A Review of the Costs of Assault, Homicide, Mass Murder and Pedophilia with Implications for the Insurance Industry and the U.S. Roman Catholic Church: A Rationale for Using Computer Tests and Machine Learning Equations

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Abstract

20 May 2021 U.S. dollar cost for assault = $33,773.52; homicide, $3,834,988.08, domestic terror, mass murder, spree-shooting, 3 dead, $11,504,964.24, pedophilia, $139,430.28. Over 85 years, domestic-terror, mass-murder, spree-shooter assaults cost = 1 to 5,000. $33,773.52 x 5,000 = $168,867,600; dead victims = from 1 to 1,000. $3,834,988.08 x 1,000 = $3,834,988,080. 1936-2021 U.S. insurance industry mass murder costs = [$2,416,042,490 (630 @ $3,834,988.08) + $6,327,730,332 (1,650 @ $3,834,988.08) + $105,474,702.96 (3,123 @ $33,773.52) = $8,849,247,525.36] + [insurance, tax-increases $11,504,021,782.97 ($8,849,247,525.36 x 1.3] =$20,353,269,317.93. Projecting 2021 to 2105 insurance industry no policy change (i.e., computer tests, machine learning equations), $40,706,538,616.66, 3,330 deaths, 6,246 injuries, 388 suicides. U.S. Roman Catholic Church pedophilia costs, 1986-2011, $2,486,898,000, payouts + lost-donations [($2,486,898,000.00 x 1.3) = $3,232,967,400 = $5,719,865,400 + 5,679 x 5 = 28,395 victims]. Projecting 2017 U.S. Church (2012-2037, 2038-2056, 2057-2082, 2083-2107), $5,719,865,400 x 5 = $28,599,327,000, 5,679 x 5 = 28,395 victims.

Keywords: crime-cost, homicide, mass-murder, pedophilia, insurance-industry, rising-premiums, increased-taxes, U.S.Catholic-Church-payouts, lost-donations, predictors-mass-murder

Introduction

Over 95 years, there are 212 studies of 320,051 persons showing a consistent, objective, reliable, sensitive, specific, and valid "7-point violence profile" consisting of eight measures (violence potential (the Standard Predictor, a parole-probation machine learning equation), deception (faking and lying), depression, psychopathic deviance, paranoia, schizophrenia, and addiction scales (a computer test, the Minnesota Multiphasic Personality Inventory, Second and Adolescent Versions). This "7-point violence profile" was confirmed in a random sample of 136 adults and teens by comparing homicidal, overdosing-substance-abusing, sex-offending, and suicide-completers with controls. These four different groups of homicidal, overdosing, sex-offending and suicidal have this "7-point violence profile." The "7-point violence profile" is the same for each of the at-risk groups, and similar for adults or teen (Zagar, Varela, Busch, Garbarino, Zagar, Kovach, Tippins, Hughes, and Singh, 2019).

For nearly a century, to safeguard communities, parole and probation professionals have followed prisoners post-release

for up to 10 years and developed machine learning equations to determine "dangerous" or "return-to-court" probability (Warner, 1923; Burgess, 1928, 1929a, 1929b, 1936). These parole and probation machine learning equations were developed using the records of 184,483 female and male, adolescent and adult offenders on three continents, in five countries, and in 15 U.S. States. This sample of 184,483 is as diverse and large as those used to standardize the most dependable achievement, intelligence and personality tests. These machine learning equations with excellent psychometric properties have predicted violence potential better than clinical judgment for 99 years (Grove and Meehl, 1996; Quinsey, Harris, Rice, and Cormier, 1998; 2006; Monahan, 2006; Harris, Rice, and Quinsey, 2007). The objectivity, reliability, sensitivity, specificity and validity is 97% compared with 25% for background-credit checks, 46% for interviews, clinical judgment, 49% for medical and psychiatric exams, and 39% combined (Zagar, Busch, Grove, and Hughes, 2009; Zagar and Grove, 2010; Zagar, Kovach, Basile, Grove, Hughes, Busch, Zablocki, Osnowitz, Neuhengen, Liu, and Zagar, 2013; Zagar, Zagar, Busch, Garbarino, Ferrari, Hughes, Patzer, Kovach, Grove, Tippins, Imgrund, Dempsey, and Basile, 2016).

Every year the United States spends $110,000,000,000 on medical bills, lost earnings, and public programs for victim assistance due to violence. Such tangible losses do not include the pain, suffering, and death of "the victims", nor the pain and suffering of the victims' families; and the lifelong consequences for the perpetrators, victims, and the victims' families. If one includes the intangible losses due to pain, suffering, and lost quality of life, the annual cost is $630,000,000,000 ($597,000,000,000 for violent crime, $33,000,000,000 for property crime, and $40,000,000,000 for homicide (Fritz, 1996; Levin, 2006). National annual crimes make up 1% of all American earnings, and 3% of injury-related medical expenses (Miller, Cohen, and Wiersema, 1996) with amounts adjusted to the Consumer Price Index (2021) in May 20 U.S. dollars.

The goal of this review is to compare the cost of assault with injury, homicide, domestic-terror, mass-murder, spree-shooting (3 dead), and pedophilia. The second purpose of this review is to show the 20 May 2021 U.S. dollar cost of 5,000 assaults with injuries and 1,000 deaths. The third objective of this review is to demonstrate the 20 May 2021 U.S. dollar cost to the insurance industry for domestic-terror, mass-murder and spree-shooting. Finally, the fourth intent of this review is to establish the 20 May 2021 U.S. dollar cost to the U.S. Roman Catholic Church for pedophilia.

The implications for both the insurance industry and the U.S. Roman Catholic Church is that in using a century of research into computer tests and machine learning equations, both the U.S. insurance industry and U.S. Roman Catholic Church, may avoid the continued loss. Taking the simple steps of using computer tests and machine learning equations can lower claims expenses making them more predictable (high degrees of variance make insurance pricing much more difficult). Insurance firms and U.S. Roman Catholic Church dioceses that include this type of testing and machine learning equations and premium credits will be market leaders and be able to capture larger shares of business in many different lines of coverage and more churchgoer donations.

Table 1. Costs of Crime Including Tangible and Intangible Losses in 20 May 2021 U.S. Dollars

