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A Role for Regional Scientists in a Time of Crisis

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Abstract: The United States is in the midst of a drug crisis of unprecedented magnitude. It developed slowly at first, but has exploded across the country in recent years. It is exacting a huge human and financial cost. As the crisis continues to accelerate, it is beginning to decimate some areas, particularly small rural communities, including many in Central Appalachia. While the medical field and some other disciplines seem to have gone all in with regards to research on the crisis, regional science has pretty much been invisible. This paper lays out some facts regarding the crisis and makes a case for regional science to step up and be part of the discussion.

Keywords: regional, rural, mortality, drug crisis

JEL Codes: I15, O18, R10

1. INTRODUCTION

When I first began working on my Presidential Address back in the fall of 2016, a large portion of the U.S. population was still unaware of the drug crisis. Perhaps it was over-shadowed by conflicts overseas and fears of terrorism. Perhaps it was shoved to the side during a long, divisive, hotly-contested election campaign. Perhaps, despite reports and some news stories about the crisis, its beginnings as mostly a problem in poor rural areas meant that it was out-of-sight, out-of-mind for most people. In the year since, the crisis has exploded on to the front pages of the news as the drug problem has worsened throughout the country, being felt even in the suburbs of our metropolitan areas.

Most people readily see this drug crisis as a health and safety crisis and certainly as a major problem for our health care system and criminal justice system (including police). As we know, and the general public is beginning to better understand, the impact of the drug crisis is much broader. It is a problem for labor markets and local economic growth and development. It is a problem for governments at various levels who face strained budgets that require either raising substantially more revenue or cutting the quality of services provided. It is a poverty problem as more individuals and families are pushed into poverty at the same time that our social

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safety net gets overwhelmed by new costs related to the drug crisis. It is a social disaster as families, and sometimes entire communities, are ripped apart at the seams.

While broad awareness of the drug crisis is relatively recent, it has been building, on a smaller scale, since before the turn of the century. Nearly two decades ago, a large swath of counties that basically includes all of Central Appalachia, plus many nearby Appalachian counties in West Virginia and Tennessee, formed the core of the early stages of the current drug problem. These counties had rates of drug use and overdose deaths that would be considered high even by today's standards. During these 20 years, this region has continued to have among the highest rates of drug abuse and drug overdose deaths.

Given the complexity of the problem, understanding and addressing the current drug crisis requires a multifaceted approach. Its tentacles reach into so many different aspects of life and community that properly addressing the problem undoubtedly would benefit from perspectives from a wide variety of disciplines.

This leads to my primary question or issue. Where are the regional scientists? We have a major crisis that has built itself from a subnational level, has a clear spatial/regional character, has important economic and social aspects, and, for those of us in the Southern Regional Science Association (SRSA), has its "ground zero" in the heart of what we consider our home region.

My short answer to the question is that it appears, for the most part, that regional science is nowhere to be found. It is unfortunate if my impression is true. With our expertise in regional/spatial analysis, our experience in working with whatever information we can glean at some subnational level, our understanding of the importance of working across disciplines, and, for many in the SRSA, our knowledge about all or part of the Appalachian region, we potentially have much to contribute.

My plan here is to begin with an overview of the drug crisis from a national perspective. Then I will move down to a local/regional perspective, with particular focus on the Appalachian region. By then, it should be clear why we should be part of the research and part of the discussion. I will then talk about academic/policy contributions coming out of regional science.

2. THE NATIONAL DRUG CRISIS

Though the current drug crisis started on a much smaller scale in a limited number of locations, it has now truly become a national crisis. It is telling that the rates of drug use and rates of death from overdose that were considered to be crisis levels in parts of West Virginia and Kentucky back at the turn of the century are now about the average for the nation as a whole. At the national level, the numbers and trends are staggering:

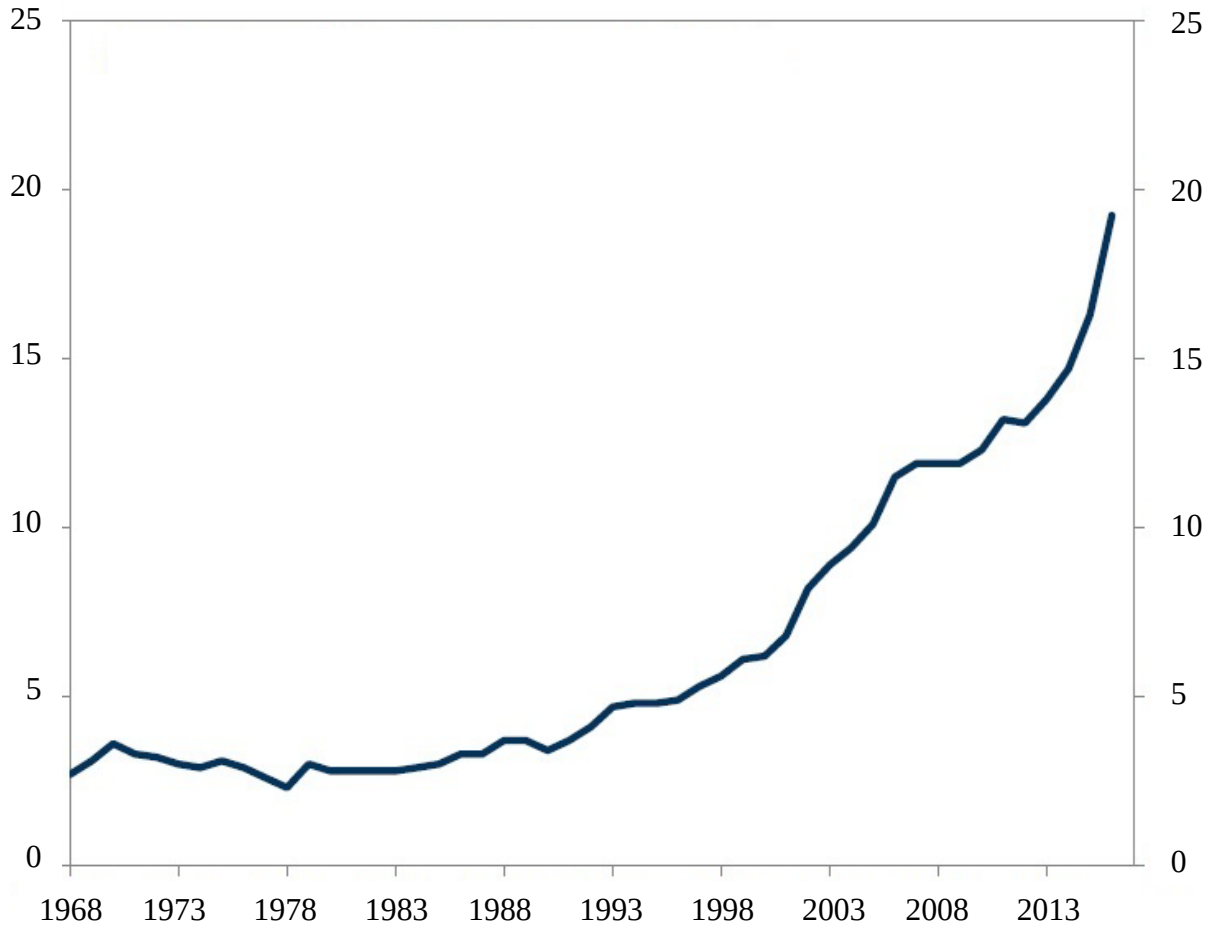
1) During 2015, an estimated 47.7 million individuals, aged 12 and over, used illicit drugs or abused prescription drugs, about 17.8 percent of the population in that age range. About 9.4 percent of the population abused prescription drugs during 2015. While the vast majority of illicit drug use was marijuana, 7-8 million individuals in this group used heroin, cocaine, or methamphetamine (SAMHSA, 2017).

2) Back in 1968, the official death toll from drug overdoses was approximately 5,000 people. This number slowly increased to approximately 8,000 people in 1990 (U.S. Department of Justice, 2017). As shown in Figure 1, the age-adjusted rate of drug deaths per year in the U.S. cycled some, but basically remained steady during this 22-year period, in the range of about

3-4 deaths per 100,000 population. During the 1990s, drug overdose deaths began to rise more rapidly, resulting in approximately 13,000 deaths in 1999, with a rate of about 6 deaths per 100,000 population (Monnat, 2016). After the turn of the century, the annual number of drug overdose deaths exploded, reaching 52,400 in 2015. The age-adjusted rate of drug overdose deaths increased from 6.1 per 100,000 population in 1999 to 16.3 in 2015, an overall average increase of 5.5 percent per year. The rate increased on average by 10 percent per year from 1999 to 2006, by 3 percent per year from 2006 to 2013, and by 9 percent per year from 2013 to 2015. The recently released provisional estimate for 2016 is 64,000, a 22 percent year-over-year increase, a rate of over 19 deaths per 100,000 for the year, and a rate of about 175 deaths per day. Recently, the National Institute on Drug Abuse estimated approximately 72,000 drug overdose deaths for the year 2017 (CNN, 2017). This would be the second consecutive year that the number of drug overdose deaths in the U.S. exceeded total U.S. casualties during the Vietnam War. Drug overdose deaths in these two years also exceed the peak annual deaths from guns, HIV, or automobiles.

