

## **A Review of Health Consequences of Recessions Internationally and a Synthesis of the US Response during the Great Recession**

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### **ABSTRACT**

The 2007 global economic recession was the most severe recession since the Great Depression of the 1930s in terms of declines in unemployment, labor force participation and gross domestic product in the United States. In order to guide future public health policies during economic downturns, we reviewed and synthesized the literature on the health consequences of the current and prior recessions focusing on the government response to the recession in the United States. We searched for primary literature in three academic and three policy databases using the indexed and free-text terms “recession”, “health”, “mortality”, “employment”, “unemployment”, “foreclosure”, “pensions”, fiscal”, “deficit”, “morbidity”, “avoidable mortality”, “amenable mortality”, “budget”, and “budget crisis” in various combinations. The search resulted in 172 English language studies published from 1 January 1980 through 1 April 2013 that met the inclusion criteria. The data synthesis was structured into two themes: new developments in our understanding of changes in morbidity or mortality risk related to recession or fiscal austerity, and public health system responses to the recession under fiscal constraints. We found consistent evidence that recessions, and unemployment in particular, can be significantly damaging to mental health, increasing the risk of substance abuse and suicide particularly for young men. We also found that the previously reported mortality declines during recessions may occur in only a few causes of death such as reduced automobile deaths. In addition, the expansion of

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Medicaid, Supplemental Nutrition Assistance Program, and unemployment benefits under American Recovery and Reinvestment Act of 2009 likely had substantial buffering effects on health, especially among poor women and their children. These programs often excluded young single men, who are at highest risk of substance abuse and suicide. Thus, these populations should be targeted during downturns or integrated into safety net programs before the next recession.

**Key Words:** Recessions, Unemployment, Austerity, Morbidity, Mortality, Suicide

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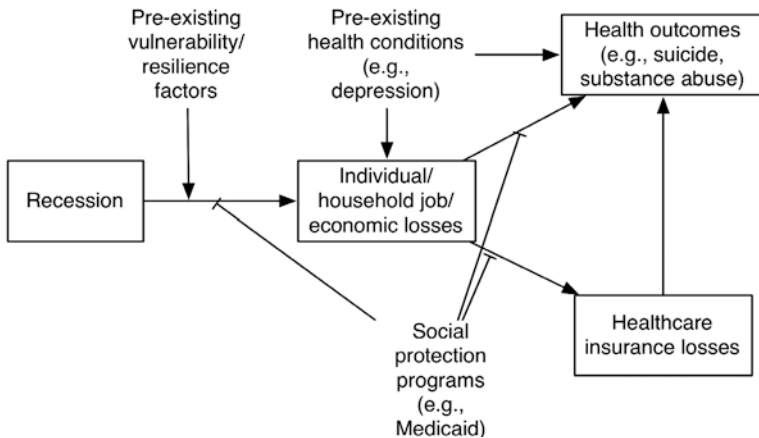
## BACKGROUND

The Great Recession—the global economic recession, starting in 2007—was associated with the largest decline in employment and gross domestic product in the United States since the Great Depression of the 1930s. Over 15 percent of US mortgages defaulted, \$8.3 trillion USD of savings were lost, and unemployment rose to a peak of 10.0 percent.<sup>1</sup> Despite a general recovery of financial markets since their nadir in October 2009, the repercussions of the recession for labor markets, state and federal budgets, and individual households continues to become evident. Poverty increased, such that two out of five Americans lived below 200 percent of the federal poverty level (<\$44,000 USD/year for a family of four) during the height of the recession.<sup>2</sup> States have faced multi-billion dollar deficits, creating pressure to cut public health programs.<sup>3</sup>

The morbidity and mortality consequences of economic shocks, such as involuntary unemployment, continue to emerge—as the effects often occur with a time delay—and health statistics themselves typically lag economic and financial data by several years. In the absence of comprehensive data, it is possible to learn both from prior recessions and early data from this recession to anticipate the potential impact on public health of this and future recessions. What evidence is there to guide public health policy makers to best protect public health as they face the consequences of this and other economic downturns?