	Tangible							Intangible	
Fatal Crime	Productivity	Medical	Mental	Police	Social	Property	Subtotal	Quality of	Total Losses
Rape	1,399,200.0	22,806.96	6,716.1	1,818.9	-	167.64	1,430,709.7	2,672,472.0	4,103,181.7
Assault/Arso	1,014,340.8	24,625.92	6,716.1	2,658.4	-	30,222.72	1,078,564.0	2,756,424.0	3,834,988.0
DUI	1,609,080.0	25,512.96	6,716.1	1,034.8	-	1,692.24	1,644,036.2	2,791,404.0	4,435,440.2
Child Abuse	3,078.24	601.92	3,498.0	40.92	2,518.5	14.52	9,752.16	71,138.76	80,890.92
Sexual	2,938.32	685.08	8,115.3	77.88	1,539.1	-	13,355.76	126,074.52	139,430.28
Physical	4,836.48	1,104.84	3,777.8	27.72	2,938.3	36.96	12,722.16	80,454.00	93,176.16
Emotional	1,259.28	-	3,777.8	27.72	2,938.3	-	8,003.16	29,523.12	37,526.28
Rape and									
Child abuse	3,078.24	699.60	3,078.2	51.48	38.28	139.92	7,085.76	113,894.88	120,980.64
Other assault	1,325.28	594.00	106.92	84.48	22.44	36.92	2,170.04	10,913.76	13,083.80
Assault with	4,337.52	2,056.56	135.96	117.48	64.68	56.76	6,768.96	27,004.56	33,773.52
Age 0-11	3,917.76	2,056.56	139.92	117.48	64.68	56.76	6,353.16	39,317.52	45,670.68
Nonsexual	1,065.24	421.08	113.52	-	-	56.76	1,656.60	13,992.00	15,648.60
No injury	97.68	-	91.08	96.36	13.20	21.12	319.44	2,378.64	2,698.08
Robbery	1,325.28	1,399.20	92.40	182.16	34.32	1,049.40	4,082.76	7,975.44	12,058.20
With injury	3,498.00	-	91.08	224.40	62.04	1,958.88	5,834.40	19,308.96	25,143.36
No injury	104.28	1,958.88	92.40	154.44	21.12	559.68	2,890.80	1,818.96	4,709.76

Drunk	3,917.76	8,954.88	114.84	55.44	?	2,238.72	15,281.64	16,650.48	31,932.12
With injury	2,402.40	-	114.84	167.64	?	5,037.12	7,722.00	67,721.28	75,443.28
No injury	237.60	1,539.12	25.08	23.76	-	1,399.20	3,224.76	1,958.88	5,183.64
Arson	2,448.60	13,992.00	33.00	1,399.2	?	21,687.60	39,560.40	25,185.60	64,746.00
With injury	34,747.68	-	25.08	1,399.2	?	31,342.08	67,514.04	214,077.60	281,591.64
No injury	10.56	-	7.92	1,399.2	-	1,948.32	3,366.00	699.60	4,065.60
Theft	10.56	-	7.92	108.24	1.32	377.52	505.56	-	505.56
Burglary	17.16	-	6.60	182.16	6.60	1,356.96	1,569.48	419.76	1,989.24
Auto Theft	21.12	-	6.60	195.36	-	4,617.36	4,840.44	419.76	5,260.20
Child Neglect	34.32	34.32	3.96	6.60	1,174.8	-	1,254.00	11,053.68	12,307.68

Victim Costs and Consequences: Tangible Losses

Placing a monetary value on the suffering from violent crime is cruel and impersonal. But without an objective assessment, it is challenging to evaluate violence costs. It is basic, crucial and important to have concrete policy making information for the ethical and moral treatment of criminals and victims. Victimization costs are one of the least well-documented aspects of personal crime. It is difficult to gather data on out-of-pocket expenses, estimated at 20% of direct victimization costs, and 35% of pain, suffering, and lost quality of life expense (Miller, Cohen and Wiersma, 1996). The main source of victimization data is the National Crime Victimization Survey, in which the Bureau of Justice Statistics polls people over 12 years of age regarding personal experiences of rape, robbery, theft, burglary, and motor vehicle theft. Costs estimates and victimization consequences are then extrapolated from the Uniform Crime Reports, National Crime Victimization Survey, National Incidence and Prevalence Survey of Child Abuse and Neglect (Sedlak, 1991), National Family Violence Surveys (Gelles and Straus, 1985), and undetected victimization estimates (Miller, Kilpatrick, and Resnick, 1994). Excluded are some crimes of child neglect, business theft or fraud, embezzlement, crimes against government, drug offenses, gambling, loan sharking, and prostitution. Victim's costs are out-of-pocket expenses for medical bills, property loss, reduced productivity at work, home, and school, and the nonmonetary losses (fear, pain, suffering, and lost quality of life). Major categories of the tangible loss per victimization are productivity, medical care and the ambulance, police and fire services, mental health care, social victim service, and property loss and damage. See Table 1. The victimization category used in Table 1 is the cost per specific type of offense. For example, the average rape costs about $700 in medical expenses, but only 25% of all reported rape victims received medical treatment, with 2% staying overnight in the hospital with amounts adjusted to the Consumer Price Index (2021) in May 20 U.S. dollars.

Productivity.

These losses include wages, fringe benefits, housework, and the school days lost by victims and their families. The latter loss includes coworkers and supervisors' costs for recruiting or training replacements for the disabled workers, worrying about an injured coworker, as well as the ancillary losses (e.g., traffic jams caused by drunk-driving accidents). There are processing insurance claims costs (e.g., life insurance claims for fatalities, worker's compensation, personal injury, disability claims, etc.) and the legal expenses incurred recovering productivity losses from perpetrators and insurers. The National Crime Victimization Survey estimates numbers of hours of work and earnings lost due to medical problems. Days of household work lost are estimated from the days off work lost. Information from the few months post-victimization is included in the National Crime Victimization Survey. Expected lifetime earnings without injury from a standard-age earnings model are similar to those reported by Rice and McKinzie (1989) and to the permanent disability probabilities derived from worker's compensation databases. These data are the long-term productivity losses by body part and the nature of injury. There are age-related differences in recovery, so the probabilities of losses may be underestimates of the effects of disability caused by the crime against the elderly and infants, due to the greater force against, and the targeting of, vulnerable body areas involved in an intentional injury as compared to the typical workplace injury. Parents' productivity is lost also when a child victim is medically treated. School children, who are victimized are also absent from school while recuperating. The cost of a lost school day is the average amount spent on education for a child on one day (Cohen, Miller, and Rossman, 1994) with amounts adjusted to the Consumer Price Index (2021) in May 20 U.S. dollars.

Medical care and ambulance.

These costs include payments for hospital and physician care, emergency medical transportation, rehabilitation, prescriptions, allied health services, medical devices, coroner costs, funeral expenses, and processing of the related insurance claims. Victims incur legal expenses in recovering medical costs from perpetrators and insurers. Categories within the National Crime Victimization Survey are broad, and they include fractured bones, gunshot wounds, and the hospitalization. Using actual lengths of stay across all hospitalized victims in California, Vermont, and Washington, and

the medical payments per day and other injury information (Miller, Pindus, Douglass, and Rossman, 1995), treatment costs are estimated and applied based on broadly defined medical disorders and injuries for each assault or rape victim (see Miller, Cohen and Wiersma, 1996, for more details). For non-hospitalized injured victims, the National Crime Victimization Survey estimates of short-term costs are used. Estimates are multiplied by lifetime to the short term cost ratios for injuries not requiring hospitalization, using the International Classification of Diseases, 10th Edition (ICD-10; World Health Organization, 2013) groupings. Medical costs for fatal injuries are taken from Miller, Cohen and Wiersma (1996), based on all fatal workers' compensation cases in 41 states. Data on medical costs per case of child abuse are obtained directly from the above-mentioned health care data and an inferred hospitalization rate. Administrative costs for insurance are estimated at 7.5 % of medical costs covered under the health insurance policies and 13% of workers' compensation cases (Miller, 1990, 1993) with amounts adjusted to the Consumer Price Index (2021) in May 20 U.S. dollars.

Mental health costs.

