

# Collected Thoughts

Contributions on Several Unrelated but Relevant Topics

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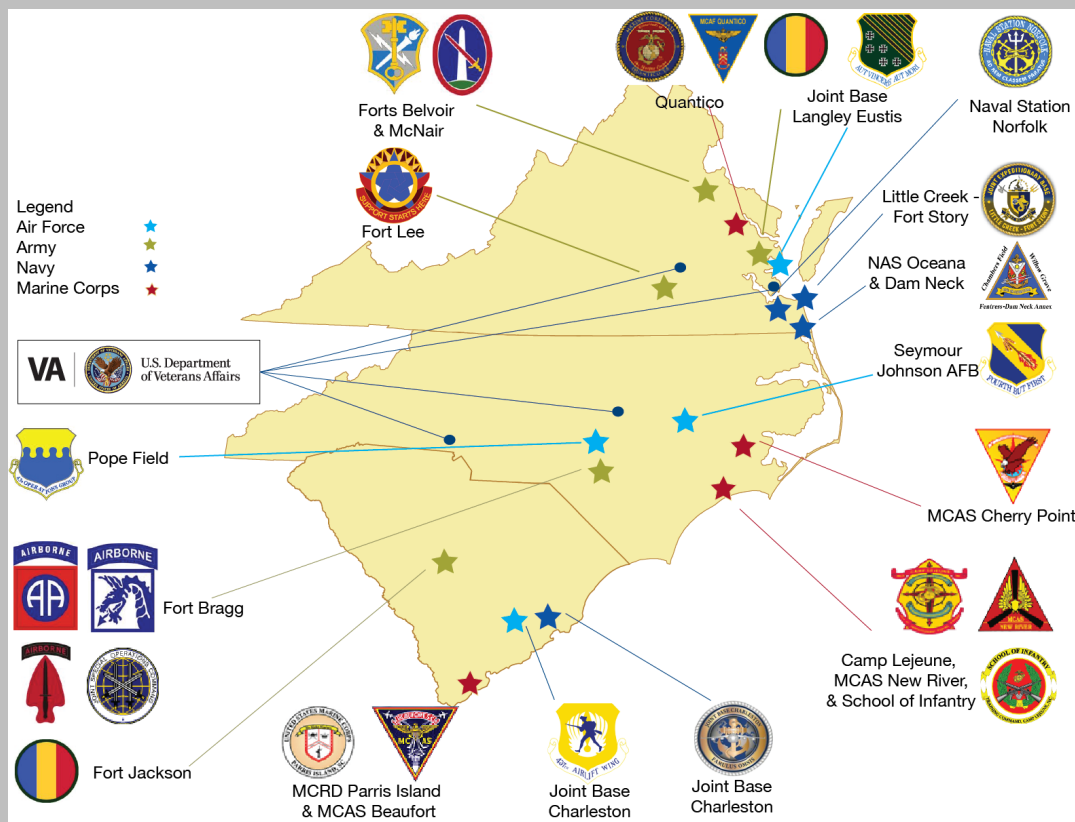
Duke University and Durham VA Medical Center

# Outline

- Military in NC
- Veterans in NC
  - Demographics overall
  - Numbers by county
- Veterans, MH and SUD
- Violence
  - One perspective on the task force work
  - Central role of alcohol and a possible “quick win”

*Remember, I am here as an individual and not speaking on behalf of the Dept of Veterans Affairs or Duke*

