst the UK 2pm and Switzerland 3pm were lowest, with thirteen countries having rates of less than 10pm. The overall OWC average of 7pm gives an OWC to USA ratio of 1:7.86. Total ASDR and Youth assault rates in all countries strongly correlated ($\rho=0.7027$ $p<0.001$) (Table 2).

Table 1: Suicides Youth (15-24) & Total ASDR rates per million [pm] 2000-2015, % of Change. Youth Chi Square OWC v USA, Ranked by Highest Youth Rates

S. No	Countries & Years 2000-02 v 2013-15	Suicide ASDR	%	Suicide Youth-	%Change	Chi Sq. P value																																																																																																																																		
1	New Zealand 2011-13	119	-5%	187	9%	5.747 <0.02																																																																																																																																		
		113		204			2	Finland 2013-15	198	-35%	186	-30%	24.13 <0.0001	129	130	3	Ireland 2012-14	116	-10%	163	-23%	18.33 <0.001	104	125	4	Australia 2013-15	113	-3%	125	-4%	8.267 <0.004	110	120	5	USA 2013-15	98	23%	100	16%	n/a	121	116	6	Canada 2011-13	106	-9%	121	-13%	11.32 <0.001	96	105	7	Norway 2013-15	112	-13%	141	-32%	22.3 <0.0001	97	96	8	Sweden 2013-15	108	0.94	86	9%	3.912 <0.05	102	94	9	Belgium 2013-15	174	-22%	123	-30%	19.63 <0.001	136	86	10	Austria 2013-15	153	-32%	128	-33%	22.8 <0.0001	104	84	11	France 2012-14	147	-24%	76	5%	4.333 <0.04	112	80	12	Switzerland 2013-15	152	-37%	126	-40%	26.9 <0.000	96	75	13	Germany 2013-15	104	-17%	78	-24%	12.6 <0.001	86	59	14	Netherlands 2013-15	80	11%	55	5%	3.457 <0.07t	89	58	15	UK 2013-15	65	2%	61	-11%	7.073 <0.008	66	54	16	Denmark 2013-15	103	-20%
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17	Spain 2013-15	62	-3%	44	-11%	5.592 <0.02
		60		39		
18	Italy 2013-15	53	-6%	41	-17%	6.397 <0.02
		50		34		
19	Portugal 2012-14	60	18%	33	-15%	5.081 <0.03
		71		28		
20	Greece 2013-15	26	50%	25	4%	2.036 <0.2
		39		26		
Current Average (-US)		92		81		

Significant in BOLD

Youth & ASDR $Rho=+0.8604$ $p<0.001$

Table 2: Assaults Youth (15-24) & Total ASDR rates per million [pm] 2000-2015, % of Change. Ratio of Youth OWC v USA Ranked by Highest Youth Rates

S. No	Countries & Years 2000-02 v2013-15	Assault ASDR	% Change	Assault Youth	% Change	Youth OWC: USA Ratio
1	USA 2013-15	66	-17%	121	-12%	1
		55		107		
2	Canada 2011-13	15	-7%	22	-5%	5.09
		14		21		
3	Sweden 2013-15	10	-10%	15	40	5.09
		9		21		
4	New Zealand 2011-13	16	-9%	19	-16%	6.68
		13		16		
5	Australia 2013-15	16	-31%	21	-48%	9.73
		11		11		
6	Portugal 2012-14	12	-25%	12	-25%	11.9
		9		9		
7	Denmark 2013-15	10	-40%	10	-20%	13.4
		6		8		
8	Germany 2013-15	7	-29%	8	-12%	15.3
		5		7		
9	Finland 2013-15	26	-46%	38	-84%	17.8
		14		6		
10	Greece 2013-15	8	13%	6	0	17.8
		9		6		
11	Ireland 2012-14	10	-30%	16	-62%	17.8
		7		6		
12	Italy 2013-15	9	-33%	12	-50%	17.8
		6		6		
13	Netherlands 2013-15	12	-50%	19	-68%	17.8
		6		6		
14	Spain 2013-15	9	-33%	7	-29%	21.4
		6		5		
15	France 2012-14	8	-37%	7	-43%	26.7
		5		4		
16	Belgium 2013-15	18	-44%	20	-70	26.7
		10		4		

17	Norway 2013-15	9	-33%	17	-82%	35.7
		6		3		
18	Switzerland 2013-15	9	-44%	12	-75%	35.7
		5		3		
19	UK 2013-15	6	-67%	16	-87%	53.5
		2smug		2		
20	Austria 2013-15	9	-56%	7	-86%	107
		4		1		
Current Average (-US)		7		8		15.3

Statistically Significant in BOLD
 Youth & ASDR Rho=+0.7027 p<0.001

Transport Deaths

Youths: The highest Youth transport rates were in Greece at 174pm followed by the USA at

163pm and New Zealand 126pm, the lowest being Sweden 35pm, Spain 41pm and the Netherlands 42pm. The OWC average was 72pm, less than half the USA rate, a ratio of 1:2.26. Youth transport deaths rates fell substantially in every country, however the magnitude of reduction varied between 42% in Canada and the USA to 82% Spain. Chi square tests showed that fourteen countries had statically greater reductions than the USA over the period.