There are at least two major pathways by which recessions might adversely affect health outcomes (see Figure 1 for conceptual model). One pathway is through economic shocks. These include unemployment, loss of savings, foreclosure and eviction, and unpayable debt. In the US, each of these factors has been found to trigger health problems such as suicides,

substance abuse, and deferment of medical care due to losses of income or increasing debt. There is a large literature debating variously why crude mortality rates often decline during recessionary periods, and recent advances in this area are presented below. However, from the perspective of public health agencies there appear to be vulnerable populations that are often “hidden” from public health surveillance.<sup>4</sup> For example, while average drinking rates have typically declined during the recession (presumably as most people can afford less alcohol), a subpopulation has increased bingeing; this population appears to disproportionately include those at risk for unemployment.<sup>5</sup> Hence, crude mortality rate declines may mask hidden public health problems. There is also some limited evidence that changes in housing tenure (e.g., foreclosures) and savings affect health during fiscal crisis. Knowing the effects of recessions on health, it should be possible to target interventions toward the most vulnerable, but discussion of what should be done in practice is nearly absent from the public health literature.



**Fig. 1. Conceptual Model.** The conceptual model can be further supplemented by a series of moderators and mediators of the recession-health relation. Specifically, social protection programs can be modifiers of the recession-health relation as different individuals have pre-existing enrollment in such programs; conversely they can act as mediators or buffers of recessionary impact. From a social ecological perspective, individual pre-existing conditions can be conditioned upon community-level, household-level, and individual-level social and economic circumstances that are further discussed in the main text, as in the Stoddard health field model in which the social, physical and genetic environments lead to variations in individual behavior and biology and lead to health and feedback loops between health and socioeconomic outcomes (e.g., chronic disease or alcoholism leading to job loss).

A second pathway through which recessions may affect health outcomes is their effect, and that of fiscal austerity measures, on healthcare delivery systems and social safety nets. Many newly-unemployed people entered into public health insurance programs such as Medicaid (US government health insurance program for families and individuals with low income) at precisely the moment when government programs received less funding, due in large part to declines in income and associated tax-based revenues.<sup>6</sup> Hence, healthcare programs had to decide what programs to continue funding as their revenue streams evaporated. Major insurance companies also made changes to their policies on deductibles, lowering the probability that even individuals with coverage would seek timely care.<sup>7,8</sup> Depending on how healthcare delivery changes, amenable mortality—deaths that are avoidable with timely and effective healthcare—might be amplified or averted. Other types of safety net interventions also affected health by, for example, preventing or protecting the newly-impooverished from loss of nutritional support (“food stamp” Supplemental Nutrition Assistance Program) or becoming homeless (housing assistance programs), which itself modifies disease risk.

Here, we conduct a review of available data on health risks and outcomes among US populations as compared with other populations in Organization of Economic Cooperation and Development (OECD) countries during economic downturns, in order to compare strategic responses to this and prior recessions among countries facing similar financial burdens. We focus specifically on changes in morbidity and mortality risk, updating the existing literature to reflect recent insights from the Great Recession and various austerity measures; we also highlight the changes to social determinants of health associated with recessions and separately study the impact of alternate healthcare and public health policy responses intended to mitigate negative effects of recessions and fiscal constraints on health outcomes.

## **METHODS**

### **Search Strategy**

We searched for primary literature in three major databases—Google Scholar, EconLit and PubMed—using the indexed and free-text terms “recession”, “health”, “mortality”, “employment”, “unemployment”, “foreclosure”, “pensions”, “fiscal”, “deficit”, “morbidity”, “avoidable mortality”,

“amenable mortality”, “budget”, and “budget crisis” in various combinations, as described in Box 1. Because much of the discussion and data collection on this topic has been performed outside of academic circles by government agencies and non-governmental groups, we supplemented the database search by conducting the same keyword searches on the websites of the World Health Organization library database WHOLIS, the Commonwealth Foundation, and the Kaiser Family Foundation. The search terms included studies in English published from 1 January 1980 through 1 April 2013.

### **Box 1**

#### *Search Strategy*

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We searched the following electronic databases:

Google Scholar;  
EconLit;  
PubMed;  
WHOLIS  
Commonwealth Foundation; and  
Kaiser Family Foundation

The following search was performed with the keywords as MeSH terms, title, keywords, or abstract words:

(“recession” OR “employment” OR “unemployment” OR “budget” OR “budget crisis” OR “foreclosure” OR “pensions” OR “fiscal” OR “deficit”) AND (“health OR “mortality” OR “disease” OR “morbidity” OR “avoidable mortality” OR “amenable mortality”) AND NOT (Letter[ptyp] OR Editorial[ptyp]);

The search was performed in April 2013. Only English language papers were included.