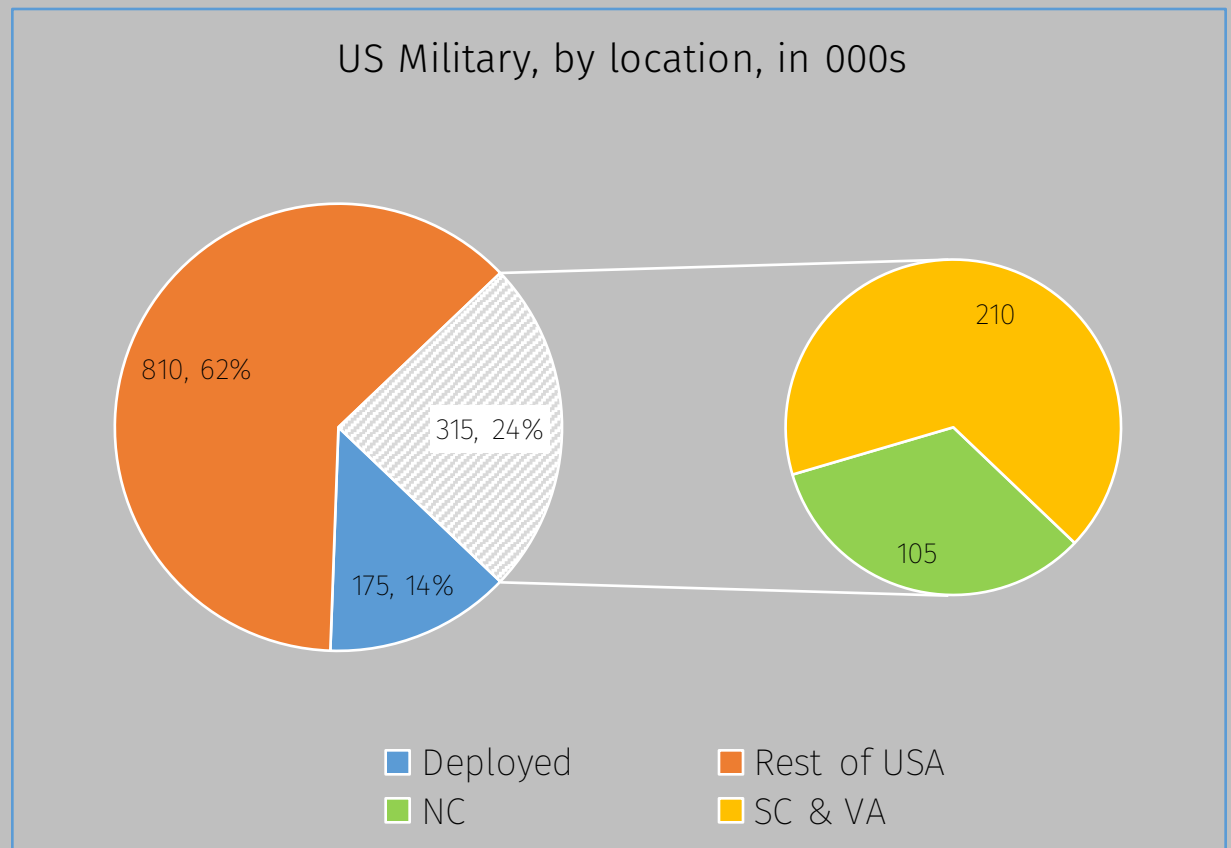
# National Military Power in NC



- North Carolina is home for:
  - the largest Army and Marine Corps installations east of the Mississippi River
  - most of the USA's east coast expeditionary forces:
    - XVIII ABN Corps, 82<sup>nd</sup> ABN Div, USASOC
    - II MEF, 2<sup>nd</sup> MARDIV, MARSOC
    - 4<sup>th</sup> Fighter Wing

