Effects of Smoking Ban on Acute Myocardial Infarction Hospitalization in Marion County

Executive Summary

Submitted to the Indiana State Department of Health

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January 31, 2017

EXECUTIVE SUMMARY

The Project

In this report, we examined the effect of a smoking ban on acute myocardial infarction (AMI) admission rates in Marion County. The City-County Council of the City of Indianapolis and Marion County implemented a comprehensive smoking ban beginning June 1, 2012 in order to protect citizens of Indianapolis and most of Marion County from exposure to tobacco smoking and secondhand smoke in public places. Hospitalization for AMI is a major health consequence of exposure to tobacco smoking and secondhand smoke. A number of studies reported a decrease in incidence of AMI after smoke-free legislation implementation in the United States, Europe, and Canada, but no study has been conducted in Marion County, Indiana. We evaluated changes in AMI admission rates in Marion County and Indianapolis after the smoking ban.

The aims of this report were:

1. To assess pre-ban and post-ban rates of AMI admissions.
2. To evaluate the effect of smoking ban on AMI admission rates.
3. To identify subpopulations in which the effect of the smoking ban on AMI admission rates might be stronger.

Methods

We collected data on AMI admissions from five major Marion County hospitals between May 2007 and December 2014 from the Regenstrief Institute. We performed descriptive statistical analyses to calculate pre- and post-ban six-month AMI admissions in Marion County overall and stratified by AMI risk factors such as age, sex, race, smoking status, Medicaid status, and history of diabetes, congestive heart failure, and hypertension. We conducted multivariable Poisson regression to evaluate the effects of the smoking ban on monthly AMI hospitalizations, adjusting for month of admission, seasonality, monthly mean apparent temperature, monthly ambient $PM_{2.5}$ concentrations, and monthly hospital utilization. We conducted analyses overall and stratified by the AMI risk factors listed above. We tested the interactions between the smoking ban and AMI risk factors on monthly AMI admission rates in order to identify subpopulations in which the effect of the smoking ban on monthly AMI admission rates might be stronger.

Key Findings

- *Monthly AMI admissions declined 20% in Marion County and 25% in Indianapolis after the smoking ban was implemented.* The smoking ban appears to be effective in preventing AMI among the general population of Indianapolis and Marion County.
- *All sex and race groups except black females had a decline in monthly AMI admissions after the ban.* White females and males, as well as black males appear to have benefitted from the ban.

- *Never, former and current smokers had declines in monthly AMI admissions of 21%, 28%, and 26%, respectively, after the smoking ban.* Current and former smokers had a great decline in monthly AMI admission rates, possibly due to smoking fewer cigarettes or quitting.
- *Individuals who were not Medicaid beneficiaries had a decline of 26% in monthly AMI admissions, greater than a 19% decline for those those who were Medicaid beneficiaries.* This is the first attempt to identify subpopulations whose AMI admission associated with a smoking ban might vary by Medicaid status.
- *Individuals without preexisting risk factors for AMI including diabetes, CHF, hypertension benefited more from the smoking ordinance by showing a decline of 25%, 24%, and 26% in monthly AMI after the ban.* This is the first attempt to identify subpopulations whose AMI admission associated with a smoking ban might vary by history of diabetes, congestive heart failure, or hypertension.

Recommendations
- Maintain strict enforcement of the smoking ban.
- Consider similarly strict smoking bans in nearby areas.
- Strength smoking ban policy campaign with the message that ban benefits individuals without preexisting risk factors for AMI.

Strength smoking ban policy campaign with the message that ban benefits individuals without preexisting risk factors for AMI such as diabetes, CHF, and hypertension). Individuals without preexisting risk factors for AMI (diabetes, CHF, hypertension) benefited the most from the smoking ordinance in this study.

Conclusions
AMI admission rates declined in Indianapolis and Marion County in the two and a half years following the implementation of the comprehensive smoking ban. This decline was notable among all sex/race groups except black females. The decrease in AMI admission rates was also significant among all strata of smoking status, Medicaid beneficiaries, diabetes status, congestive heart failure status, and hypertension status. Our results showed that the comprehensive smoking ban is associated with decreased rate of AMI admissions in Marion County.