These are payments to mental health care providers and the insurance processing costs for service to the victims. Cohen and Miller (1994) study 168 mental health care professionals in a stratified random sample of seven different professional organizations' members, asking the respondents to detail the number of visits for victimization. At least $8,000,000,000 to $9,500,000,000 or 10 to 20% of U.S. mental health care is spent annually on the care of victims of crime. Each homicide is associated with 1.5 to 2.5 witnesses, friends, or relatives needing therapy; *25* to 50% of rape or child abuse victims received some form of mental health treatment with amounts adjusted to the Consumer Price Index (2021) in May 20 U.S. dollars.

Police and fire services.

Services include the initial police response and follow-up investigation and the fire services required for the arson and accidents caused by drunk driving. The costs of other aspects of the criminal justice system are not included. Estimates are derived from the surveys and published statistics reported by Cohen and Miller 1994; Cohen, Miller, and Rossman, 1994. Compared to the direct impact on victims, the police and fire services are a relatively small portion of the cost of crime (about $100/case). However, the police and fire services add up to about $5,280,000,000 annually in the U.S., which can be a significant portion of the municipal budgets. The costs of arson and homicide average about $1,800 per incident with amounts adjusted to the Consumer Price Index (2021) in May 20 U.S. dollars.

Victim services.

These services are activities of the Victim Service and Child Protective Agencies and include foster care for maltreated youth removed from homes, special education for maltreated children, and services aimed at reintegrating families with abused or neglected children. Little data exist on the extent of victim services required by the types of victims served. For assault, rape, and robbery crimes, the costs of victim services are the U.S. dollar value of Federal Government grants to the victim service agencies, inflated for the non-Federal portion, per Miller, Cohen, and Wiersma, 1996. The value of time spent by the volunteers in these organizations is not included. The cost of $38.28 per rape is an underestimate (Cohen, 1988; 1995; 1998; Cohen and Piquero, 2007; Russell, 2008). Victim services for child abuse are larger than for the adults ($1,500 to $3,000 per incident) and are based on the few available data with reasonable and conservative assumptions. Estimates involve foster care stays and the child protective services for domestic and child abuse victims (Daro, 1988; McCurdy and Daro, 1993) with amounts adjusted to the Consumer Price Index (2021) in May 20 U.S. dollars.

Property damage and loss.

These costs comprise the value of property damaged, the stolen and not recovered items, and the administrative costs for insurance claims for compensation of victims' property losses. In cases where losses are insured, 16% is added to the costs to account for the processing costs; see Best (1993) for a loss-adjustment expense ratio. Supplementary published sources are used for the costs of damages due to drunk-driving accidents (Miller and Bincoe, 1994) and arson (Hall, 1993). Property damage accounts for only a small percent of the cost of violent crime, usually 1%; the bulk of this figure (60 to 90%) comprises expenses related to the loss of property in burglary and theft and property damage in arson offenses. The average arson victim's property damage is $21,687. The mean loss in auto theft is $4,617. The average property loss for a robbery is $1,049 with amounts adjusted to the Consumer Price Index (2021) in May 20 U.S. dollars.

Subtotal of tangible loss.

Tangible losses are the sum of the costs due to lost productivity, the medical care, ambulance, the police and fire services, mental health care, the victim services, and the property damage and loss. Per death cost estimates of tangible losses range from $1,320,000 to $9,240,000 with amounts adjusted to the Consumer Price Index (2021) in May 20 U.S. dollars.

Victim Costs and Consequences: Intangible Losses Quality of life.

Intangible losses are assigned by jury award and do not have an objective price. However, the losses are very real. Economists use various methods to place the monetary values on intangible losses (Miller, Cohen and Wiersma, 1996). Lost quality of life due to death estimates are based on the amount people typically spend in dollars or time to reduce the risk of death (Miller, 1990; Viscusi, 1993). The average estimate of per death from the literature (Miller, 1990) adjusted to reflect the victim's life expectancy, is $3,800,000 (2021 U.S. dollars); lost quality of life accounts for about $2,700,000 of this average. Nonfatal injuries, the values of pain, suffering, fear, and lost quality of life involve in jury awards to crime and burn victims (Cohen and Miller, 1994; Miller, Cohen and Wiersma, 1996). A sample of jury awards ($N = 1,106$) and the settlements to assault survivors are used to estimate the intangible costs as assigned by juries. These cases included 361 rape survivors (including 39 assaults, many only with psychological injuries), and 606 burn survivors (arson losses). These exclude jury awards for the punitive damages and include only the portion of awards and the settlements meant to compensate for the victim's pain, suffering, and the lost quality of life. Relationship among the out-of-pocket crime costs (lost wages and medical expenses), the victim characteristics (age, sex, work status), the injury severity (body part, hospitalization), and the jury awards for pain and suffering are calculated using the actual U.S. distribution of crime victims. Estimates of the average jury award for the pain and suffering are for the presenting offense. Lost quality-of-life estimates for nonfatal injuries are lower than the estimated jury awards to a crime victim with amounts adjusted to the Consumer Price Index (2021) in May 20 U.S. dollars.

Criminal Justice Costs and Discount rates.

The estimates of the social costs of a typical career delinquent are made using the 2% and 10% discount rates for comparison. According to Cohen (1995; Cohen and Piquero, 2007; Russell, 2008), the monetary value of saving an at-risk youth in 2021 U.S. dollars is $2,000,000 to $2,700,000. Feldstein, 1964; Baumol, 1968). The appropriate discount rate is the rate at which a corporation can borrow money. Such market rates range from 5% to 12% (Viscusi and Moore, 1989; Cropper and Sussman, 1990; Horowitz and Carson, 1990). Criminal justice costs are presented as a total without discounting, and then the discount rates of 2% and 10% are presented, to represent the low and the high ends of reasonable estimate ranges. The more conservative 2% discount rate is consistent with average increases in workers' wages over time, the inflation, and the consumer interest rates (Lesser and Zerbe, 1994). The 10% rate is used by the Office of Management and Budget for policy evaluations. Injury cost calculations use discount rates between 2% and 10% with the amounts adjusted to the Consumer Price Index (2021) in May 20 U.S. dollars. See Table 2.

Table 2. Cost for Legal Defense, Prison or Jail time, Parole and Probation in 20 May 2021 U.S. Dollars

	Criminal Justice	Delinquent	& Criminal	Cost	
Offense	Legal	Defense	Jail/Parole	Probation	Total Cost
Homicide	1,310.76	140,549.64	848.76	87.12	142,796.28
Rape	35.64	2,894.76	33.00	7.92	2,971.32
Robbery	68.64	6,873.24	100.32	30.36	7,072.56
Assault	77.88	4,140.84	135.96	89.76	4,444.44
Burglary	23.76	1,729.20	64.68	59.40	1,877.04
Theft	23.76	858.00	62.04	62.04	1,005.84
Auto Theft	43.56	1,508.76	108.24	109.56	1,770.12

Calculating criminal justice costs.