# Regional Military Presence

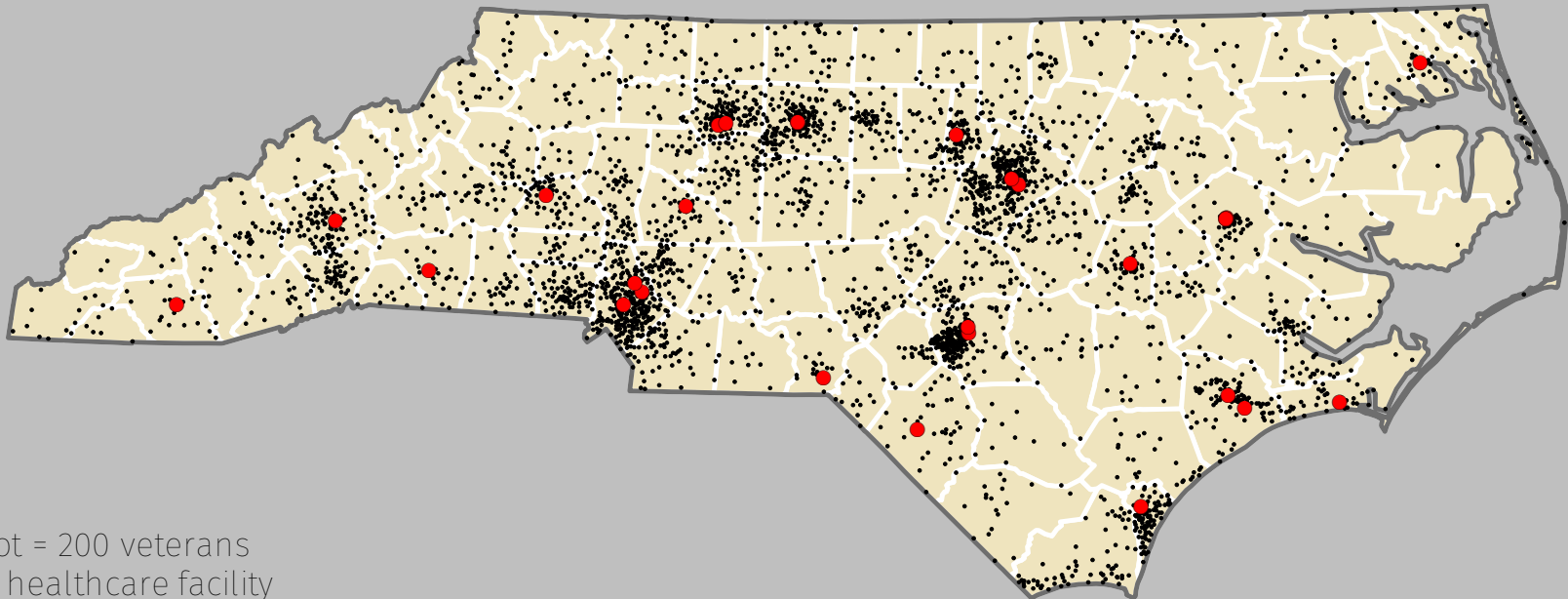
- North Carolina ranks #4 among the states for the number of active-duty military with 105,000 individuals
  - CA (168k), VA (125k), and TX (122k) are #1-3
- Compare to biotechnology (human/vet/ag) with ~63k employees in NC



# North Carolina Veterans

- 792,000 veterans live in NC (9<sup>th</sup> in USA)
- 13% of the NC population is a veteran, and 35% of the population is in the military, a veteran, or military – veteran family (spouse, child, or parent)
- In North Carolina, veterans are younger and more likely to be female:
  - Women veterans: NC 8.8%, USA 7.3%
  - Under age 55: NC 37 %, USA 33%

