Identification of Vulnerable Communities in Health Impact Assessment

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Abstract

A Health Impact Assessment (HIA) is one tool that can be used by policy makers to identify potential positive and negative impacts of a policy under consideration, and focuses specifically on populations that may experience disproportionate health impacts if a policy is or is not adopted. Because decision-makers are faced with multiple tight deadlines, and because each policy decision has a different combination of factors that may ultimately influence health, it is sometimes difficult for HIA practitioners to communicate the impacts among vulnerable populations succinctly. Using distribution analyses and mapping techniques, a flexible, topic-tailored vulnerability score was developed to illustrate the 13 counties in Kansas that might be at highest risk for disproportionate health effects related to the passage of medical marijuana legislation. This tool can add to the research methods used in HIA, and could assist in tailoring recommendations, targeting monitoring efforts, and planning engagement activities for the needs of vulnerable communities.

Introduction

Health Impact Assessment (HIA) is a tool used to inform decision-makers on the potential positive and negative impacts of a policy that is under consideration. HIA aims to protect and promote health and to reduce inequities in health during a decision-making process.[i] The International Association of Impact Assessment defines HIA as: a combination of procedures, methods and tools that systematically judges the potential, and sometimes unintended, effects of a policy, plan, program, or project on the health of a population and the distribution of those effects within the population. HIA identifies appropriate actions to manage those effects.[ii]

As a best practice, HIAs focus on promoting health equity; one of the key values of HIA is the identification of vulnerable populations that might be disproportionately impacted by a policy decision. These vulnerable populations may include low-income, youth, indigenous populations, and racial and ethnic minorities, among others. Some of these populations can be defined geographically, for example, counties with high rates of mental illness, low-income census tracts, or zip codes with a high percentage of indigenous populations. While users of HIA may strive to promote health equity among these populations, it has been identified that many HIAs could be improved by taking a more intentional approach to addressing equity, and new tools have been sought to remedy this.[iii]

Decision-makers are faced with multiple decisions and tight timelines, and making the findings of an HIA relevant in a succinct way is often a challenge for practitioners of HIA.[iv] Furthermore, each policy decision has its own context and a unique combination of factors may influence levels of vulnerability among populations and sub-populations.

In response to these challenges, a flexible, topic-tailored vulnerability score was developed to illustrate which counties might be at highest risk for disproportionate health effects if medical marijuana were to be

legalized in Kansas.[1] This vulnerability score can be used in a variety of projects, including HIA, and can be adapted to encompass indicators relevant to the decision topic. It can also be used on a variety of geographies, including states, zip codes or census tracts. For use in HIA, the vulnerability score can be utilized during the assessment step in addition to other methods.[v] It can also assist HIA practitioners and decision makers tailor recommendations, target monitoring efforts, and plan engagement activities towards the needs of these vulnerable communities.

Methods

There are six steps in conducting a Health Impact Assessment: Screening, Scoping, Assessment, Recommendations, Reporting, and Monitoring/Evaluation.[vi] The development of this vulnerability index was part of the assessment step, but could also be utilized to summarize baseline conditions that relate to marijuana use.

During the screening and scoping steps, the topic of interest was identified. In this HIA, the topic was the legalization of medical marijuana in Kansas. Next, a pathway diagram[2] was constructed and a literature review was conducted to identify the additional themes and determinants of health that were associated with the legalization of medical marijuana. The items identified for the HIA were: access to marijuana, consumption of marijuana, crime, incarceration, ingestion and overdose, driving under the influence, changes in local and state tax revenue, and employment. In the assessment step, data sources and methods were identified, data were collected, and a literature review was conducted to identify which of the determinants of health and health behaviors are related to higher marijuana use. Based on this information, measures were identified to include in a vulnerability score which would inform the recommendations related to medical marijuana legalization.

Sixteen measures (listed in Table 1) were identified through the literature review and data collection and were used to identify which counties might be vulnerable to increases in marijuana consumption. All of these measures were averaged for the five-year period of 2008-2012. For 14 of the 16 identified measures, higher values represent greater vulnerability for the geographic unit. To provide a standardized approach to quantifying and comparing scores, the means, standards deviations and z-scores[3] were computed for all geographical units on each measure. On the two measures where a higher value indicated lower vulnerability (median income and age of initiation), the opposite value of the z-score was assigned and used in the calculation of the aggregate vulnerability score.