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### **Study Selection**

All titles and abstracts found in the search were filtered for relevance to the study objective. Studies must have included data on a population affected by recession or fiscal crisis, broadly defined as increased unemployment, economic downturns or explicit discussion of budgetary shortfalls or funding dilemmas. The full texts of potentially relevant articles were subject to the inclusion criteria listed in Table 1 to ensure they met minimum methodological standards including specifying and using primary data in the main analysis and performing adjustments for pre-existing time trends and endogeneity.

**Table 1**  
*Review Inclusion Criteria*

<b>Aspect</b>	<b>Minimum Criteria for Inclusion</b>
Data collection in facilities	If comparison between programs, comparators were randomly selected, or population matched/adjacent.
Sample size	For quantitative studies, must include >20 patients per facility or program described, or more than 100 persons if community-based household surveys. If questionnaire-based, must include >50% response rate. For qualitative studies, must include description of interviewees and systematic selection criteria.
Data description	For quantitative studies, must include data selection criteria, population demographic description, data collection method, and statistical analysis description. For qualitative studies, study must include population selection results based on specified criteria, data collection approach, and data synthesis strategy involving more than one author-reviewer if using a grounded-theory approach. For household surveys, study must include census of households or random selection from list of available households. For economics/cost-effectiveness studies, must specify data sources for costs and QALYs, specify model parameters and transition probabilities, conform to Gold standards for CEA analysis and specify discounting rates and method of summing costs across specified population.
Data presentation	Data and tables should add up and be consistent. Absolute numbers must be given or denominators must be available for percentage results. Exclude if obvious data errors; inquire from authors in case of suspected typos. If statistical tests were performed, the tests need to be appropriate for the type of data being analyzed.
Bias	No other important issues in design, conduct or analysis that could introduce bias considered on an individual basis, e.g., amount of potential bias if using different methods for collecting data between private and public providers. No unusual events occurred during study that could introduce bias.

## **Data Extraction and Analysis**

A data extraction method was designed by two reviewers (SM, SB), who extracted the data using a pre-established standard data entry format to categorize each paper on a number of dimensions including primary and secondary outcomes, minimum methodological standards, and main findings. Standard data describing each study were also extracted, including the country and subpopulation where the study was performed, study period, study methodology, primary and secondary outcome measures and end points, and study limitations. Disagreements between the two reviewers were resolved by consensus among all authors. Appendix 1 outlines the number of studies included and reasons for exclusion.

The data synthesis was structured into two themes: new developments in our understanding of changes in morbidity or mortality risk related to recession or fiscal austerity, and public health system responses to the recession under fiscal austerity (including the impact of social protection systems related to health, such as food stamps). Reports containing information relevant to more than one theme were included in all related thematic areas. We did not perform further sub-analysis of the highest quality studies because few studies were sufficiently comparable to perform meta-analyses or further quantitative syntheses for the outcome variables assessed due to a high level of heterogeneity of both methods and outcomes among studies.

## **RESULTS**

### **Theme 1: Changes in Morbidity or Mortality Risk Related to Recession or Fiscal Austerity – An Update**

While there have been several comprehensive reviews on the health consequences of recessions,<sup>9-11</sup> the recent global downturn has spurred new studies on the relationship between macro-economic change and health. We review the literature on the effects of recessions on several dimensions of health, focusing on areas where the literature has recently converged. We also highlight remaining controversies. Our intention is to build on a recent review done by Catalano et al.<sup>10</sup> and summarize new findings from recent studies with regard to the effects of recessions on health. This contribution includes over 20 recent papers not examined in prior reviews.

## Areas of Convergence

### *Methodological Considerations*

The literature on the effects of recessions on several dimensions of health has been plagued by inconsistencies and methodological challenges. One particular problem has been that studies of the effects of recessions on health have generally taken two methodological approaches: macro- and micro-level analysis. The macro-economic approach examines how changes in gross domestic product or area-level unemployment rates affect aggregate area-level mortality. In a series of macro-level studies, Ruhm and others have found a consistent but counterintuitive result that mortality generally declines during economic contractions.<sup>4,12-18</sup> These findings have been found across the OECD countries,<sup>4,16</sup> in the US<sup>12-15</sup> and even during the Great Depression.<sup>18</sup> In contrast, micro-level studies suggest that unemployment itself leads to poorer health.<sup>19-27</sup> However, studies that are unable to account for the dynamic selection out of the labor market may be capturing the “healthy worker effect”, the consistent finding that workers who maintain employment have more favorable health outcomes than the newly unemployed or even the general population. Therefore the results of some micro studies may reflect the previous health conditions of the unemployed or newly unemployed.<sup>28-35</sup> Previous reviews note the divergence in the results of micro and macro studies and suggest that the policy agenda will remain ambiguous until there is greater methodological agreement and advancement.<sup>10,36</sup>