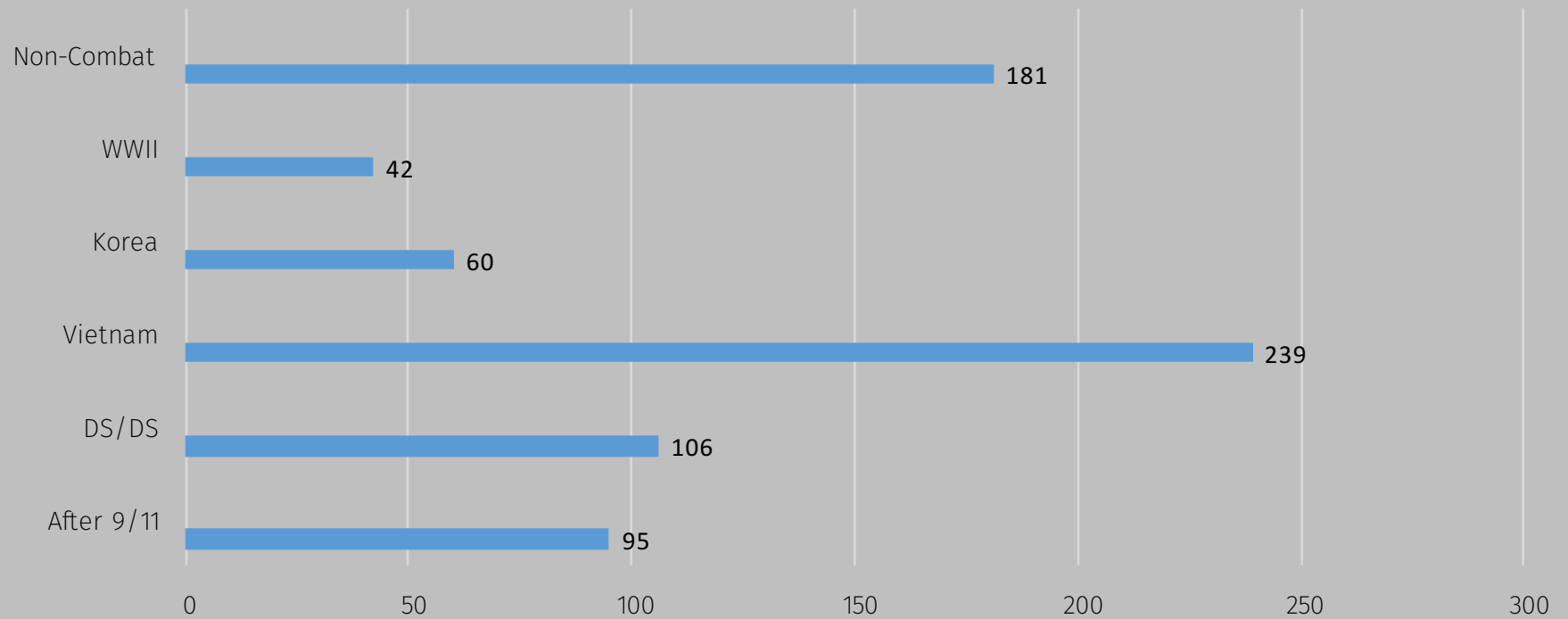
# Veteran Distribution in North Carolina



Each black dot = 200 veterans  
Red dot = VA healthcare facility

<http://www2.census.gov/library/infographics/2015/comm/vets/nc-vets.pdf>

# NC Veterans: Periods of Service



# Veteran Health Needs

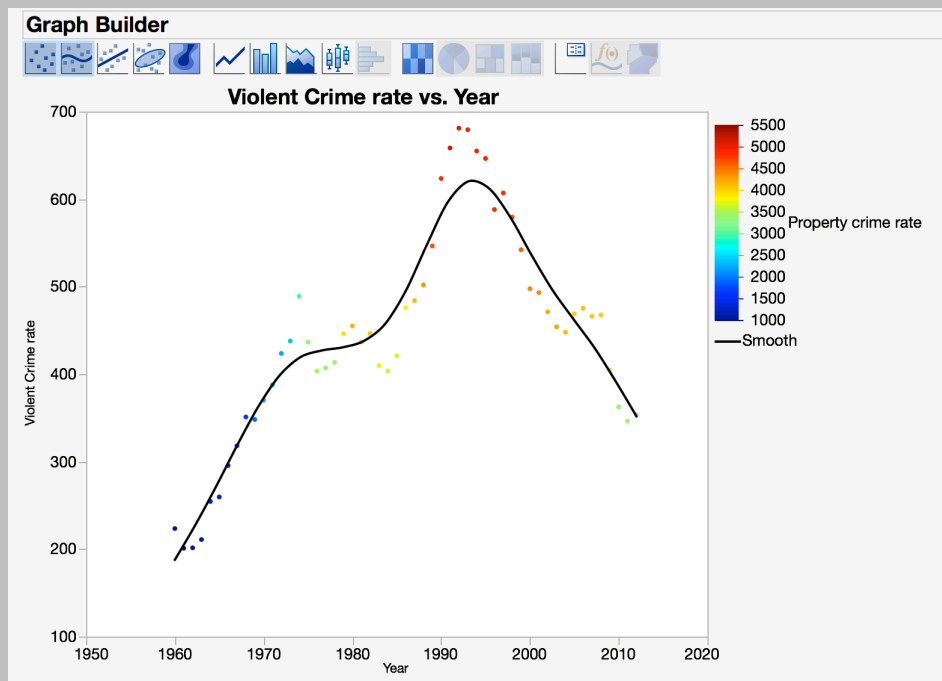
- According to 2015 VA data, 61% of post-9/11 veterans utilize VA healthcare, with 60% of these veterans using the VA in the last 12 months
  - Presence of a VA rated disability is inconsistently linked to utilizing VA care, but generally, a VA disability increased VA utilization (reviewed by Fried et al, 2015)
- Veterans receiving inpatient VA care are more seriously ill than comparable patients at non-VA facilities (Agha et al 2000)
  - Differences remained after adjusting for number of clinical conditions, demographic factors, and relative efficiency of VA vs other facilities



