Missing the forest for the trees: The world around us and surgical treatment of endocarditis

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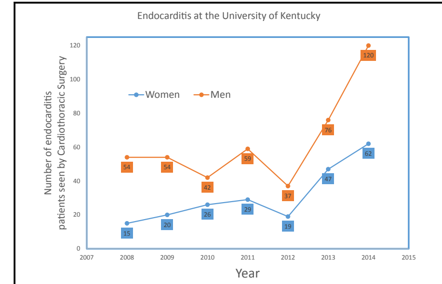
ABSTRACT

There has been a dramatic increase in intravenous drug abuse (IVDA)–related deaths in midlife Americans. Nowhere is this more profound than in rural Appalachia, with Kentucky in the midst of the epidemic. The causes of this finding are multifactorial and likely related to social, economic, legal, and population factors. Evidence suggests that the economic middle class is shrinking. The traditionally white midlife demographic that used to comprise more than 80% of the US middle class now accounts for less than 60%. Along with this shrinking middle class come the inevitable trappings of poverty, including drug abuse. Population-based data reveal that the shrinking middle class is associated with a significant rise in drug abuse in the population that traditionally made up the middle class; that is, white, midlife Americans. In Kentucky, the drug of choice for abuse has changed during the past 2 decades, largely related to law enforcement and political efforts. Efforts to control drug abuse have, however, suppressed availability and use of 1 substance only to have another move to the forefront. For example, during this time abuse has shifted from methamphetamine at the turn of the century to narcotic pills during the early 2000s to intravenous injection of heroin beginning around 2010. Along with this shift in the drug of choice for abuse came an alarming trend in mortality associated with IVDA, both in Kentucky and nationally, including the need for surgical correction of IVDA-related endocarditis. Thoracic surgeons have tended to avoid or ignore the greater problems that caused the epidemic of IVDA-related endocarditis. Perhaps it is time for thoracic surgeons to give a stronger voice to the societal issues that loom in the background of this epidemic. (J Thorac Cardiovasc Surg 2016;152:677-80)



Increasing incidence of endocarditis in rural Appalachia.

Central Message

Drug-related endocarditis and associated mortality are increasing in white, midlife Americans. The causes suggest societal problems that need to be addressed.

Perspective

Intravenous drug abuse-related endocarditis represents more than just operative treatment of complex problems of valvular endocarditis. Thoracic surgeons can play a role by bringing the problem of intravenous drug abuse to public consciousness and by facilitating solutions to the underlying causes of this problem.

See Article page 832.

See Editorial Commentaries page 681 and 842.

If you can't see the forest for the trees, you can't see the whole situation clearly because you're looking too closely at small details, or because you're too closely involved.

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Abusers of intravenous drugs are not a favorite population for cardiothoracic surgeons to manage. Apart from the high recidivism rate, the operations required to treat complex endocarditis require intensive surgical interventions and dramatic resource expenditures. The hours spent reconstructing the fibrous skeleton of the heart in a patient with endocarditis are both long and tedious. There are very few simple operations for valvular endocarditis related to intravenous drug abuse (IVDA). Unfortunately, the rate of IVDA increased dramatically in Kentucky beginning around 2010 (Figure 1).

At the University of Kentucky, our hospital serves a large population from the eastern part of the state, where rural poverty persists and is increasing. The population is mostly

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Received for publication Feb 26, 2016; revisions received April 25, 2016; accepted for publication May 3, 2016; available ahead of print June 8, 2016.

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0022-5223/$36.00

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http://dx.doi.org/10.1016/j.jtcvs.2016.05.014

Abbreviations and Acronyms
CMEA = Combat Methamphetamine Epidemic Act of 2005
IVDA = intravenous drug abuse

white Americans, many of whom have lost jobs from decline in the coal industry or who avoid higher education in favor of work that provides for immediate, minimal standards of survival—food, shelter, and necessities of daily life. Our state struggles with the fallout of rural poverty in Appalachia, including drug abuse and addiction.