Fortunately, several recent articles have come a long way to clarify this controversy. Miller et al. and Stevens et al. replicate the analysis done by Ruhm using the same data and analytical strategy, but disaggregate the data by age, gender and cause of death in an attempt to bring the macro study closer in line with micro ones. In doing so, Miller et al. find that once mortality trends were disaggregated, the major decline in deaths during recessions are due to *decreases* in cardiovascular disease, degenerative brain diseases and infection related mortality concentrated in older women who are not in the labor market.<sup>17,37</sup> The observed decreases in mortality for older women may be due to pre-existing trends, especially as the durations of time between recessions and these ecologically-correlated outcomes appear biologically implausible in many cases (e.g., degenerative brain diseases declining). It has also been speculated that recessions could increase the pool of skilled workers in the care sector, though the precise mechanisms involved are unclear.<sup>17,37</sup> Both studies confirm that motor vehicle deaths decrease substantially in working age groups, perhaps as fewer people commute to work, can afford to drive or pay for gas during recessions. However, this decline in traffic accidents masks a significant rise in suicides among



working aged men.<sup>17,37</sup> Stuckler et al. corroborate that motor vehicle fatalities fall and suicides rise in recessions independently using European data.<sup>38</sup> In a second study, Stuckler et al. reexamine data from the Great Depression, accounting for pre-existing trends mortality, and disaggregate the mortality trends by state level.<sup>39</sup> They find that suicides increase and motor vehicle fatalities, death due to cirrhosis (related to alcohol consumption), and pneumonia decrease. Together these new analyses advance our understanding of the relations between mortality and recession. They suggest that the previously reported mortality declines during recessions may reflect an artifact due to pre-existing trends affecting reported deaths from chronic health conditions, but a causal relationship with motor vehicle deaths and suicides are biologically plausible.

### *Substance Abuse and Mental Health*

Another key inconsistency previously debated was based on the observation that during recessions aggregate substance abuse declines while mental health deteriorates. These two findings were at odds with the well-established notion that mental health is a strong risk factor for substance abuse.<sup>40</sup> Several countervailing hypotheses have been presented in the debate on the relationship between economic recessions and substance abuse: an “uncovering” hypothesis suggesting that those most susceptible to substance abuse will be “frightened out of” abusing by the threat of job loss if they continue to abuse<sup>41</sup>; an “income-effect” hypothesis suggesting that less income with which to purchase tobacco, alcohol or drugs will lead to less abuse during the recession; and a “provocation” hypothesis reasoning that people will cope with insecurity and stress related to real or threatened job loss by abusing substances more. The concern for public health is whether health systems can find those populations who are most at risk for increased abuse, and design effective programs to mitigate abuse within constrained program budgets.

We identified 20 studies that assessed the relationship between recessions and substance abuse, seven of which were conducted during the recent downturn, and attempted to distinguish between the different hypotheses put forth.<sup>21,25,42-59</sup> While there is evidence of a decrease in overall alcohol consumption during recessions,<sup>5,53</sup> studies also consistently find an increase in alcohol related traffic accidents<sup>55</sup> (despite an overall decline in deaths from road traffic accidents), binge drinking,<sup>5</sup> and alcohol related hospitalization during economic contractions.<sup>25</sup> In other words, while on average some people reduce their drinking of alcohol, a subpopulation increases its use to potentially dangerous levels, reflecting that the hypotheses

above may apply variously to different groups. In aggregate data on consumption, a small proportion of the population that binges on alcohol as a coping mechanism is masked by a larger overall decline in drinking in the general population.<sup>5,21,54</sup> This finding may also explain the previous research on the elasticity of the demand for alcohol, which has shown that as incomes decline by one percent the demand for alcohol declines by less than one percent (inelastic demand).<sup>60</sup> During recessions when incomes inevitably decline, potential abusers may increase consumption so much as to compensate for the reduced consumption from the overall population. Similar patterns were found for tobacco use in a prospective study in Iceland, where the income effects dominated, but when income was not a constraint smoking increased during the recent downturn.<sup>58</sup> Even with prescription medications, a recent study found increases in opiate consumption in states with higher unemployment rates in the US,<sup>47</sup> though other categories of prescription drugs were largely unchanged. There is also a report of an increase in intravenous drug use-related HIV infections in Greece.<sup>59</sup> Across multiple studies, there are consistently stronger relationships between the recession and substance abuse in young adults and men.<sup>5,21,52</sup>