The cost of crime due to the use of the criminal justice system includes the average number of offenses, the costs of legal defense and incarceration, and the parole and probation expenses. These are multiplied by the number of offenses committed by a delinquent over his career. The rate of officially recognized juvenile offending is estimated at three crimes per delinquent career (Loeber and Snyder, 1990) with convictions of one per year, consistent with Nagan, Farrington, and Moffitt (1995). The costs shown in Table 3 are computed on a per incident basis, which includes the offenses never reported to police, as well as those for which no arrest is made. Miller, Cohen and Wiersma (1996) estimate from the pre-conviction earnings of an offender, that the loss of earnings due to incarceration is $7,124 per year on average. Since most 17-year-old youths earn money only during the 3 months of one summer, lost wages estimate are $1,781 in (2006 U.S.D. Miller, Cohen and Wiersma, 1996). Costs estimate per offense for legal defense, prison or jail time, and parole, and probation (see Table 3) with the amounts adjusted to the Consumer Price Index (2021) in May 20 U.S. dollars. Social costs of adult career criminals arc about $1,670,000-$2,100,000; while for a career juvenile delinquent the cost is $100,000 to $400,000 (homicide has much higher costs). Costs with discount rates for criminals and delinquents arc lower, of course; for the 2% discount rate, costs are $1,400,000 to $1,800,000 and $95,000 to $385,000 respectively, for adults and juveniles. At the 10% discount rate, these costs are $90,000 to $1,200,000 and $84,000-$340,000 respectively

Table 3. Discount Rates in 2021 U.S. Dollars 20 May

Cost Category	Criminal & Delinquent Present Value 2% Discount	Costs: 2% & 10% Value 10% Discount	Discount Rates 2021$ Total Costs
Delinquent Victim	71,359.20-288,235.20	62,964.00-254,654.40	74,157.60-298,029.60
Criminal Justice	23,786.40-96,544.80	20,988.00-85,351.20	25,185.60-99,343.20
Delinquent Career	95,145.60-384,780.00	83,952.00-340,005.60	99,343.20-397372.80
Criminal Victim	1,003,226.40	562,478.40	1,182,324.00
Criminal Justice	334,408.80	218,275.20	394,574.40
Offender Productivity	64,363.20	41,976.00	75,556,80
Criminal Career	1,399,200.00	825,528.00	166,056.00
Total	1,399,200.00-1,818,960.00	90,948.00-1,188,00.00	167,904.00-2,098,800.00

Third party costs of the babies exposed *in utero* to cocaine or other substances and malnourishment, neglect, or mistreatment of children are taken from the National Drug Control Strategy report in 1990. These costs are $132,000 annually per case (Kcsserow, 1990). Associated costs of hospital delivery and the prenatal and foster care until age 5 years are $66,842 per infant with amounts adjusted to the Consumer Price Index (2021) in May 20 U.S. dollars. School dropout is also associated with delinquency (Tracy, Wolfgang, and Figlio, 1990) resulting in reduced employment opportunities as well as the lost future income due to incarceration. Education provides private benefits such as the increased wages and the fringe benefits that are related to the public benefits (Haveman and Wolfe, 1984). Hansen (1963) compared the lifetime earnings of males by education level from the U.S. Census data for high school graduates versus the non-graduates. Cohen (1995) gave similar estimates of the increased lifetime future earnings for high school graduates at $503,712. With a 2% discount rate, this is $260,964, and with a 10% discount rate earnings of $21,407 (Donohue and Siegelman, 1998) with amounts adjusted to the Consumer Price Index (2021) in 20 May U.S. dollars.

Cost-benefit Analyses.

Cost-benefit analyses related to criminal justice includes the intangible losses (Miller, 1993). The U.S. Office of Management and Budget (1989) requires the inclusion of intangible losses whenever a cost-benefit analysis appraises the saving of human lives. Lost quality of life is the largest cost component of violent crimes, and is the component with the most uncertainty. Inaccurate estimates of estimates of intangible loss can result in expensive policy decisions, e.g., Cohen's (1988) cost-benefit test applied to an early release program; based on out-of-pocket expenses for crimes committed by early-release recidivists compared to the savings of not building more prisons, the results showed that building more prisons is preferable. Within tangible loss categories, productivity losses are the largest, although medical costs are also substantial. General exclusions in all analyses include actions to reduce the risk of becoming a victim, e.g., purchase of burglar alarm systems. Omissions from analyses include expenses for processing public and private disability insurance and welfare payments to those permanently disabled by crime, long-term effects on victim earnings from psychological injury caused by domestic violence, and second-generation costs with amounts adjusted to the Consumer Price Index (2021) in May 20 U.S. dollars.

Comparing Assault, Homicide, Domestic-Terror, Mass-Murder, Spree-Shooting and Pedophilia Cost

See the assault with injury, homicide, domestic-terror, mass-murder, spree-shooting and pedophilia cost in Figure 1 (Cohen, 1988, 1995, 1998; Daro, 1988; McCurdy and Daro, 1993; Cohen and Piquero, 2007; Russell, 2008; Consumer Price Index; 2021) in May 20 U.S. dollars. Figures are computed by the (rate of each crime committed x the total tangible and intangible costs). Crimes include mass-murder (3 x 3,834,988.08 =11,504,964.24), homicide (1 x 3,834,988.08), pedophilia, and assault with injury (1 x 33,773.52) with amounts adjusted to the Consumer Price Index (2021) May 20 U.S. dollars.
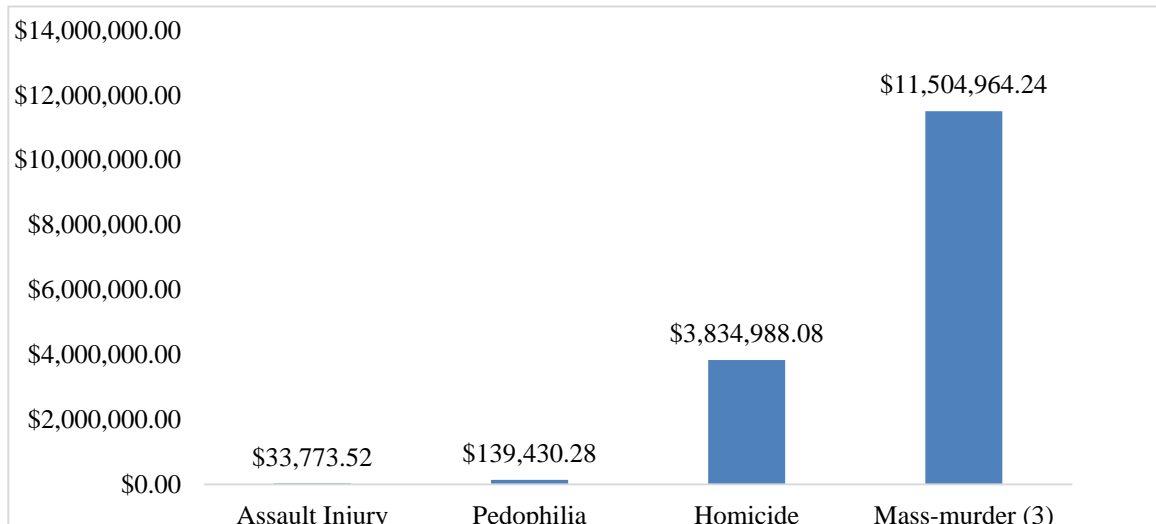
Figure 1. Cost for Assault with Injury, Homicide, Mass-Murder (3) and Pedophilia

Cost of 1,000 Homicides, Domestic-Terror, Mass-Murder, Spree-Shooting Deaths and 5,000 Injured