3) Abuse of prescription drugs, mainly opioid-based pain medications, drove the increase in substance abuse and deaths during the early part of the century. Illicit drugs, primarily

Figure 1: Annual Age-Adjusted Rate of Drug Deaths per 100,000 Population in the United States, 1968-2016



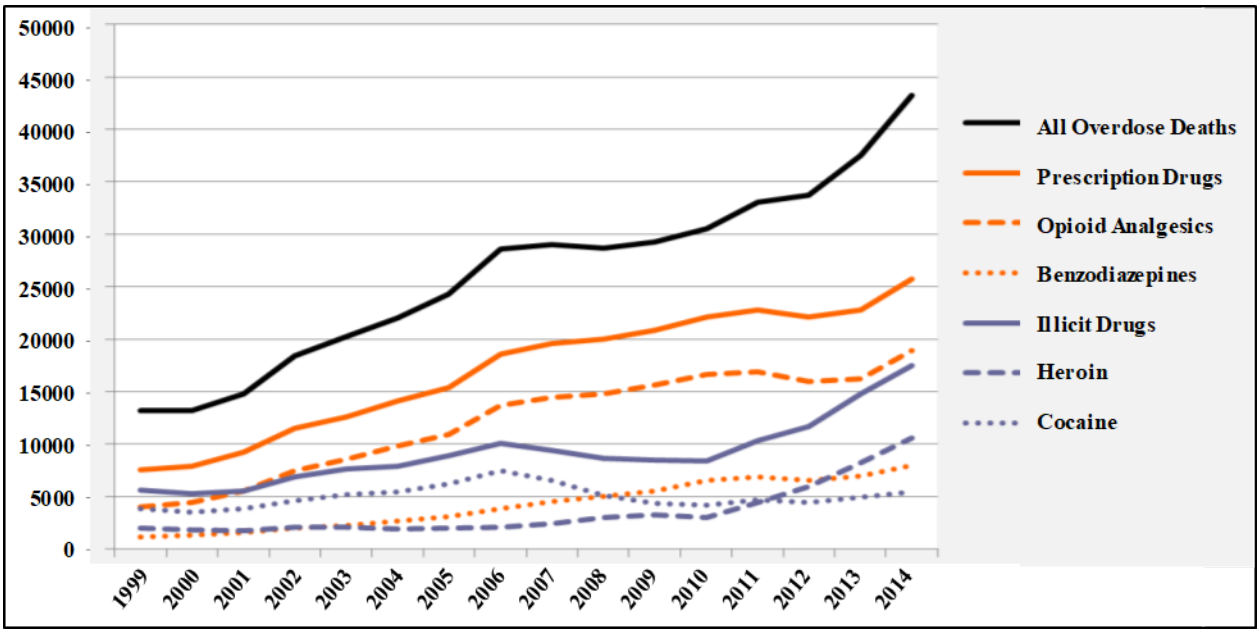
2016 is preliminary estimate. Source: The Fiscal Times (2017)

inexpensive heroin, have accounted for the surge since 2010 (Figure 2). The number of active heroin users in the U.S. more than doubled between 2002 and 2016 from 404,000 to 948,000. About 33,000 of the 53,000 drug overdose deaths in 2015, and nearly 50,000 of the 64,000 deaths in 2016, have been attributed to opioids. Much of the recent rapid increase in deaths by overdose has been attributed to increasing exposure to synthetic opioids, particularly fentanyl and fentanyl analogs, which are used to lace other drugs to increase potency and addiction. Fentanyl is estimated to be perhaps 50-100 times more potent than heroin. Exposure to fentanyl and its analogs accounts for the apparent discrepancy between a leveling off of opioid use and a continuing surge in opioid-related deaths. Experts also believe this explains the huge surge in cocaine-related deaths in recent years, including an expected 52 percent jump between 2016 and 2017. Fentanyl overtook heroin as the deadliest substance in the U.S. in 2016, claiming roughly 20,000 lives in 2016, up from just under 10,000 lives in 2015. These trends are expected to continue (CNN, 2017).

4) The number of drug overdose deaths in the U.S. is increasing rapidly for all age groups, but it is highest and has increased most rapidly for the middle-aged. For all age groups, the age-adjusted death rate from drugs was 16.3 in 2015. The death rate was 30.0 in persons aged 45-54 years and 28.3 in persons aged 35-44 years, more than 70 percent above the national average (CDC, 2017).