Higher z-scores indicate larger differences between the values of a measure for a specific geographic unit compared to the average of all geographic units being compared on that measure. This approach was useful for the quick identification of outliers. For example, a county with a z-score greater than or equal to 1.5 is among the poorest performing 6.7% of all counties for this measure (assuming this measure follows a normal distribution). A z-score of 1.5 or greater was used as a cut-off to identify counties that may be at increased vulnerability for each measure. Aggregate vulnerability scores were computed by counting the number of measures with z-scores of 1.5 or greater for each county. The maximum vulnerability score was 16.

[1] This vulnerability score was developed as part of the Kansas Medical Marijuana HIA Project. A full report of HIA findings and recommendations will be available in July 2015.
[2] A pathway diagram is used in the Scoping step of HIA. A pathway diagram describes effects directly related to the proposal and traces them to health determinants and finally to health outcomes.
[3] Z score = (county value - mean) / (standard deviation)

Table 1. Domains and Measures in the Vulnerability Index

Domain	Measure and Description	Source
Perceived Availability of Marijuana	Percent of youth who answered "very easy" to the question: if you wanted to get some marijuana, how easy would it be for you to get some?	Kansas Communities That Care (CTC) Survey
Youth Lifetime Marijuana Use	Percent of youth who answered "At least once" to the question: on how many occasions (if any) have you used marijuana in your lifetime?	Kansas CTC Survey
Youth Past 30-day Marijuana Use	Percent of youth who answered" At least once" to the question: on how many occasions (if any) have you used marijuana in the past 30 days?	Kansas CTC Survey
Age of Initiation of Marijuana Use	Average Age of marijuana initiation (youth)	Kansas CTC Survey
Marijuana-related Offenses	Rate of marijuana-related offenses per 10,000 people	Kansas Bureau of Investigation (KBI)
Violent Crime	Rate of Violent Crimes per 100,000 People	KBI
Property Crime	Rate of Property Crimes per 100,000 People	KBI
Poverty	Percent of population with income in the past 12 months below federal poverty level	Census Bureau, 2012 ACS 5-year
Income Inequality	Ratio of household income at the 80th percentile to that at the 20th percentile	Census Bureau, 2012 ACS 5-year
Educational Attainment	Percent of adults aged 25 years and over with less than a high school diploma	Census Bureau, 2012 ACS 5-year
Median Income	Median Household Income	Census Bureau, 2012 ACS 5-year
Unemployment	Percent of population aged 16 years and over in Labor Force that is unemployed	Census Bureau, 2012 ACS 5-year
Youth Lifetime Alcohol Use	Percent of youth who answered "At least once" to the question: on how many occasions (if any) have you had beer, wine or hard liquor to drink in your lifetime?	Kansas CTC Survey
Youth Binge Drinking	Percent of youth who answered "At least once" to the question: Think back over the last two weeks. How many times have you had five or more alcoholic drinks in a row?	Kansas CTC Survey
Racial Disparity: Poverty[†]	The difference between Hispanic and non-Hispanic White on the percentage of population with income in the past 12 months below federal poverty level	Census Bureau, 2012 ACS 5-year
Racial Disparity: Poverty[‡]	The difference between Black and non-Hispanic White on the percentage of population with income in the past 12 months below federal poverty level	Census Bureau, 2012 ACS 5-year

[†] In counties where the Hispanic population in the denominator is smaller than 20 persons, the value is suppressed for this measure.
[‡] In counties where the Black population in the denominator is smaller than 20 persons, the value is suppressed for this measure.

Results

Thirteen counties were identified that had aggregate vulnerability scores of greater than or equal to 3. Nearly all (104 of 105) counties had scores between 0-5; the exception was Wyandotte County, whose vulnerability score was 9. The scores were divided into three 'low' scores (0-2), three 'high' scores (3-5), and three 'very high' scores (6-9). The 13 counties that were identified as having 'high' vulnerability scores (greater than 3) are illustrated in Figure 1 and listed in Table 2.