Substance abuse is well recognized in Kentucky. The abuse of crystal methamphetamine reached such national importance that, in 2005, the US Senate passed the Combat Methamphetamine Epidemic Act of 2005 (CMEA), which regulated, among other things, retail over-the-counter sale of ephedrine and pseudoephedrine (precursors in the manufacturing of methamphetamine). Notably, the CMEA is Title VII of the USA Patriot Improvement and Reauthorization Act of 2005. The final provisions of the law went into effect during September 2006. In Kentucky, Senate Bill 63, patterned after the CMEA, was passed banning the cold remedy methamphetamine precursors from over-the-counter sale. Purchases were allowed in quantities equal to a 30-day supply of medication. Photo identification and signatures are required. Affected medications can now only be dispensed at pharmacies from behind the counter. The law went into effect June 21, 2005. By 2009, Kentucky had closed 696 methamphetamine labs.[1] The methamphetamine problem was effectively controlled. Unfortunately, the underpinnings of substance abuse are not so easily controlled with legislation and law enforcement.

Next up was prescription painkillers. Centers for Disease Control and Prevention 2012 data show that at that time Kentucky had among the highest rates of prescription painkiller use, with 128 prescriptions written for every 100 adult citizens. In 2011, 1023 overdose deaths occurred in Kentucky, the vast majority of which were unintentional and attributed to the use of prescription oral painkillers. Florida had a similar issue with prescription painkillers. In 2010, 650 million painkiller capsules were shipped into the state of Florida; that is, enough for 34 pills for each resident. In 2012, the Florida state legislature passed laws regulating pain clinics and stopped health care providers from dispensing prescription painkillers from their offices. Kentucky House Bill 1, modeled after Florida's legislative efforts, restricted prescription painkillers and pain clinics.[2] One year after House Bill 1 went into effect, a press release from the Kentucky Governor's office described the influence of this legislation: "For the first time in a decade Kentucky overdose deaths have declined."[3] The report concluded by saying that "autopsy overdose deaths attributed to the use of intravenous heroin increased by 550% over the previous year, from 22 in 2011 to 143 cases in 2012" (Figure 1). This was the tip of the iceberg and a precursor of things to come.

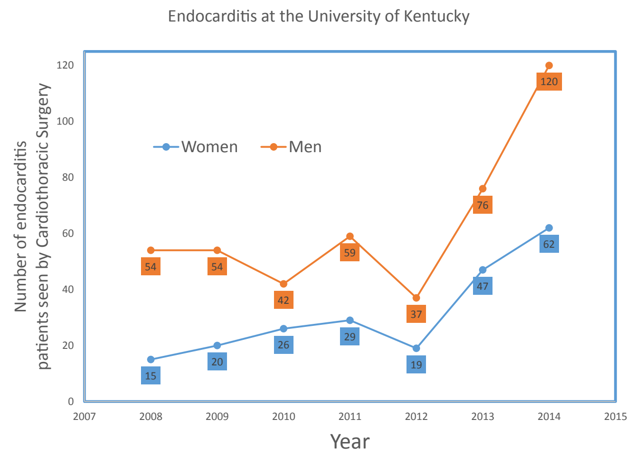

FIGURE 1. Increasing incidence of endocarditis in rural Appalachia.

IVDA rapidly replaced methamphetamine and prescription narcotic pill abuse as the leading cause of drug-related deaths in Kentucky beginning around 2012 (Figure 1). Surgical endocarditis patients are the most visible victims of this substance abuse epidemic in our field. However, nonoperative patients with primary endocarditis treated with intravenous antibiotics for 6 weeks in the hospital, patients treated for

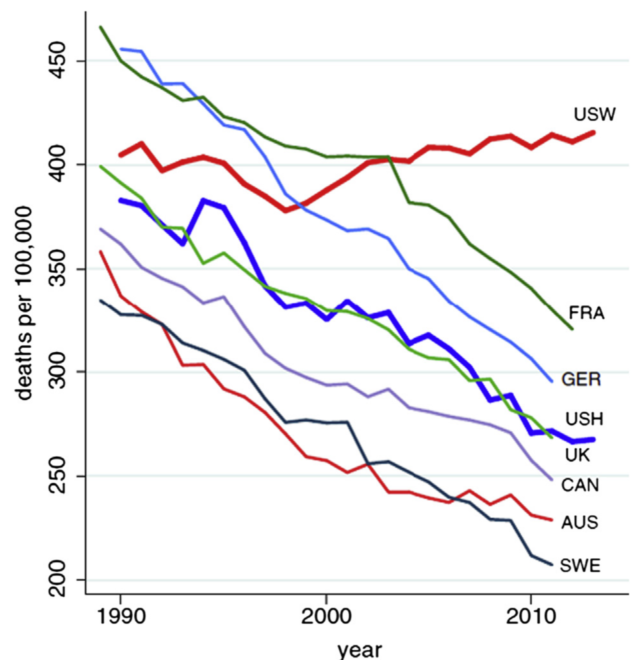

FIGURE 2. Increasing death rates in white, midlife Americans. *USW*, US white non-Hispanics; *FRA*, France; *GER*, Germany; *USH*, US Hispanics; *UK*, United Kingdom; *CAN*, Canada; *AUS*, Australia; *SWE*, Sweden. Reprinted with permission.[4]