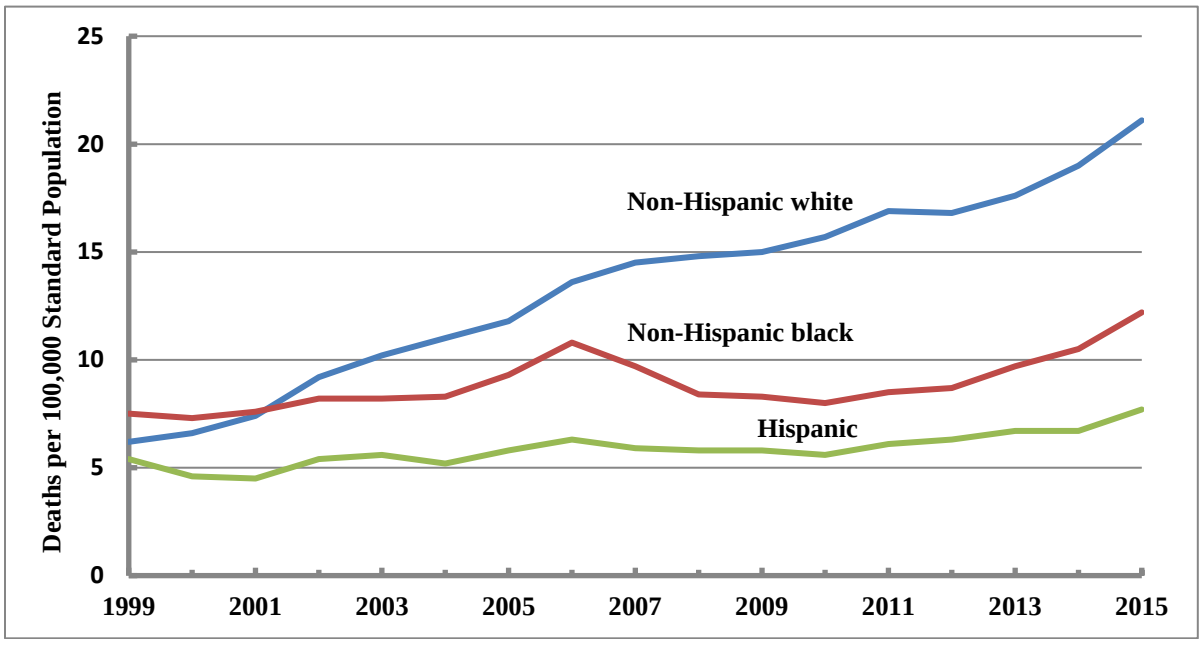
5) Drug overdoses are expected to remain the leading cause of death for Americans under 50, as synthetic opioids, primarily fentanyl and its analogs, continue to push the death count higher (U.S. Department of Justice, 2017). Drug deaths involving fentanyl more than doubled from 2015 to 2016, accompanied by an upturn in deaths involving cocaine and methamphetamine.

Figure 2: National Overdose Deaths from Prescription and Illicit Drugs, 1999-2014



Data: National Center on Health Statistics, CDC Wonder (2015). Overdose deaths include deaths with underlying causes of unintentional drug poisoning, suicide drug poisoning, homicide drug poisoning, or drug poisoning of undetermined intent, as coded in the International Classification of Diseases, 10th Revision. Source: Monnat (2016).

Figure 3: Age-Adjusted Drug Overdose Death Rates, by Race and Ethnicity, United States, 1999-2015



Statistically significant increasing trend for all three groups, $p < 0.005$. Rate for non-Hispanic white persons was significantly higher than for non-Hispanic black and Hispanic persons, $p < 0.001$. Deaths are classified using the International Classification of Diseases, Tenth Revision. Drug overdose deaths are identified using underlying cause-of-death codes X40–X44, X60–X64, X85, and Y10–Y14. Deaths for Hispanic persons may be underreported by about 5 percent. Access data table for Figure 3.

Source: NCHS (2017): www.cdc.gov/nchs/data/databriefs/db273_table.pdf#3

6) Unlike previous drug crisis episodes in the U.S., this crisis is having the greatest effect on non-Hispanic whites (Figure 3). The death rate per 100,000 population for non-Hispanic Whites (21.1) is almost double that of non-Hispanic Blacks (12.2) and almost triple the rate for Hispanics (7.7).

3. THE COST OF THE NATIONAL DRUG CRISIS

There have been a few major atempts to quantify the cost of the national drug crisis. In 2011, the National Drug Intelligence Center (NDIC) provided an estimate of the cost of illicit drug use in the annual *National Drug Assessment Threat* (NDIC, 2011), except for the year 2007. They estimated the cost as $193 billion, $120.3 billion related to lost productivity, $61.4 billion related to crime, and $11.4 billion related to health care costs.