# Veteran Health Questions for NC

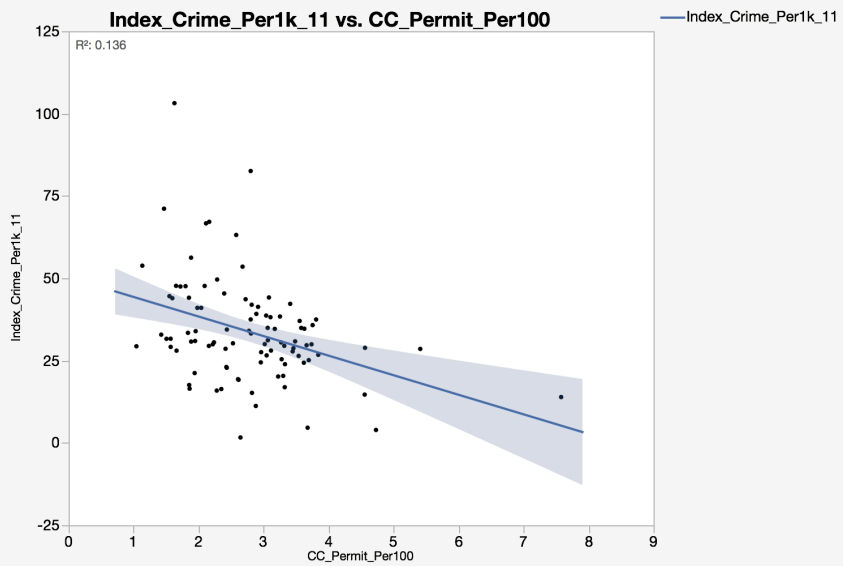
- Rural veterans
- Role of telehealth
- Future of Veterans Choice (non-VA care paid by VA)