Total Transport

ASDR transport death rates were highest in the USA at 110pm, then Greece 96pm and New Zealand 70pm, the lows being the UK at 26pm, Sweden 27pm and the Netherlands 28pm. Average OWC total transport deaths at 48pm yielding an OWC to USA ratio of 1:2.29. It should be noted that every country’s Youth rates were higher than ASDR and in eighteen countries were 30% higher. Seventeen countries had significantly greater reduction over the period than the USA. Total and Youth transport deaths of all countries positively correlated (Rho=+0.9280) (Table 3).

Table 3: Transport Youth (15-24) & n Total ASDR Death rates per million [pm] 2000-2015 % of Change. Chi Square Youth OWC v USA. Ranked by Highest Youth Rates

S. No	Countries & Years 2000-02 v 2013-15	Trans ASDR	Ratio Change	Transport Youth	Ratio Change	Youth Chi Sq P value
1	Greece 2013-15	166	-60%	298	-42%	0<1.0
		96		174		
2	USA 2013-15	159	-31%	280	-42%	n/a
		110		163		
3	New Zealand 2011-13	140	-45%	230	-43%	0.165<0.7
		77		126		
4	Canada 2011-13	95	-34%	186	-46%	0.251<0.7
		63		100		
5	Belgium 2013-15	152	-62%	336	-74%	20.4<0.0001
		58		89		
6	Austria 2013-15	109	-59%	244	-66%	10.828<0.001
		45		84		
7	Italy 2013-15	120	-57%	230	-65%	9.646 <0.002
		52		81		
8	France 2012-14	123	-62%	243	-67%	12.96<0.001
		47		79		
9	Australia 2013-15	101	-48%	197	-62%	6.452<0.02
		53		75		
10	Finland 2013-15	96	-52%	103	-28%	13.46<0.001#
		46		74		
11	Portugal 2012-14	163	-63%	215	-67%	11.926<0.001
		60		70		

12	Germany 2013-15	88	-56%	224	-71%	17.31<0.001
		39		64		
13	Denmark 2013-15	86	-63%	188	-61%	14.55<0.001
		32		55		
14	Norway 2013-15	81	-59%	185	-72%	15.75<0.001
		33		52		
15	Ireland 2012-14	101	-65%	231	-80%	33.176<0.0001
		35		46		
16	Spain 2013-15	136	-73%	241	-81%	37.8<0.0001
		37		45		
17	Netherlands 2013-15	64	-55%	146	72%	13.27<0.001
		29		41		
18	UK 2013-15	58	-55%	108	-63%	4.694<0.03
		26		40		
19	Switzerland 2013-15	71	-59%	128	-70%	9.893<0.002
		29		39		
20	Sweden 2013-15	63	-59%	118	-68%	8.062<0.005
		26		38		
Current Average (-USA)		48		72		

Statistically Significant in BOLD. #Poorer Outcome than USA.

Youth & ASDR $Rho=+0.9280$ $p<0.001$

Table 4: Gun-Ownership per 1000 persons (ptp)e 2018 Twenty Western World Countries. OWC: USA ownership ratio Correlating Ranks Suicide & Gun Ownership $Rho=+0.4019$ $p<0.05$

S. No	Country & Rank	Gun-ownership Rank-Rate ptp	Ownership OWC: USA ratio
1	USA	1205	1
2	Canada	347	3.47
3	Finland	324	3.72
4	Austria	300	4.02
5	Norway	288	4.18
6	Switzerland	276	4.37
7	New Zealand	263	4.59
8	Sweden	231	5.22
9	Portugal	213	5.66
10	France	196	6.15
11	Germany	196	6.15
12	Greece	176	6.85
13	Australia	145	8.31
14	Italy	144	8.37
15	Denmark	99	12.2
16	UK	83	14.5
17	Spain	75	16.1
18	Ireland	72	16.7
19	Belgium	61	19.8
20	Netherlands	26	46.3

Correlating Ranks Transport & Gun Ownership $Rho=0.2918$ n.sig

Correlating Ranks Assault & Guns $Rho =+0.2166$ n.sig.