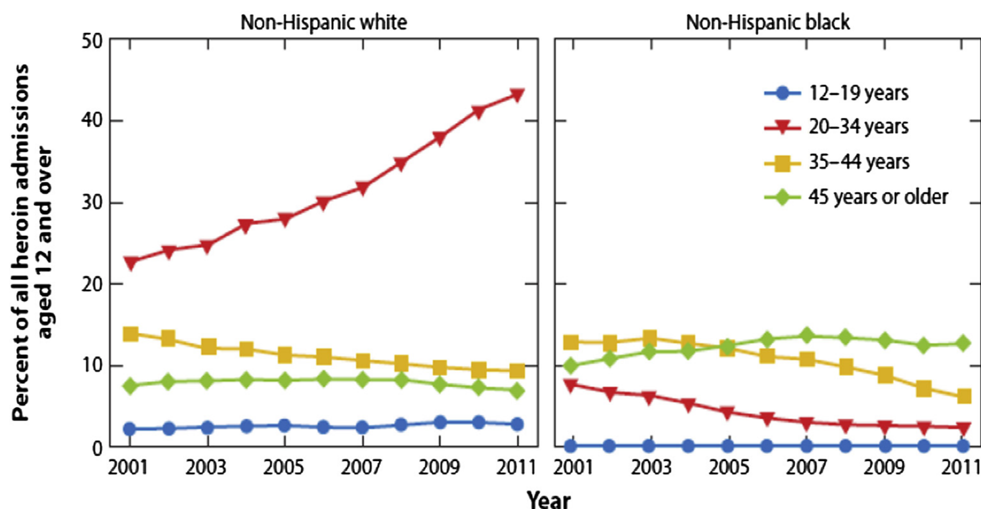

FIGURE 3. Heroin admissions, by age group and race/ethnicity between 2001 and 2011.[5] Reprinted with permission.[4]

hepatitis and other bloodborne diseases, violence associated with drug trafficking, and sexual abuse are all part of this epidemic. As so often happens, we, as a specialty, tend to focus on the immediate needs of patients without looking at the bigger picture. What exactly is causing this dramatic surge in endocarditis? Few people have accused cardiothoracic surgeons of not being able to see the forest for the trees, but that is exactly the crime of which we are guilty. When we saw the increase in endocarditis related to IVDA, we wrote this off as a Kentucky phenomena. Then we read the article by Case and Deaton.[4]

These authors identified an alarming decline in the life expectancy of midlife, white North Americans (Figure 2).[4] This trend of declining life expectancy was not seen in any other demographic groups studied. In fact, they found that death rates for non-Hispanic whites were rising or flattening for all adult age groups younger than age 65 years.[4] The decreasing life expectancy was particularly pronounced in white midlife women. Further, Case and Deaton[4] found that the mortality rate from drug and alcohol poisonings rose more than 4-fold between 2001 and 2011 for this group, from 13.7 to 58.0 deaths per 100,000 adults. Along with this alarming trend in drug- and alcohol-related death rates came a more than 100% increase in heroin-related hospital admissions among white non-Hispanics (Figure 3).[4,5] We were shocked by these findings. There are lots of candidate groups that we might have guessed have declining life expectancy, but not white midlife Americans. Then the light went on. Whom do we see dying at an alarmingly increasing rate at our institution? None other than white, midlife Kentuckians with IVDA. Then we started to ask colleagues at national meetings about their endocarditis rates related to IVDA. Surprise, surprise, this is not only a Kentucky phenomenon.[6] Then an article appeared on the front page of the *New York Times* that sealed the deal.[7] For their article, Kolata and Cohen[7] analyzed death certificates collected by the Centers for Disease Control and Prevention and noticed an alarming phenomenon: In 2014, the overdose death rate for whites aged 25 to 34 years was 5 times the level seen in 1999 (Figure 3), and the rate for whites aged 35 to 44 years tripled during that period.[5] The numbers cover both illegal and prescription drugs. Over the same time, death rates for blacks and most Hispanic groups continued to fall. There may be a reason why black individuals appear to have been spared the worst of the narcotic epidemic. Studies suggest that doctors are much more reluctant to prescribe painkillers to minority patients, worrying that they might sell them or become addicted. Andrew Kolodny, a nationally prominent expert on drug addiction, suggests that "racial stereotypes are protecting these patients from the addiction epidemic."[7] By failing to recognize these disturbing trends in drug addiction and use of intravenous heroin, we have been guilty of not seeing the forest for the trees.