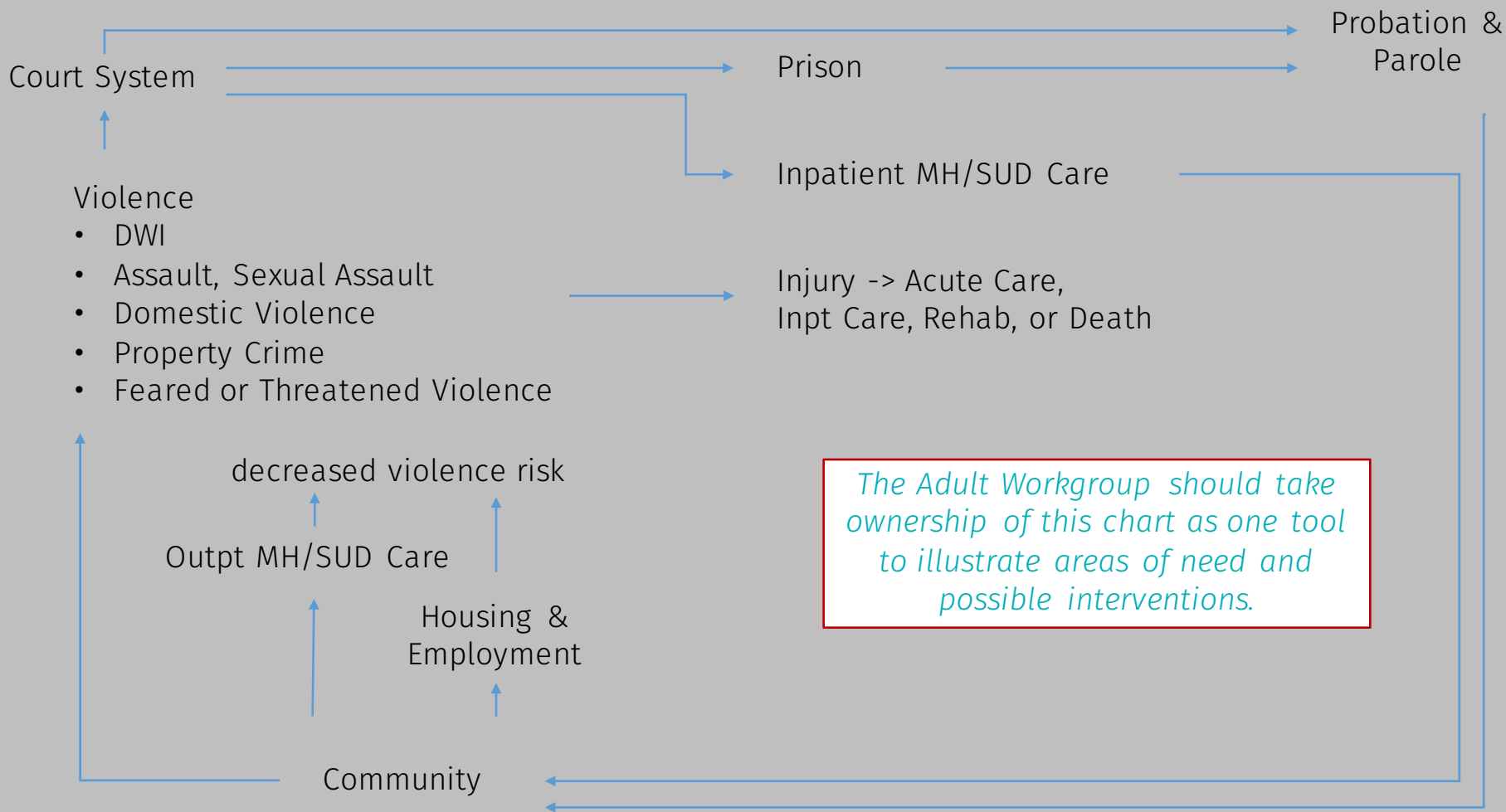
# Crime in North Carolina, 1960-2012



- Violent crime rate peaked at 682 in 1992
- Despite reductions in the last 20 years, property and violent crime rates are around 3.5x and 1.6x higher than 1960 levels

Graph Builder





# Psychosis and Violence

- Witt et al reviewed 110 studies on 45,000 individuals and identified violence risk factors as:
  - Personal history of child abuse, homelessness, male, non-white, current lower SES; parental history of criminal behavior or alcohol misuse;
  - Criminal history (most factors reviewed, but not recent violence)
  - Lack of insight, anti-social personality diagnosis, not adhering to psychotherapy (much more so than not taking medication); prior suicide attempts
  - Strongly associated with comorbid substance use diagnosis and prior criminal activity
- A 10-year prospective study found treating psychosis and SUD was linked to fewer violent acts (Langeveld et al 2014)

# PTSD and Violence

- Elbogen et al (2014) examined violence among OEF/OIF veterans in an epidemiologic survey of 1000 veterans. Results indicated risk factors for violence:
  - Include younger age, financial problems, pre-military violent behavior, higher combat exposure, PTSD diagnosis, and alcohol misuse
  - The combination of PTSD and alcohol misuse was linked to subsequent violent behavior
  - However, the presence of PTSD or alcohol misuse was not associated with a higher rate of violence
- MacManus et al (2013) found similar results in a UK cohort study and recommended alcohol and aggression as treatment targets, with PTSD as a less prominent target.

