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Social capital and immunization against the 2009 A(H1N1) pandemic in the American States



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ABSTRACT

The objective of this paper was to investigate the association between contextual social capital and immunization coverage rates. A cross-sectional, ecologic study design was used. Three different estimations of contextual social capital in American states have been used. Data on immunization coverage rates at state level comes from Centers for Disease Control and Prevention. Correlation coefficients were calculated to investigate the bivariate association between the independent variable social capital and the dependent variable 2009 A(H1N1) immunization coverage rates. A multivariate OLS regression model was used to investigate the association between contextual social capital and immunization, under control for state-level health care spending per capita, state population, population per square mile, and median age in the American States. Results show that Social capital was strongly correlated with 2009 A(H1N1) immunization acceptance among American States. In a multivariate regression analysis, the association remains strong and significant also when controlling state-level confounders. In conclusion, social capital, at least in a U.S. context, is shown to be associated with the state-level uptake of vaccination against the 2009 A(H1N1) pandemic.

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Introduction

Social capital refers to features of social organization such as trust, norms, and networks that facilitate collective action for mutual benefit.^{1,2} Social capital is considered to be both a contextual variable and an individual level variable. A community enjoying high levels of social capital is characterized by a flourishing social life, high levels of civic participation, and widely shared norms of trust and reciprocity. Similarly, individual level social capital indicators include membership in associations, and level of generalized trust.¹

Initially, Robert Putnam had claimed population health to be an area where social capital was less likely to play an important role.¹ However, only a couple of years later and in the light of new convincing research results, Putnam changed his mind. He had found a very clear state level correlation between his social capital index and a variety of health indicators.² Even before that, Ichiro Kawachi and his colleagues^{3,4} had initiated what has been developing into a research agenda, focusing on how different conceptualizations of social capital are linked to different measures of health and health-related behaviour. In particular, it has been

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proved that both aggregate levels of social capital within a community and individual level social capital indicators are associated with health.^{3,4}

An important question raised in this research field concerns the causal pathways linking social capital with health.⁴ Several different causal pathways have been suggested, such as, for example, rapid circulation of health information, healthy norms, sufficient access to material resources, lower crime rates, emotional support within a network, and control over deviant health behaviour in the community.^{4,2}

The aim of this study is to empirically investigate the association between state-level contextual social capital indicators in the American States on the one hand, and immunization coverage rates against the 2009 A(H1N1) pandemic, on the other. In recent research on social capital and health, the association between social capital and immunization^{5–7} has been investigated in a few studies. To begin with, an association between individual level social capital indicators – trust in health care and generalized trust – and intentions to accept vaccination against the 2009 A(H1N1) in Sweden was established by Rönnerstrand.⁵ Also, Nagaoka and colleagues found a measure of contextual social capital – voting rate – to be associated with uptake of measles-containing vaccine in large municipalities in Japan.⁶ Finally, Jung and colleagues found that the degree of neighbourhood social capital mediated the association between 2009 A(H1N1) pandemic knowledge among parents and immunization acceptance for their children.⁷ Hypothetically, also contextual social capital will increase A(H1N1) pandemic vaccination uptake, even under control for potential confounders.

In this paper, social capital is shown to be associated with state-level uptake of vaccination against the 2009 A(H1N1) pandemic, even when controlling for state-level mean health care spending per capita, state population, population per square mile, and state-level median age. In the discussion section, different causal pathways potentially linking social capital and immunization acceptance are being discussed, including access to health care, information diffusion, trust in health care, and altruistic norms.

By means of this investigation new knowledge is provided allowing to account for the large variation in immunization uptake observed in the American States. To my knowledge, this paper may be among the first to explore the link between social capital and immunization, thereby contributing also to the already existing knowledge about the link between social capital and health.

Methods

Outcome variable – immunization coverage rates at state level

Data on immunization coverage rates at state level comes from the U.S. Department of Health and Human Services, and the ‘Morbidity and Mortality Weekly’ report published by Centers for Disease Control and Prevention.⁸ It is based on a combination of data collected from November 2009 to February 2010 from two different surveys.

Explanatory variables – social capital measures at state level

In the empirical analysis, three different measures of social capital have been used. Firstly, from the website www.bowlingalone.com the author downloaded the state-level social capital index used by Robert D. Putnam in his seminal *Bowling Alone*. The index consists of 14 social capital indicators related to community organizational life, engagement in public affairs, community volunteerism, sociability, and social trust.² This source of data has the advantage of being as close to an ‘official’ state-level social capital measure as possible. The drawback is that the index is quite old, building on data collected about two decades ago, as it is.

Recent analyses indicate a certain cross-state variability as for levels of social capital, although the general pattern seems to be that state-level social capital indicators are quite stable over time. The overall correlation between Putnam's index and a recent averaged social capital index (1986–2004) developed by Hawes and colleagues is 0.824 (Pearson's R).⁹

Secondly, state-level aggregated estimations of answers to the standard generalized trust question were used, the dichotomous ‘Generally speaking, would you say that most people can be trusted or that you can't be too careful in dealing with people?’ The estimations are based on the aggregation of several different nation-wide surveys.¹⁰ This source of data is comparatively recent, but it has got the disadvantage of containing data from survey-questions that, although very similar, still contain some variation as compared to the wordings of the standard trust question.

The third source of social capital measure is state-level volunteer rate. It is based on data from the Current population survey, conducted by the U.S. Census Bureau for the Bureau of Labour Statistics. The *secular volunteer rate* measure is based upon pooled data from 2005, 2006, and 2007, developed by Rotolo and Wilson.¹¹ The question asked in the survey was ‘Since September 1st, of last year, have you done any volunteering activities through or for an organization?’. Secular volunteering was measured as the number of respondents volunteering in any type of non-religious organization. The advantage of this source of data is that is rather recent. Furthermore, it complements the trust measure with a measure of behavioural social capital. Secular volunteer rate was used because of the potential association between religious beliefs and attitude towards immunization,¹² but the correlation between secular volunteer rate and volunteer rate including religious organizations is very strong (0.913, Pearson's R).

Confounders

Along with Baum,¹³ and in order to rule out the risk for potential association between state level social capital and immunization only to be the result of covariation between state level social capital and state level health care spending, the variable health care spending per capita in the regression model was included. Data on health care spending per capita 2009 comes from Cuckler and colleagues.¹⁴ Also for state-level population size and population per square mile were controlled. Endrich and colleagues investigated how socio-

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