There are many reasons for this alarming trend. The substrates for this development include a shrinking middle class associated with increasing poverty, unemployment, lack of education, and loss of job skills. There is little doubt that the middle class is shrinking.[8] In 1970, the share of national income that went to the middle class was 62%, and 80% of that wealth went to white Americans.[8] In 2014, the share of the national income that went to the middle class was 49% and whites made up 61% of the middle class.[8] The share of American adults in the lowest-income tier rose from 16% in 1971 to 20% in 2015, with whites having the biggest increase in lower income brackets.[8] This population shift likely underlies some of the poverty-related decline in life expectancy in whites in their midlife.

We are fairly sure that no single individual can do much about these alarming trends. We are equally sure that our specialty could do something about these trends if we were to raise our collective voice loud enough. First and foremost, we need to adjust our practice to care for

increasing numbers of patients with IVDA-related endocarditis. The operative challenges are substantial and the intricacies of treating this patient group need wide dissemination. Overcoming the technical challenges of operating on these very difficult patients is like examining the individual trees in a forest. We need to expand our view to look at the forest. Along with the technical parts of these complex operations, we need to address the needs of patients who often require social and other long-term interventions. Our practice routinely keeps patients undergoing operation for IVDA-related endocarditis in the hospital for 4 to 6 weeks after operation for continued intravenous antibiotic therapy. During their hospitalizations, there is need for rehabilitation of all sorts. We need to embrace prevention strategies. Importantly, longer-term goals like improving education and providing job skills are not a part of this rehabilitation process, but they should be. We have to enlist allies to see the forest more clearly and to address underlying problems. Insurance companies are likely allies because they may be footing some of the bill for the increased costs of treating IVDA-related endocarditis. Politicians may help, but legislation is not a guaranteed means of changing social patterns related to economic trends. Some countries have decriminalized drug abuse with moderate success,[9] but decriminalization was less successful elsewhere.[10] Law enforcement has failed to have an effect on drug abuse, but their assistance is needed and their understanding of the difficult substrate that leads to IVDA is essential. Educators are vital to the process of addressing the problem, especially because lack of education fosters unemployment and lack of job skills that increase drug-related crimes and abuse. The cure for IVDA is clearly a multidisciplinary undertaking, not mainly involving surgeons, but involving a larger part of society.

Chasing the Scream by Johann Hari[11] documents the war on drugs that started in the United States but spread internationally, conveniently stimulated by US economic influence worldwide. It traces the criminalization of drug abuse beginning in the early 1900s with the creation of the Federal Bureau of Narcotics and its first Commissioner Harry Ansberger. *Chasing the Scream*[11] contains dramatic, gut-wrenching personal stories of people the author met in the course of writing this book. These people include a transsexual crack dealer in Brooklyn who wanted to know who killed her mother, a mother in Mexico who spent years tracking her daughter's murderer across the desert, a child smuggled out of the Jewish ghetto during the Holocaust who helped unlock the scientific secrets of addiction, and a doctor who pushed the decriminalization of drugs in Portugal. These stories and other evidence make a very convincing argument in favor of decriminalizing drug abuse, as has been done in other countries. Decriminalization would be a major paradigm shift in our country's approach to drug abuse. Given the progressive sequencing of the abuse drug of choice, however, one has to ask what if, by some miracle, we did away with intravenous heroin abuse, what would be next? Would there be another drug to surface? Would we regress to the good old days of pill abuse? Are there designer drugs that might provide new highs?

Our simple-minded surgeons' view is that criminalization of drug abuse does not work. Some form of paradigm shift is required to limit the alarming death rate associated with drug abuse. Perhaps decriminalization is the answer, but maintaining the present course seems doomed to fail. Cardiothoracic surgeons can be the bellwether but others have to take up the challenge. We all need to accept it at a community level and at the national level. We look forward to the response that we know our specialty can provide.

Conflict of Interest Statement

V.A.F. has received fees for participation in an advisory panel (Acelity, a division of KCI Global) and for a continuing medical education event (Baxter Healthcare). The other author has nothing to disclose with regard to commercial support.

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Key Words: endocarditis, IV drug abuse, health outcome research, global health policies