See Figures 2 and 3 for 1,000 dead from homicide, domestic-terror, mass-murder, spree-shooting expense and 5,000 assaults with injuries (Cohen, 1988, 1995, 1998; Daro, 1988; McCurdy and Daro, 1993; Cohen and Piquero, 2007; Russell, 2008; Consumer Price Index; 2021) in May 20 U.S. dollars.
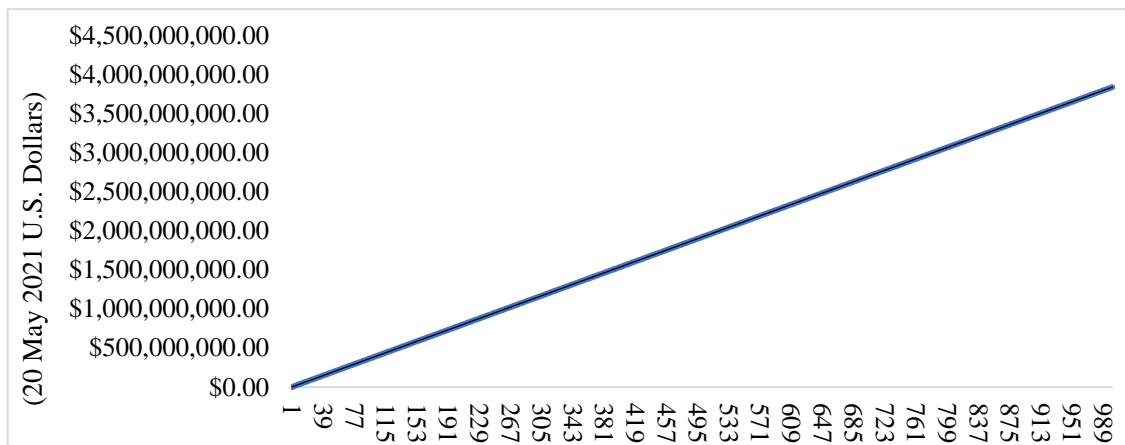
Figure 2. Cumulative Cost of 1,000 Spree-Shooter Dead @ $3,834,988.08, 20 May 2021 U.S. Dollars
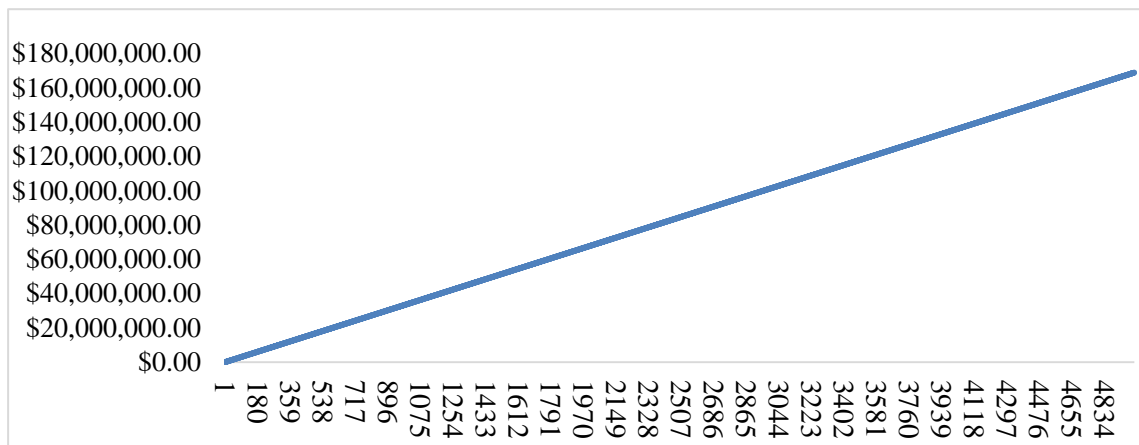
Figure 3. Cumulative Cost of 5,000 Assault with Injuries @ $33,773.52 in 20 May 2021 U.S. Dollars

The Insurance Industry Cost of 630 Spree-Shooters (1936-2107) Dead, Injured

See in Figure 4 for the insurance industry combined cumulative cost of spree-shooters, dead and injured victims, lost

business customers, and increased premiums and taxes computed by adding each year's spree-shooter, dead and injured victim, and lost business expense. There is the combined cumulative cost to = $40,706,538,616.66 projected into the future with no computer tests and machine learning equations. Who pays this $40,706,538,616.66? Taxpayers and insurance purchasers pay this, because the government and insurers (disability, errors and omission, health, life, liability, personal injury, workers compensation, etc.) cover the expense for the families of the dead and injured and the cost of incarceration of the spree-shooter. There is also the lost business, residents moving from a spree-shooter location, the direct and indirect health costs of the stress. This does not include the inflation of the rising consumer price index. These are projected with no change in insurance industry policy to use computer tests and machine learning equations in hospitals-clinics, courts-police, schools-universities, and human resources.
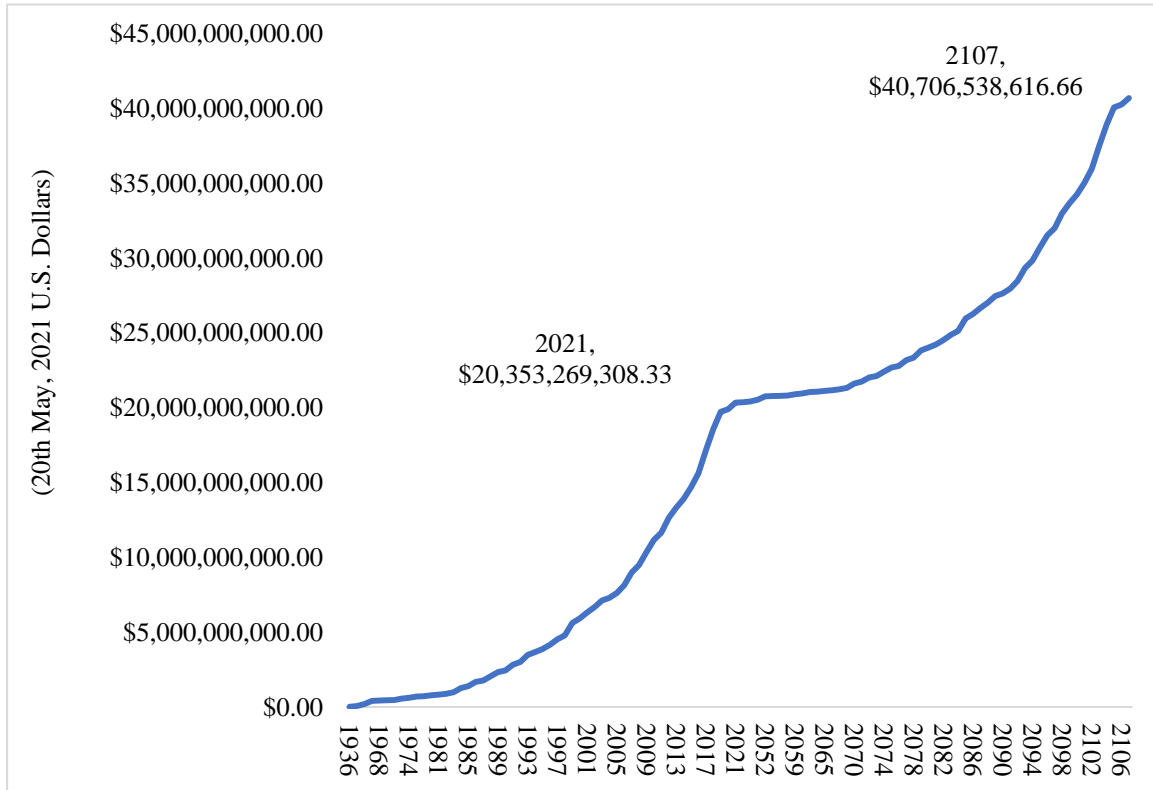

