From: team 1917151

To: The Chief administrator

Date: 28 January, 2019

Subject: The spread and control of opioid epidemics

通过分析2010年-2017年五个州内各个县阿片类药物报告数量和各个县的人口普查数据的变化规律，有如下结论和见解：

第一, 找到传播源头并从源头治理。阿片类药物在这五个州内已经呈现出正在传播的状态，这五个州内传播的源头分别是Kentucky州的JEFFERSON，Ohio州的HAMILTON, Pennsylvania州的PHILADELPHIA, Virginia州的FAIRFAX, West Virginia州的KANAWHA。根据数据对未来进行预测，可以得到几个需要特别关注的县（意味着会在取代源头并成为新的爆发点）分别是：2010-2017年中 Ohio州的CUYAHOGA已经爆发，2019年是West Virginia的WOOD,2022年是Pennsylvania的ALLEGHENY,2025年是Kentucky州的KENTON。达到的药物阈值，分别是26715起，499起，9299起，2146起，分别达到了各自州的顶峰。其中需要尤其重视的地区是，Ohio州以及对应的CUYAHOGA县，该州的毒品数量远远超过其他各州顶峰的总和，且上涨速度非常恐怖。

第二，影响阿片类药物流行病传播的社会因素之一是单亲家庭数量，由人口普查数据可以得到，一个县的阿片类药物数量与该县中男性主人且有孩子无配偶的家庭数量呈现强正相关，也就是说，一个县中单亲家庭的数量越多，阿片类药物数量就会越多，建议更多关注单亲家庭，给予单亲家庭儿童更多关怀。

第三，影响阿片类药物流行病传播的另一个社会因素是青少年教育，由人口普查数据可以得到，一个县的阿片类药物数量与该县中未婚女性（孤寡、离婚）家庭数和祖父母等长辈抚养儿童的家庭数呈现强正相关，也就是说，一个县内的祖辈抚养孩子的家庭越多，阿片类药物就会越多，建议加强青少年的教育工作，尤其是家里缺少父母直接教育的家庭，政府应该加以关注并采取措施进行广泛的青少年禁毒教育。

第四、影响阿片类药物流行病传播的另一个社会因素是外来人口，由人口普查数据可以得到，一个县的阿片类药物与该县中意大利和捷克等外来人口呈现正相关，也就是说，从数据来看，一个县内的意大利和捷克等外来人口越多，该县内的阿片类药物数量就会越多，建议完善外来人口管理政策，对外来人口的合法登记进行严格管理，由数据来看，意大利和捷克的外来人口对阿片类药物数量影响最大，尤其应该加以重视。

第五、影响阿片类药物流行病传播的另一个社会因素是关注社会福利覆盖面，由人口普查数据可以得到，一个县内的阿片类药物数量与该县中非社会福利人口数量呈现正相关，也就是说，一个县内的非社会福利人口越多，该县内的阿片类药物数量就会越多，建议完善社会福利制度，逐步减少非社会福利人口数量，提高底层人民生活水平。

综上所述，阿片类药物流行病的传播形势不容乐观，一些地区在未来的阿片类药物发展趋势应该加以重视。另外通过对两百多种社会经济数据的分析和对模型的检验，得到了几个与阿片类药物数量呈现强相关的社会因素，应该对于这几项社会因素的相关改善尤其加以重视，而其他社会因素对于阿片类药物数量的影响相对不大。另外，通过我们对模型的检验，建议在州内源头的县采取更加严格的措施进行阿片类药物的打压和管理，以降低其阿片类药物数量，从源头的治理可以有效在几年内降低一个州内的阿片类药物数量。

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By analyzing the number of opioid reports in each county and the census data of each county in the five states from 2010 to 2017, the following conclusions and insights are obtained:

First, find the source of the communication and manage it from the source. Opioids are already spreading in these five states. The sources of the five states are JEFFERSON in Kentucky, HAMILTON in Ohio, PHILADELPHIA in Pennsylvania, FAIRFAX in Virginia, West Virginia KANAWHA. Based on the data to predict the future, you can get a few counties that need special attention (meaning it will replace the source and become a new explosion point): CUYAHOGA in Ohio State has exploded in 2010-2017, WOOD in West Virginia will explode in 2019, ALLEGHENY of Pennsylvania will explode in 2022, and KENTON of Kentucky will explore in 2025. The drug thresholds reached were 26,715, 499, 9,299, and 2,146, respectively, reaching the peak of their respective states. Among the areas that need special attention are the state of Ohio and the corresponding CUYAHOGA County, where the number of drugs far exceeds the sum of the peaks of other states, and the rate of increase is terrifying.

Second, one of the social factors affecting the spread of opioid epidemics is the number of single-parent families, which can be obtained from census data. The number of opioids in a county has positive correlation with the number of males in the county who have no children, that is, the more single-parent families in a county, the more the number of opioids will be. It is recommended to pay more attention to single-parent families and give more care to single-parent families.

Third, another social factor affecting the spread of opioid epidemics is adolescent education, which is available from census data. The number of opioids in a county has positive correlation with the number of unmarried women (solitude, divorce) and elders in the county. That is to say, the more families raised by ancestors in a county, the more opioids there are. It is recommended to strengthen the education of young people, especially those who lack direct parent education at home. The government should pay attention to them and take measures to carry out extensive youth anti-drug education.

Fourth, another social factor affecting the spread of opioid epidemics is the immigrant population, which is available from census data. The opioids in a county are positively correlated with the immigrant population in Italy and the Czech Republic, that is, according to the data, the more foreign populations in Italy and the Czech Republic, the more the number of opioids in the county will be. It is recommended to improve the management policy of the foreign population and strictly manage the legal registration of the foreign population. The number of migrants in Italy and the Czech Republic has the greatest impact on the number of opioids, especially should be emphasized.

Fifth, another social factor affecting the spread of opioid epidemics is the focus on social welfare coverage, which can be obtained from census data. The number of opioids in a county is positively correlated with the number of non-social welfare population in the county. That is to say, the more non-social welfare population in a county, the more the number of opioids in the county will be. It is recommended to improve the social welfare system, gradually reduce the number of non-social welfare population, and improve the living standards of the people at the bottom.

In summary, the spread of opioid epidemics is not optimistic, and some regions should pay attention to the future development trend of opioids. In addition, through the analysis of more than 200 kinds of socio-economic data and the test of the model, several social factors that are strongly related to the number of opioids are obtained, and the improvement of these social factors should be especially emphasized, while others social factors have relatively little impact on the number of opioids. In addition, through our test of the model, it is recommended to take more stringent measures to suppress and manage opioids in the county at the source of the state to reduce the number of opioids. The governance from the source can effectively reduce the number of opioids within a state within a few years.