USA Numbers of Deaths

Youths: We transpose USA violent Youth deaths back into actual numbers. In the year 2015

American Youth suicides were 5,491, assaults 4,732 and 7,209 transport deaths, making the overall total for Youth violent deaths 17,432 in that year. Over the century, 2000-2015, Youth Suicides totaled 62,904 or 4,944pa, Assaults were 79,880 at 5,345pa and Transport deaths 150,395, reaching an annual average of 10,026p.a. Overall combined Youth deaths for the three violent categories were 293,178 in sixteen years, averaging 18,324pa over the period.

Total

In 2015 all ages American violent deaths consisted of 44,193 suicides, 39,675 transports deaths and 17,788 homicides totaling 101,656 for the year. During the 21st century there was an all-ages total of 684,257 transport deaths, averaging 42,766p. a; Suicides 585,132 an average of 36,570p. and 261,362 homicide an average of 16,335-a total annual average of 95,671p.a. If suicides and homicides are considered, then annually the combined numbers would have an average of 52,905pa unequivocal violent deaths.

Gun Ownership

Table 4 list gun ownership per thousand persons (ptp), headed by the USA at 1205ptp, followed by Canada 347ptp and Finland 324ptp, the fewest were the Netherlands 26ptp, Belgium 61ptp and Ireland 72ptp an OWC average of 167ptp. The USA ownership rate was more than four-times seventeen other countries and more than ten times in six countries. Amongst all twenty countries reviewed only Youth suicides and gun ownership positively correlated ($Rho=+0.4017$ $p<0.05$) (Table 4).

Discussion

Somewhat reassuringly, in most countries when broadly looking at Youth violent death trends this century, all three categories of violent death showed a general pattern of reduction, except for USA Youth suicides, up 16%. The mean reduction in OWC, minus the USA was for Transport death rates down 63%, Assault death rates fell 41% and Suicides fell on average 18%. Furthermore, when looking at individual countries transport death rates fell in all 20 countries, assault deaths fell in 18 countries and suicides in 16. The big concern is the rise in American Youth suicides. Conversely the decline of Youth transport deaths in during this century can be framed as a public health success story; evidence that governments have responded to the issue of road deaths with policy changes in several areas-e.g., legislation, infrastructure, incentivization of car safety, education, and law enforcement. Whilst the USA transport death rates remained relatively high there were still substantial reductions. Another matter of concern is the assault death rate in the USA, which is ten times higher than the mean assault rate of the

other countries. Although these results are echoed in the American ASDR death rates, we should bear in mind that USA Youth are particularly vulnerable as their assault rates were almost double that of total ASDR.

To what extent is the easy access to firearms linked to USA Youth assault and suicide rates? The answer lies in a recent Global Burden of Disease study, that found the USA, along with three Latin American countries, accounted for more than 50% of world-wide firearms related deaths [22]. Several American studies have shown that at State level there is a strong correlation between access to guns and deaths [9,23-24]. Whilst in most American States eighteen-years old can legally purchase guns [10,25], which reflects the fact that there are more guns in the USA than people-1205per 100,000 persons [21]. Whilst there are some early encouraging signs of a public health approach to access to firearms in a new initiative for proper domestic care of firearms where children are present, in response to the number of accidental gun- deaths at home [26-27]. Nonetheless these results show there are significant differences in the patterns of suicide, assault, and transport deaths, appear to reflect an innate cultural factor as there were strong positive correlations between all mortality categories and Youth and Total deaths rates, and the differences found between the USA and the other nations regarding violent deaths means the null hypothesis is rejected.

It is beyond the scope of this study to explain causal factors that contributed to differences between the USA and all the other countries, though based on our findings we would suggest that there is a specific need for further public health focus on Youth violence in the USA. Averaging over 10,000 p.a indicates more than 5,000 deaths would be from by firearms, higher than recent USA military losses in the Afghan and Iraq wars, surely demands serious public health attention [4]. But there is another 'public health' aspect. Most 15-24-year-old suicide and homicide victims will have parents, who will have experienced the reality of every parent's nightmare-that their child should pre-deceases them, creates a massive mental health burden [10,13-15]. To evoke change in the USA strong fact-based language is needed. As a recent American study calculated, that if the firearm death-toll continues at the present rate, then one in five of today's adolescents by adulthood will have had a family member or close friend who died by gunfire [28]. Until such an on-going toll is more widely realised by the public-that their Youths are dying annually to virtually match the annual Vietnam war American death-toll, then there will be little political will to stem the tide of these young lives lost [29-31].

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