Figure 4. 1936-2107 Combined Cumulative Cost of 630 Spree Shooters Dead Injured Insurance & Taxes

1986-2107 U.S. Catholic Church Pedophilia Costs and Victims

See Figure 5 for the U.S. Roman Catholic Church (1986-2107) [payouts, 12,434,490,000].
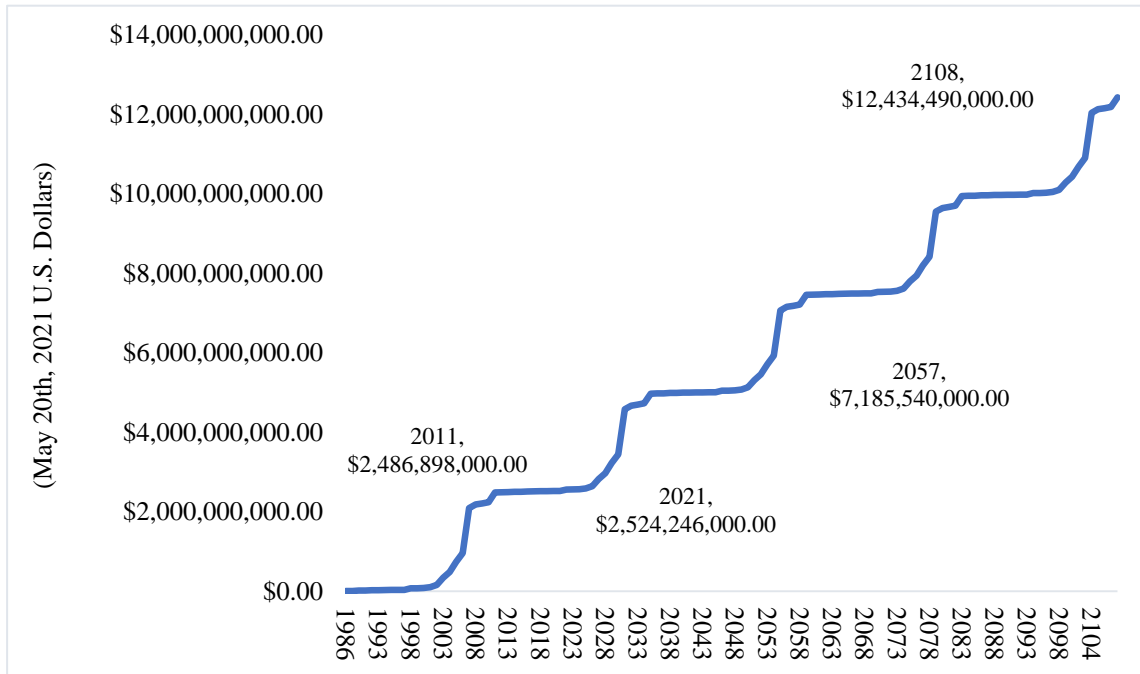
Figure 5. 1986-2107 Cumulative U.S. Roman Catholic Church Payouts

See Figure 6 for [lost donations = 1.3 x payouts] (Botton and Perez-Truglia, 2016) 16,164,837,000, projected with no computer tests and machine learning equations.
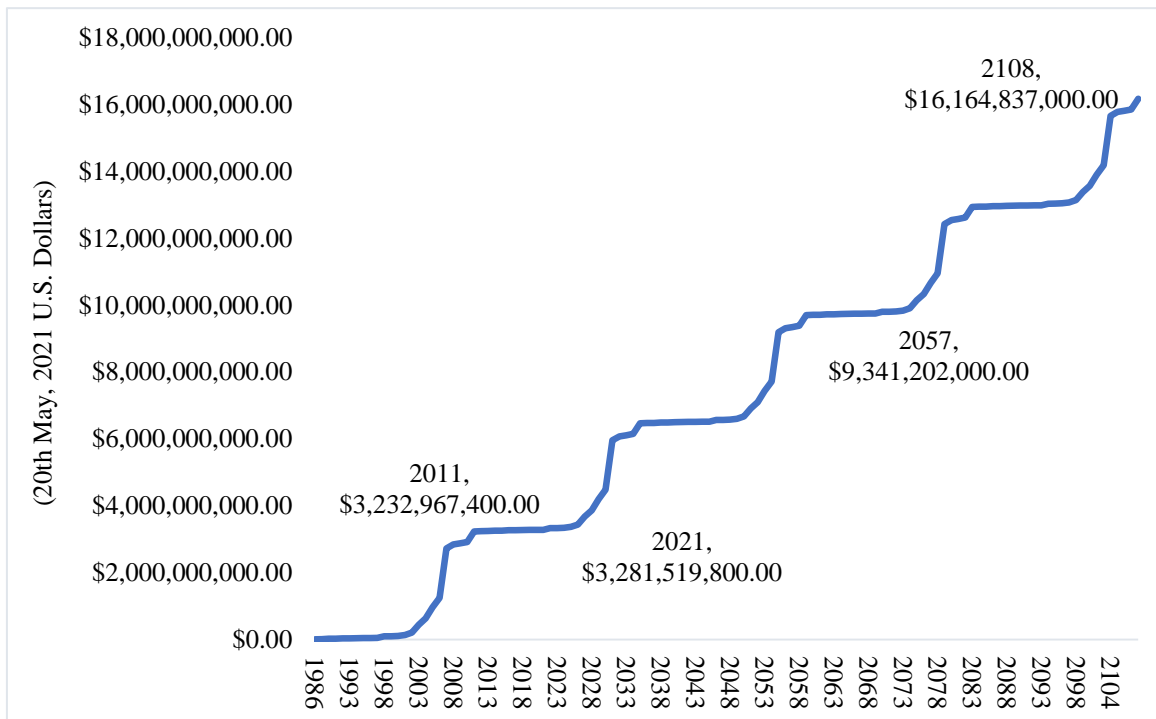

Figure 6. 1986-2108 Cumulative U.S. Roman Catholic Church Lost Donations (1.3 x Payouts)