Florence et al. (2016) estimated that the total "economic burden" of prescription opioid misuse alone in the U.S. was $78.5 billion for 2013, including the costs of healthcare, lost productivity, addiction treatment, and criminal justice involvement. Accounting for all drug abuse would yield a significantly higher total cost of drug abuse even in 2013, which would make it much more consistent with the National Drug Intelligence Center estimate.

Extrapolating these studies to account for the much higher rates of drug use, overdoses, and deaths since 2013 suggests a substantially higher cost to society in more recent years. Adding a fuller accounting of “value of life,” an estimate of the cost of long-term health, and ripple or multiplier effects would also greatly increase cost estimates.

There are many other costs that may be less direct and more difficult to measure in dollars, but are important none-the-less, such as the effect on labor markets and on families. Krueger (2017) and others (CNBC, 2017) suggest that the rapid increase in drug abuse since the turn of the century has contributed to the significant decline in the labor force participation rate, which hit a 40-year low of 62.4 percent in September 2015, and has only moved up about half a percent since then. The drug problem is wide-spread enough that it almost certainly has dampened participation in labor markets. These experts also believe that the drug crisis has slowed the recovery of employment in the aftermath of the recession. This may also be interfering with the ability of the economy to get back to full employment. From the perspective of employers, the drug problem also appears to be interfering with the ability to fill vacant jobs, something we often hear in the news. On multiple occasions in recent years, the Federal Reserve Bank has reported, in their *Beige Book*, comments from employers related to difficulty finding enough applicants who could pass drug tests (US Federal Reserve, 2012, 2015, 2017).

The U.S. is facing a crisis of unprecedented proportions. It crosses all demographic groups and has the potential to affect virtually all corners of our society. The societal cost is enormous and, like drug use and abuse itself, is accelerating rapidly. It finally seems to be broadly recognized for the potential catastrophe that it is, which will likely mean a much greater commitment of resources to address the problem.

4. ALCOHOL ABUSE

The statistics and discussion thus far have not incorporated alcohol abuse, which typically is not considered as part of the drug abuse problem that has exploded across the country. However, it is a significant component of the broader issue of substance abuse. To be complete, I will briefly present information regarding alcohol use and abuse.

In June 2017, the National Institutes of Health released its report from the "2015 National Survey on Drug Use and Health" (NIAAA, 2017). Some key facts from the survey:

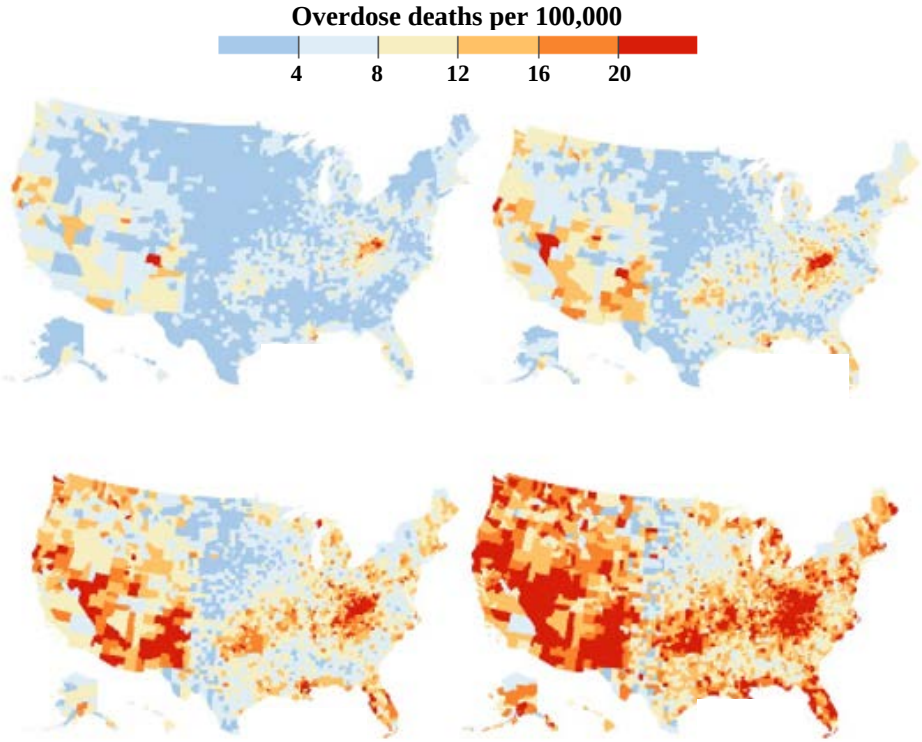
1) 26.9 percent of people aged 18 or older reported binge drinking during the past month, with another 7.0 percent reporting heavy alcohol use sometime in the past month.
2) 15.1 million adults (6.2 percent) aged 18 years and older were alcohol abusers, along with 623,000 (2.5 percent) of those aged 12-17 years.
3) An estimated 88,000 people die from alcohol-related causes each year; in 2014, 9,967 people died due to alcohol-impaired driving, which was 31 percent of overall driving fatalities.
4) For 2010, it was estimated that alcohol abuse imposed a cost of $249.0 billion on the U.S., with about three quarters of this cost related to binge drinking. As with drug abuse, it is likely that the full costs of alcohol abuse have been significantly underestimated.