# Children and Fatal Motor Vehicle Accidents (MVA)

- Kelley-Baker & Romano (2014) examined FARS data for passenger vehicles (i.e. ignored commercial vehicles) for fatal accidents when the child was <16 yo and the driver was 21+ yo
  - 177 annual USA child fatalities from own driver where BAC  $\geq 0.08$
  - These crashes occur more likely at night and without seat belts
  - Since 2000, the lowest annual percent of child fatalities from own driver involving alcohol is 10.5% in 2003
- Extrapolation to NC is difficult. Assuming injuries are proportionate to population, NC will experience 5 or 6 alcohol-related child fatalities per year. However, a mean 177 per year may not reflect scaling for annual passenger-miles driven.

# Children, Alcohol, and Fatal MVA



Rate of child passenger deaths while transported by an alcohol-impaired driver and percentage of child passengers killed while riding in same car as an alcohol-impaired driver: FARS, United States, 2001–2010.

Kyran Quinlan et al. *Pediatrics* 2014;133:966-972





# Children and non-fatal MVA

- Romano and Kelley-Baker (2015) examined GES data for non-fatal accidents involving children using similar methods.
  - After including alcohol in the statistical analysis, the effect of speeding and failure to obey traffic signals disappeared
  - Annually, about 860,000 children <15 yo are involved in a non-fatal MVA, and 165,000 of them are non-fatally injured
  - Between 2002-2011, alcohol was involved in ~1% of all crashes, and ~2% of crashes with non-fatally injured children. Note that alcohol use was reported by law enforcement, not actual BAC, and may be an underestimate of actual alcohol intoxication rates
  - Extrapolation to NC suggests annually ~25,000 children are involved in accidents, and 5,100 of them are injured; alcohol is a factor in 250 and 110 cases, respectively

# Drug Use and MVA Fatalities

- Rudisill et al reported on FARS data and drug use for MVA fatalities 1999-2010 where drug test results were known:
  - Presence of any drug or alcohol increased 18% in 1999 to 28% in 2010
  - Of the drivers testing positive for any drug, in the three years prior to the fatal crash, 29.5% crashed and 36% were convicted of a DUI
  - Comparing 1999-2000 to 2009-2010, cannabis and benzodiazepine use roughly doubled and opiate use was 4.3 to 6.4x higher. In absolute terms of a hypothetical 1000 crash victims in 2009-2010, drugs were present as 117 with cannabis, 60 with benzodiazepines, and 50 with opiates
- For 10,000 drug positive drivers, more than one car was involved in the accident (~800 per year, or ~24 in NC)

# Ignition Interlocks and DUI Rates

- McCartt et al note 31% of fatal MVA involve an impaired driver and ask if ignition interlocks would reduce DUI recidivism, citing two studies reporting 60-80% lower recidivism rates with interlocks.
  - Results found lower re-arrest rates, and an 8% reduction in late-night single vehicle crash rates.
  - A 2004 Cochrane review found these devices were effective only while installed (Willis et al 2004; Cochrane Database Syst Rev 2004; Oct 18;4:CD004168)
  - *Is there value in requiring the devices after DUI? Does DUI require criminal state of mind for a conviction? What if DUI first offense was managed administratively through DMV?*

# MVA Burden

- Bergen et al (2014) report for every one MVA fatality in 2012, there are an estimated 8 hospital admissions plus an additional 100 victims treated and released from the ED
  - Estimated cost per ED visit \$3300 and hospitalization \$56000, with 80% of the costs occurring within 18 months after the crash
- These results lead to the injury costs linked with every MVA fatality as 8@ \$56000 plus 100@ \$3300 within 18 months
  - Total injury costs implied per MVA fatality: \$778,000
- NC MVA death rate per 100,000 population = 8.6, or 855 anticipated deaths per year

# Reducing Alcohol Effect upon MVAs

- With 855 MVA annual deaths in NC and ~30% of MVA fatalities involving alcohol (McCartt 2013), 256 alcohol deaths are attributable to alcohol. Remember alcohol rates do not include drug use rates.
- 256 deaths @ \$778,000 injury costs per fatality = \$200m per year
  - This figure is a starting point for calculating the reduction in direct health care costs attributable to reduced DUI risk through improved MH and SUD treatment. I have omitted all costs for lost wages or productivity, choosing to include only direct medical costs.