See Figure 7 for the cumulative combination cost of the payouts and the lost donations = $28,599,327,000. (1986-2107) with victims [(1986-2107), 22,716, projected forward as if the U.S. Roman Catholic Church does not use computer tests and machine learning equations going forward in every diocese and among every religious group(Bishopaccountability.com). This is a similar to U.S. states and insurance industry higher insurance and taxes for

domestic terror, mass murder, spree-shooting. These cumulative combination costs are again projected with no change in policy, namely papal ordered computer tests and machine learning equations for every bishop and cardinal within every U.S. Roman Catholic diocese and among every religious group, not only for tests and equations but education in the mathematical scientific rationale and the case studies and organizational examples of successes and failures.
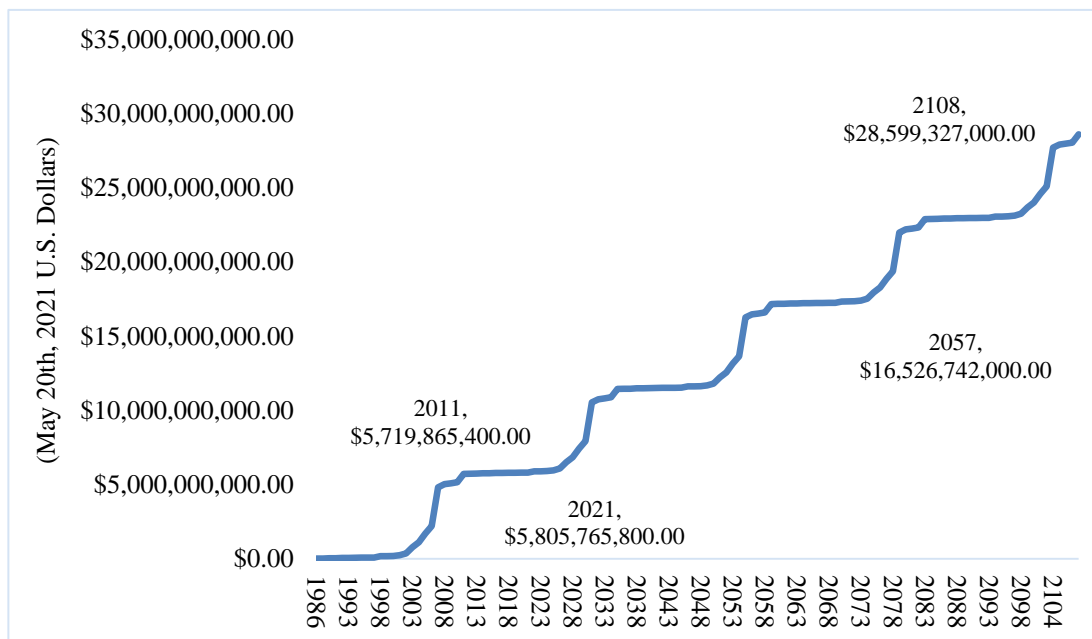

Figure 7. Roman Catholic Church Payouts plus Lost Donations in 20 May 2021 U.S. Dollars

Discussion: Insurance Purchasers, Taxpayers, Churchgoers Pay for Assaults, Mass Murders, Pedophilia

Insurance purchasers and taxpayers pay for the violent, criminal and delinquent offenses, and their direct and indirect costs. Insurance purchasers pay the disability, error and omission, health, liability, life, personal injury and workers compensation costs, which the company passes on to the insured purchaser. Taxpayers pay for the courts, jail, police, prisons and other direct and indirect costs of violence. Corporations and governments want to control the spiraling costs. Most strategies seek to optimize the choice. Diversions, interventions and treatments to predict and to prevent violence should be cost effective and readily available (Lyons, Howard, O'Mahoney, and Lish, 1997). The philosophy of market-based services is embodied in the concept of prediction and prevention of violence by using computer tests and machine learning equations to increase predictability and minimize risk.

Outcome

Persons come to hospitals, schools, courts, jails, prisons, and the corporate human resources to receive services. Yet often the human resources assessment is flawed by high cost for inaccurate diagnosis and imprecise human decision making. Corporate human judgment, interviews, medical exams, and paper-and-pencil tests are a combined 39% effectiveness at thousands of dollars in cost. Contrast this with the expense of hundreds of dollars for 97% objective, reliable, sensitive, specific, valid computer test and machine learning equation. This then allows human resource leaders to then apply evidence based empirical diversions, interventions and treatments (Seligman, 1995). Decision analysis business theory identifies the key decision points and the information used to inform those decisions. Information can then be modeled using decision tools, not only for actuarial diagnosis, but treatment, quality improvement, and the process of managing diagnosis-treatment-cost assessments (Lyons, Chesler, Shallcross, and Kisiel, 1996). This empirical process should comprise the conceptual basis of human resource service, and specify corrective actions for improved human resource and employee assistance program outcomes (Beutler, 1991; Gellman and Frawley, 1996).

Action Plan to Lower Costs by Using Computer Tests and Machine Learning Equations Use

The use of computer personality testing and machine learning equations is widespread, but not yet comprehensive, nor consistent. A very brief examination of how testing is currently used in various organizations, presented with suggestions for implementation, is in order. The question is how many youngsters and elders, need to die, and how many tens of billions need to be wasted because of the nonuse of computer tests and machine learning equations. When will the insurance industry and U.S. Roman Catholic Church leadership change direction and begin to use actuarial tests and machine learning equations paired with empirical treatments to impose a new cost-beneficial and cost-effective approach

to this challenge? Violence is a public health crisis that is immensely costly both in monetary expense and in lives needlessly lost. By using the computer tests and machine learning equations at each point in development in hospitals, schools, courts and human resources, savings are real to ensure safety.

Objective, Reliable, Sensitive, Specific, Valid Computer Tests and Machine Learning Equations

Inexpensive reliable sensitive specific valid tools now available include the Behavior Assessment System for Children Third Edition (BASC-3) which has 150-200 items for parents, teachers, and infants, children, teens and adults from 0-25 years for $5-6 U.S. (2021 dollars) per rating, generating a 30-page report with diagnosis, interventions and treatment suggestions (Kamphaus and Reynolds, 2015a; 2015b). The Minnesota Multiphasic Personality Inventory (MMPI-2 and MMPI-A) have 567 and 468 items respectively, giving a 30-page report comparing the teen or adult with millions. The report includes personal, interpersonal skills, diagnosis, intervention and treatment options, and probability outcomes for $50 US (2021 dollars) per individual through Pearson (Pope, Butcher, and Seelan, 2006). The Child Abuse Potential Inventory is another computer test for teens and adults, 18-99 years of age with 150 items for $5 per person available through PAR, Incorporated (Milner, 1986). The Standard Predictor of Violence Potential (Zagar and Grove 2010) has a 98 item adult and 135 item youth machine learning equation with AUC=.99 for adults and AUC=.91 for youth to measure violence potential. Psynetix Laboratories has a 650-item rating scale used among police and in colleges and universities to screen for violence potential. Workplace and school spree-shooters and violent prone are increasing in numbers yearly and computer tests and machine learning equations must be added to background checks, judgment, interviews, medical exams and other less than chance precise approaches currently used. "Doing the same over and over again and expecting different results" is not the answer. Using computer tests and machine learning equations is the solution. Using the information gathered from tests and equations within the ethical, legal and moral guidelines ensures better probability outcomes and more predictable cost in money, lives and injuries.

Finger Print ID, Metal Detector Use, Risk Education

Universal and widespread use of inexpensive finger print identification scanners less susceptible to identification error or fraud, metal detectors in schools, commercial locations, and workplaces will make people less vulnerable. When these environmental improvements are used in addition to more professionals learning to use computer tests and machine learning equations, there will be a decrease in violence, because those more likely to act out violently can be observed within hospitals, schools, courts and the workplace. Currently students and co-workers know who the high at-risk individuals are. Leadership needs to protect students and co-workers.