Alcohol use and abuse has been much steadier over time, compared with drug abuse. For all of these years, however, alcohol abuse has been far more costly and far more deadly than drugs. Unless current trends change soon, drug abuse will surpass alcohol abuse on both counts.

5. LOCAL/REGIONAL/SPATIAL ASPECTS OF THE DRUG CRISIS

As anyone in regional science would expect, the big picture at the national level is only part of the story, missing all of the details and intricacies that play out at the state, or more often, the local level.

Figure 4: U.S. County Drug Overdose Death Rates over Time



Note: The source article has a series of maps for each year from 1999 through 2014.

Source: Park and Bloch (2016).

5.1 The Timeline of the Drug Crisis over Space

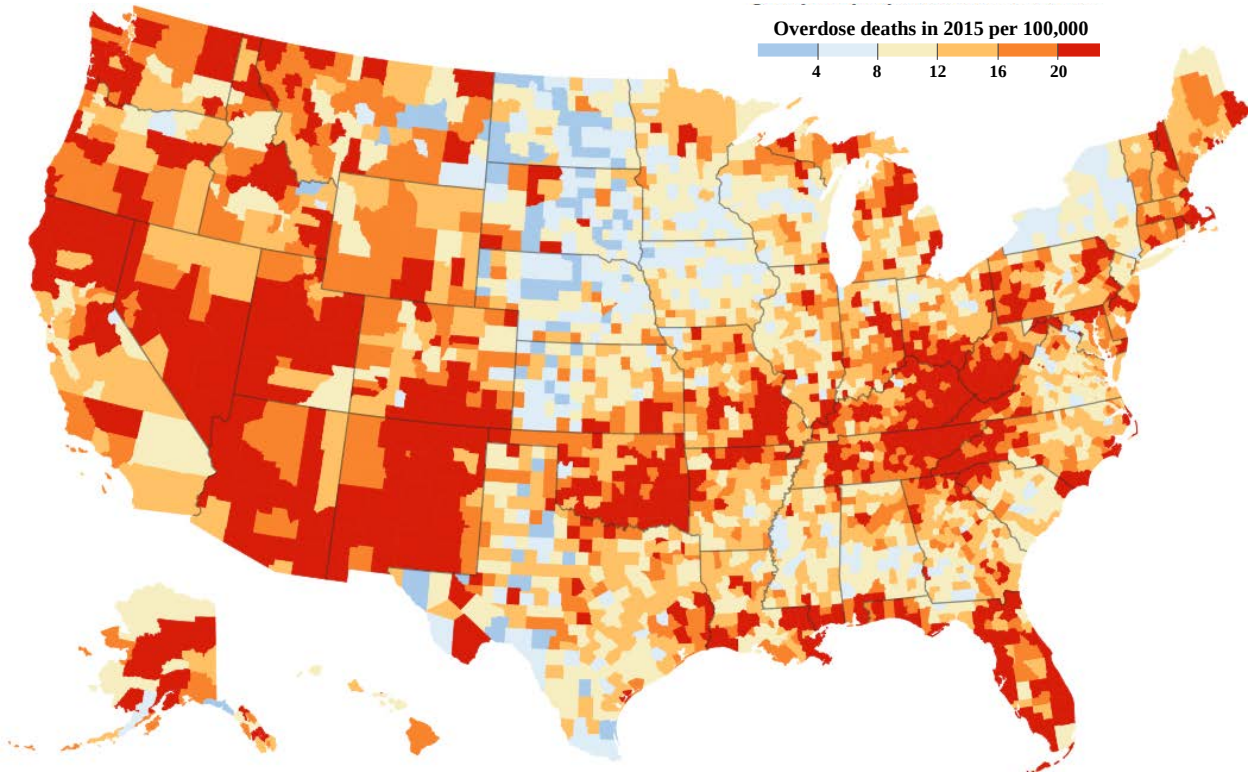
At the turn of the century, what was the beginning of our current drug crisis was just a blip on the radar. As shown in Figure 4, the earliest pockets of counties with high rates of drug overdose deaths were in the vicinity of Central Appalachia, but also with some high rates out in mostly lightly-populated counties in the southwestern states. Back in 1999, drug overdose death rates in these counties equaled or exceeded the current national rate of 16 deaths per 100,000 people, with many of these counties exceeding 20 deaths per 100,000 population.