Figure 1. Vulnerable Kansas Counties

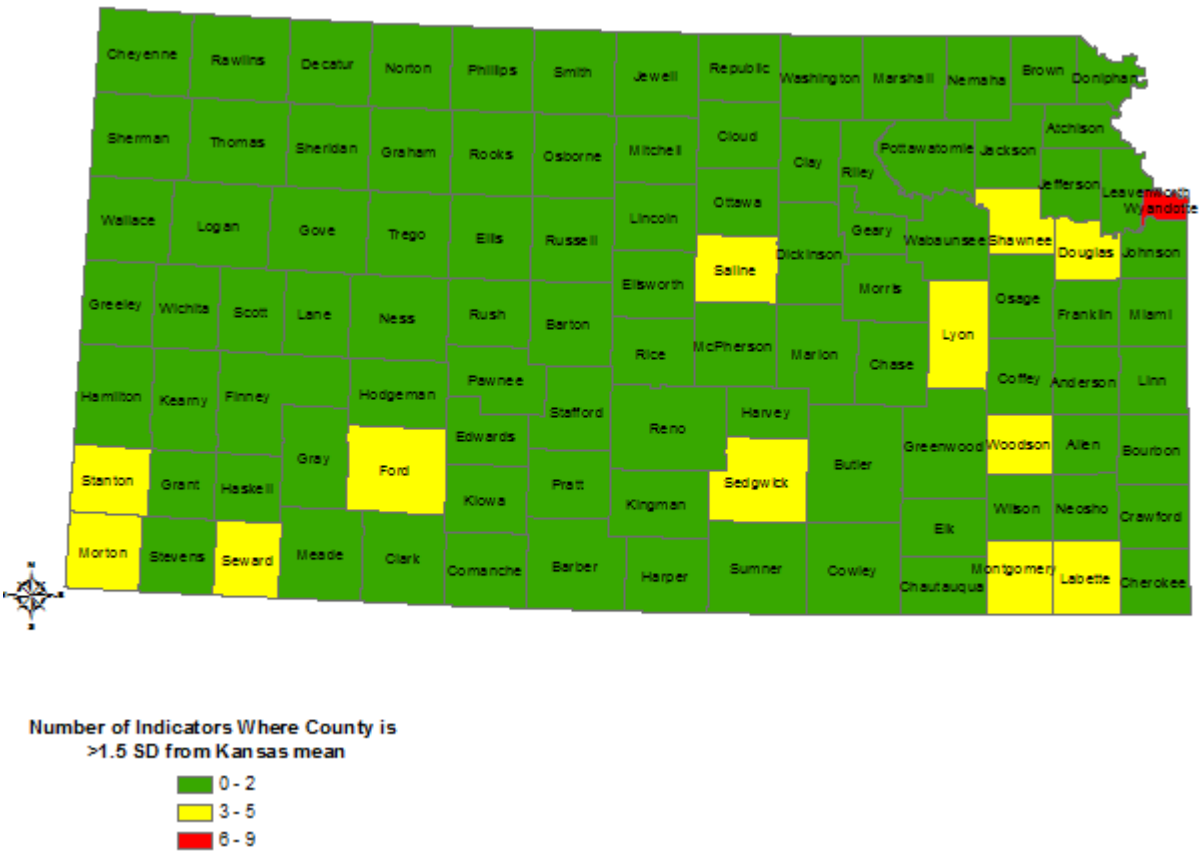

Table 2. Vulnerable Kansas Counties

County	Vulnerability Score
Lyon	3
Montgomery	3
Morton	3
Sedgwick	3
Seward	3
Stanton	3
Labette	4
Saline	4
Woodson	4

Shawnee	5
Douglas	5
Ford	5
Wyandotte	9

Discussion

Thirteen counties in Kansas had high vulnerability in the factors associated with marijuana use. The Medical Marijuana HIA[vii] assessment found that passage of medical marijuana legislation would make illegal marijuana more accessible in the community, particularly among at-risk youth. Based on the analysis, these 13 identified communities have underlying behavioral and socioeconomic characteristics that would identify them as being at increased risk for marijuana use and related population health outcomes. These counties may experience disproportionate community impacts if medical marijuana legislation were to be passed in Kansas. Based on these findings, policymakers should consider focusing prevention efforts on these counties.

The tool used to identify these counties can be tailored to suit other policies or topic areas. It is a tool that takes a large amount of seemingly disparate information, combines it into one 'index' score, and presents the findings in a visual and easy-to digest manner. This tool can be used in HIA to aid in the decision-making process as well as a variety of other planning contexts.

Limitations include the fact that data were not available for all counties in Kansas, as well as that some indicators of interest (driving under the influence of marijuana, accidental ingestion and overdose) were not available at the county level. Additionally, this index does not take into account potential positive impacts of medical marijuana legalization, such as a decrease in arrest rates for individuals authorized to use marijuana.

Conclusion

Health behaviors and outcomes are affected by a myriad of determinants, and these determinants may vary based on the health outcome or behavior of interest. In counties with vulnerabilities in several of these determinants, the population may be disproportionately impacted by a policy decision. Policymakers can use this tool to focus prevention efforts on the identified vulnerable populations in order to reduce health inequities and improve overall population health.

References

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