# Alcohol and Domestic Violence

- Two review studies examined existing work on attempts to reduce domestic violence through alcohol-related interventions (Kearns et al 2015; Wilson et al 2014).
  - Despite a sizable body of evidence showing statistical associations between SUD and domestic violence, correlation does not imply causation, as reflected in neither of these two studies finding any clear interventions for domestic violence.
  - Wilson et al suggests that SUD programs may be modestly useful while the violence perpetrator remains enrolled.

# Occupational Injury

- Ramirez et al examined 427 fatal occupational injuries in a state database from 2005-2009 and reported drug and alcohol test results.
  - Nearly half of all cases involved vehicular deaths
  - 280 of the 427 cases were tested, and 22% of tests were positive. 70% of positive test results could have altered the victim's mental status
- Applying calculations similar to the MVA results suggests that ~210 vehicular fatalities would be associated with 1600 hospital admissions and 21,000 ED visits, and assuming similar costs, \$158m. With ~20% positive tests, the economic starting point is ~\$30m in potential cost avoidance

# College Student Health

- College students drink excessively, and this alcohol use is associated with elevated risks for assault, sexual assault, and MVA (Hingson 2009)
- A brief web-based educational intervention targeting female college students was shown to reduce alcohol-related sexual assaults for the women with more severe histories of sexual assault victimization (Gilmore et al, 2015)



# Issues and Questions

- In motor vehicle accidents – fatal and non-fatal – does the state require testing for alcohol and drug use? Are results included on death certificates?
  - *It is not possible to identify, track, or improve problems without consistent data*
- What is the expected efficacy of outpatient programs with or without specialty courts in reducing risks of recurrent violent actions from alcohol- and/or drug-related factors?

- Given the striking increases in cannabis and prescription drug use rates among fatally injured drivers, should alcohol and drug testing become more widely used? If yes, would special courts leverage these test results into greater public safety?
  - *Courts and MH/SUD professionals should adopt a shared goal of risk reduction toward SUD-related violence. Less violence from alcohol and illicit drug use appears to be an important public good.*
- The potential direct cost avoidance from alcohol related MVA and occupational injuries may be around \$230m per year.
  - *What is the expected Medicaid impact? Should lost wages and productivity be included in that amount, and if so, how? Would workers comp rates be affected, improving NC business climate?*

- What are the anticipated economic results from a risk reduction program upon hospital ED visits and admissions for assaults, falls, and intentional self-harm?
  - *Time, not interest, precluded answers to these questions*
- Does NC law allow, require, or not address ignition interlock use for alcohol-related driving offenses? If interlocks are considered, should their use be mandatory or factored into sentencing?
  - *Interlocks appear to decrease re-arrest rates. The effect upon vehicle crashes is less clear. Does the public want fewer accidents or more arrests? Does the threat of interlock reduce SUD treatment stigma?*

- Would an ACO model allow catastrophic risk protection, incentives for private organizations to share system-wide savings, and simultaneously expand MH/SUD access?
  - *Review risk-sharing capitated models driving organizational change and cost reductions at Duke University Hospital ca 1995-2000.*
- The state corrections system could score inmates for possible violence risk from MH and/or SUD and refer them for specialized outpatient care
  - *These care resources might include a forensic ACT team, a specialized medical – behavioral outpatient team, or model similar to mobile Vet Center*

...to be continued...

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<http://www.ncglobaleconomy.com/biotechnology/tables.shtml#table3a>