Using the five-year intervals shown, drug overdose deaths increased at a relatively rapid rate, before seemingly exploding throughout much of the country in recent years. Throughout this period, the heaviest concentrations of high overdose counties appeared to spread out from those initial locations.

5.2 Current Patterns and Peaks

Figure 5, an enlarged map of county overdose death rates for 2015, clearly illustrates spatial patterns in the concentration of high and low overdose death rate counties, with high rate counties incorporating much of the Appalachian region, particularly the vicinity of Central Appalachia. The State of New York, including New York City and Long Island, stands out as a large pocket of counties with low overdose death rates. In 2015, McDowell County, WV had the

Figure 5: U.S. County Drug Overdose Death Rates, 2015



Source: Park and Bloch (2016).

highest overdose death rate in the nation at 93 per 100,000 people, more than 450 percent above the national average of 16.1 per 100,000 people.

With many policy initiatives to deal with the crisis established at the state level, it is worth noting that West Virginia's death rate from drugs (41.5) during 2015 sat well above all others, with New Hampshire (34.3), Kentucky (29.9), Ohio (29.9), and Rhode Island (28.2) rates also standing out above other states (Hedegaard, Warner, and Miniño, 2017). If death rates are representative of the magnitude of the drug problem, then these are also the states that may be facing the highest costs.

6. REGIONAL RESEARCH

6.1 Making Sense of Locally High Concentrations of Drug Abuse and Overdose Death Rates

As the drug crisis has exploded across the country, many have tried to explain the wide variation in the rates of substance abuse and mortality across space and time. Hollingsworth, Ruhm, and Simon (2017) connect increased drug abuse and mortality to macroeconomic conditions, as represented by the state (or county) unemployment rate, with substance abuse and death issues becoming more severe during economic downturns. They posit that economic downturns may lead to declining mental health (which may also lead to declining physical health) and an increase in use of prescription drugs. Though results are somewhat mixed, they do find evidence that local economic conditions affect substance abuse decisions, with drug abuse and mortality increasing when economic conditions deteriorate.

Carpenter, McClellan, and Rees (2017) also point to a causal connection between economic conditions, pain medications, and ultimately substance abuse. Importantly, they dig down further by stratifying by key demographic characteristics, such as sex, race/ethnicity, educational attainment, and age. They find the strongest and most consistent responses (greater drug abuse as unemployment rates rise) for whites and males and the older working age group (aged 31-64). These findings fit well with many studies that have noted that drug abuse rates for middle-aged white males were rising most rapidly. Though it is not really part of the research, they do note an important policy conclusion. As economic conditions deteriorate, state and local budgets also tend to deteriorate, leading to cuts in services, which likely would include cuts in programs that support treament for substance abusers. This is probably more likely the case for substance abuse treatment programs than for many others since many still view substance abuse as a moral failure rather than as an illness. Though they do not discuss it in this manner, if an economic downturn is leading to more substance abuse due to stress from the economic downturn, treatment programs should be viewed as part of the safety net provided during downturns. Safety net programs are intended to provide a floor to protect individuals from falling into too deep of an economic hole.

Case and Deaton (2017) explain the increasing rates of mortality in middle-aged, non-Hispanic whites with low levels of educational attainment to the combination of increasing "deaths of despair" from drugs, alcohol, and suicides and slowed progress toward lowering death rates from causes such as heart attacks. The "deaths of despair" result from poor and declining economic opportunities. These deaths are accompanied by significant deterioration in an individual's social and economic situation. They suggest that this effectively becomes intergenerational – that the situation deteriorates more for successive cohorts. They conclude that over time, marriage rates and labor force participation rates fall between successive birth cohorts, with reports of physical pain, and poor health and mental health rising. Their concluions would seem to fit many counties in Appalachia, particularly in Central Appalachia.