Clinics and Hospitals

Taking the action plan through human development from infancy to adulthood, hospital workers must use computer tests and machine learning equations at the emergency room or clinic, when someone with mental health and violence issues presents. Insurance leadership can provide incentives because psychiatric hospitalization and treatment is expensive, whereas the computer tests and machine learning equations costs less than $200 and even if it has to be orally dictated or repeatedly to obtain a reliable, sensitive, specific, valid results, it is less expensive than the tens of thousands for hospitalization, or even more deaths or injuries that cost tens of thousands to tens of millions. If it is a child or teen, then the Standard Predictor and BASC-3 from parent and youth is available. If it is a teen or adult, then the Standard Predictor, BASC-3, the MMPI-A, the MMPI-2 and the CAPI are useful. Since insurance chief financial officers pay out the disability, errors and omission, life, personal injury and workers compensation, making insurance contingent upon use of computer tests and machine learning equations makes economic sense. Likely universal computer tests and machine learning equations will shorten psychiatric hospital stays and also shorten outpatient treatment, since patients will know objectively what they have, like with a blood test, an x-ray or other medical procedure. Then what works can be applied objectively. The reduced insurance costs can be carried back to lower premiums and increase risk assessment.

Schools and Universities

In the elementary and high school special education departments, the universal use of computer tests and machine learning equations, like the Standard Predictor and BASC-3 by the parent, the student and the teacher, will safeguard the most vulnerable, our youngsters. If there is a mental health and violence issue, then the Standard Predictor of Violence Potential, filled out by the staff and the student with preference for the rating by staff based on past behavior, is helpful, as well as the MMPI-A or in later high school the MMPI-2. In alternative programs, colleges, universities, homeschool, magnet, online programs, private excluding religious, religious or religious based, special, trade or technical school, depending upon the age, the BASC-3, Standard Predictor, MMPI-A, MMPI-2 and CAPI must be used for mental health and violence risk. This will also make schools, colleges and other academic locations safer for students and staff. Asking an aide to accompany a high risk student is a small price to pay compared to the 8 figure cost of a mass murder.

Courts, Jails, Prisons

In the courts, jails and prisons, since taxpayers fund these institutions and insurance pays for the victims, universal use of the BASC-3 and Standard Predictor and MMPI-A for youth and teens, and the Standard Predictor, the MMPI-2 and the CAPI for adults, will save judges, lawyers, court, jail and prison workers from disability, health, life, personal injury and workers compensation costs. Mental illness and violence should be 97% reliably, sensitively, specifically, validly measured to divert, intervene and treat. For those who would not likely respond, then the option is to contain, incarcerate, or execute. Many court workers suffer when the unexpected happens and predictability makes business and life easier.

Workplaces-Human Resources

At the government office or facility, manufacturing production or distribution facility, medical office or facility, military base or facility, professional office excluding medical, religious institution, residential, restaurant, retail, and other commercial site, and other location, there is human resources and employee assistance programs and family emergency medical leave of absence and short- or long-term disability costs. Many of these conditions are now dealt with in a haphazard fashion. Computer tests and machine learning equations improve the accuracy and efficiency with low cost. This increased speed likely will decrease the human resource and the insurance expense. For the teen worker, the BASC-3 or MMPI-A and the Standard Predictor, while for the adult, the MMPI-2, Standard Predictor and CAPI are useful in 97% objective, reliable, sensitive, specific assessment and treatment planning.

Insurance Industry

The insurance industry determines rates based upon claims projections. Those projections are based upon actuarial calculations using past loss data and models to project experience into the future. If this were solely the case insurance premiums would be just a pass through of claims costs plus insurance company expenses and profits. However, in commercial insurance in particular, another important factor is considered – risk management. Firms that proactively take actions such as employee training, product design, etc. realize lower premiums because the insurance industry has quantified the impact of numerous risk management activities. Many of these activities fall under the broad rubric of pre-loss loss control. Activities taken before events occur to eliminate or reduce the impact of losses. The data presented here should be considered important and exciting for the insurance industry. In most cases, losses due to shootings are paid, to a large extent, by insurers. Taking the simple steps outlined herein can help make claims expenses lower and more predictable (high degrees of variance make insurance pricing much more difficult). Insurance firms that include this type of testing and premium credits will be market leaders and be able to capture larger shares of business in many different lines of coverage.

U.S. Catholic Church and Global Church Leadership

At the intake within the convent, monastery or seminary, again before ordination or vows, at promotion to a parish, or leadership position, at transition and at retirement, computer tests and machine learning equations assesses mental illness and violence with 97% versus the current interviews, judgment, medical exams and paper-and-pencil tests that are 39%. Church leadership must codify in canonical law that computer tests and machine learning equations be used, specifying the BASC-3 (English, Spanish), the MMPI-A and MMPI-2 in 33 languages (MMPI in 150 languages, 85% of items reappear in the MMPI-A and MMPI-2) with 250 appellate court cases, 19,000 empirical studies [Butcher, 1996; Butcher, Ellertsen, Lucio, Lim. *et al*., 2000, Pope, Butcher, and Seelan, 2006] and the CAPI (English) and the Standard Predictor (English, French, Italian, Polish, Spanish) Hathaway (1970) the author of the MMPI did not want item content altered during translation.

Rosen (1958) noted that the exact equal of the original and more familiar term or translation be used. Direct translation is the most common approach with a bilingual translator and then a committee of translators the produce the best composite translation. Back translation is the verbal material is translated and then translated back to the original. If the items in the two forms differ, then further translation is needed (Brislin, 1970). Bilinguals take both the original and target version. For the Standard Predictor a sample of 5 bilinguals each language (French, Italian Polish and Spanish) followed these procedures. With regard to the BASC-3, the MMPI-2 or MMPI-A, the Standard Predictor and the CAPI, the computerized report in English can be converted from an Adobe PDF format to Microsoft Word and then dropped into google translate for other languages so that computer tests and machine learning equations can assist other cultures.

Church Canonical codification must include use of computer tests and machine learning equations at the abovementioned career time line. Also, there must be a centralized system where each diocese monitors computer tests and machine learning equations and each religious organization leader and then reports to the Psychology Institute at the Gregorian University and the Jesuit Education Secretary to monitor globally. The experience of the coauthors in the Chicago, Newark, Tarnow, Poland, and Toronto Canada dioceses, with hundreds of millions in payouts, billions in lost donations, and 200 Polish priest babies being supported by the European Union bishops, should be negative incentive to codify and computerize monitoring of compliance with computer tests and machine learning equations. Translations of these tools

can be also overseen by the Psychology Institute and Jesuit Education Secretary to comply with University of Minnesota Psychology Professor Emeritus James N. Butcher's international procedures for psychological tests.

Summary: Action Plan Results

When the insurance chief-financial-executive-officers, the governors, the presidents, the supreme court justices and the Roman Catholic Pope and Roman leadership put into procedure, law and canonical law codification and then set up oversite of the implementation computer tests and machine learning equations whether during the human development (hospitals, school, workplaces, courts, jails and prisons) or the career life span (intake into the Church through promotion and retirement), then the assaults with injury, homicide, mass-murder, overdose, sex-offending, and suicide-completion will decrease, first in the US, and then globally, and the loss of lives and expense of higher insurance and taxes will lower. Fear not for there is hope in leadership, education, science and oversight of the use of computer tests and machine learning equations for families, neighborhoods, workplaces and places of worship.

Acknowledgement

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