6.2 The Need for Regional Research

The studies discussed above were well done, interesting, and have important findings, but so much more is needed. None of the studies pay much attention to fundamental differences across places. Whether a study is done at the state level with 50 states (or 48 contiguous states) or for the 3,142 counties, we have an extremely heterogeneous mix along many dimensions. They vary greatly based on economic structure, spatial setting, history, culture, industrial mix, education, race, ethnicity, age structure (generally a wide range of demographic characteristics), government structure, political leanings, religious values, relative wealth, and more. For example, many of us in the SRSA have lived in Appalachia and focused some of our research on Appalachia. While the region has come a long way in many respects, since the formation of the Appalachian Region and the Appalachian Regional Commission back in the mid-1960s, a large part of the region, particularly, much of Central Appalachia, really is still "a region apart." Certainly, the same argument could be made for some other areas.

The research discussed above is typical of the approach that many scholars take, usually for good reasons. Fixed effects modeling allows for isolation of the unemployment rate effect on outcomes. Assuming fixed effects is a valid approach; we learn about the economic conditions proxy (such as unemployment rate), but learn nothing about all of the other differences which likely drive many of the outcomes that we see. While it is useful to be able to isolate the effect of a key variable that is a proxy for economic conditions, we need to use more of the rich details,

including the interactions among different variables in order to better understand outcomes. It is helpful to get some confirmation that current economic conditions have something to do with substance abuse outcomes, but there is much more to know.

I am convinced that better regional research could improve our understanding of the drug crisis and how and why it affects different places differently. Just as important, however, is that our research on places such as Appalachia is not just aimed at a better academic understanding of why things are as they are. Many of us have an interest in policy that improves outcomes for people and often for places. We are interested in growth and economic development or, for some places, finding ways for the population to adapt to change that might even mean a smaller, but stable, community. We need to understand the drug crisis and how it might play out differently in a place like Cabell County or McDowell County, WV so that we can think through what kinds of policies might help the county to adapt in a way that can ultimately regain some economic stability. That is unlikely to happen through broad brush research, even if that level of research sheds some light on some important topics.

6.3 Where Are the Regional Scientists?

This brings me to the main purpose and primary question from my paper. Where are the regional scientists and the regional research in the push to better understand the causes and effects of the growing drug crisis? For the most part, the answer is straightforward. While not perfect, one gauge of whether and how much we have immersed ourselves in this topic is to look at what has been published in the main journals for the regional science discipline. To do this, I looked through the last 10 years' worth of issues for the following journals: *Annals of Regional Science, Growth and Change, International Journal of Urban and Regional Research, International Regional Science Review, Journal of Regional Analysis and Policy, Journal of Regional Science, Journal of Urban Economics, Papers in Regional Science, Regional Science and Urban Economics, Regional Studies, Review of Regional Studies,* and *Urban Studies*. From this list of 12 core regional science journals, I found the following papers related to the drug crisis in the U.S.: N/A

Unless I somehow missed something, not a single paper appeared on the brewing drug crisis in 10 years' worth of the 12 journals that pretty much define our field. Perhaps there has been a good "regional" paper in a general interest journal in economics or geography, though I have not come across one. And if there is one, it still has not stirred up discussion and analysis among regional science scholars. I have only looked at a small number of programs, primarily for SRSA and NARSC, and there is not much there, either – just a couple very recent presentations.

I was not expecting to find that a large number of regional science scholars had immersed themselves in research on regional aspects of the drug crisis. On the other hand, I believe there are strong reasons that some should do so. Certainly for anyone interested in rural development, of which there are many in the SRSA, as well as some in other regional associations, this crisis commands attention. It has already devastated many rural places and will likely do much more damage until this country finds a way to turn the trend in the other direction. It has crushed the work force in many places, which is bad for households and for firms. It is overwhelming for the rural healthcare system. It is imposing huge costs on local governments and agencies, many of which are still struggling in the aftermath of the recession and the steep decline in energy markets, as well as markets for many commodities. For now, experts expect the problem to

continue to get worse. Given the nature of addiction, the crisis may have major effects on some areas long after we turn the corner on drug addiction.

A few scholars are making a start. Frank O'Connor (Eastern Kentucky University) has research underway and has begun presenting some of his work (O'Connor, 2016). David McGranahan (Economic Research Service, USDA) has collaborated on research with Shannon Monnat (Monnat, 2017) and just presented new research at the the 2017 North American Regional Science Meetings (McGranahan, 2017). I hope that their work will spur others to engage in this line of research.

The drug crisis and its effects on places is a large, complex area of study that we know will require expertise in a variety of fields. Thus far, I see little evidence of good regional/spatial analysis, despite the crisis having many characteristics that call for this type of work. I believe regional scientists have valuable skills to bring to the table, including regional analysis skills, spatial analysis skills, interdisciplinary pedigree, and many with a deep understanding regarding the nature and dynamics of the rural economy, particularly in Appalachia. I hope our scholars will step up to the table to share knowledge and skills that might help some of these places move forward.

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