Numerous studies in international settings have found a robust relationship between recessions, unemployment, and a variety of mental health disorders. We identified 78 studies that reveal a relationship between recessions and mental health outcomes.<sup>12,17,18,25,37-39,46,49,51,56,57,59,61-126</sup> In the current recession, five studies consistently found that mental health deteriorated.<sup>61,63,75,82,103</sup> The most consistent results relate to suicides. Twenty-one studies examined suicides or attempted suicides and found a marked increase in these outcomes during economic downturns.<sup>12,17,18,37,39,63,71,78,79,89,91,97,103,116,117,120-124,126</sup> The increases in suicides were concentrated in working age men, and the results were found across multiple populations including the United Kingdom,<sup>63,78</sup> the US,<sup>12</sup> Spain,<sup>121</sup> Italy<sup>122</sup> and Japan<sup>116,120,123</sup> as well as across time periods.<sup>18,39</sup> The relationship between unemployment and suicides does seem to be context specific because such relationships have not been found in Sweden,<sup>79</sup> Finland,<sup>89,91</sup> and Australia.<sup>124</sup>

In addition, there is substantial evidence of a rise in other mental health disorders such as depression and anxiety symptoms. Crucially, studies that control for previous mental health find elevated risk for mental health problems, suggesting that mental health deteriorates due to job loss itself, which increases during recessions.<sup>125</sup> These findings are strongest among young workers.<sup>79,115,121,127</sup> The finding that mental health deteriorates most for young men and that substance abuse increases in the same population strengthens the argument that these relations are causal and enhances the coherency of the literature.

## Remaining Controversies

Despite rapid increase in the number of studies on recessions and health, several controversies remain, particularly with regard to chronic conditions, infectious diseases, and populations at risk.

### *Chronic Disease*

The relationship between chronic disease, unemployment and economic recessions reveals varied outcomes suggesting differential vulnerability among groups. We identified 34 studies that assessed the relationship between recessions and chronic diseases such as cardiovascular disease and diabetes, self-reported health, or mortality from chronic conditions.<sup>12,25,26,38,43,44,57,67,69,106,128-152</sup> The relationship between chronic conditions and unemployment requires methodological strategies to compensate for biases (e.g., that those who are already more ill are more likely to become unemployed).<sup>28-32</sup> Many individual level studies find that those who are laid off are more likely to die earlier<sup>19,25-27,153</sup>; but without longitudinal data of sufficient duration or controls for previous health, it is not possible to assess the direction of the relationship (from unemployment to illness, and vice versa, creating a vicious spiral). Several recent studies attempt to bypass this inferential problem by examining mortality outcomes for workers let go because of plant closures, which mitigates the likelihood that results are due to reverse causality.<sup>25,151,152</sup> However one study finds that male workers with previously strong attachments to the labor market suffer higher mortality related to circulatory disease after plant closures in Denmark,<sup>25</sup> while the others find no such relation for men in Sweden.<sup>151,152</sup>

As noted above, some macro-level studies also find that mortality from chronic conditions such as cardiovascular disease *decreases* during recessions for non-working populations.<sup>12,14,17</sup> Not only is the age profile of these associations suspect as noted above, but also the results suggest that contemporaneous changes in economy decrease mortality almost instantaneously, which is inconsistent with biological knowledge. With the exception of cirrhosis of the liver, where short term reductions in exposure can reduce mortality,<sup>39,154</sup> even a sudden drastic reduction in risky behavior or adoption of healthy behaviors or a new treatment would be expected to take months or even years to become evident at the population level. Further refinement in methods, segregation of individual diseases, and improved understanding of appropriate time lag are needed before we draw causal conclusions on the effects of recession on chronic conditions.

**Table 2**  
*Summary of Findings*

<b>Dimension of Health</b>	<b>Studies</b>	<b>Broad Conclusions and Limitations of Studies</b>	<b>Population Most at Risk</b>
Mental Health (Depression, Anxiety Disorders, Suicides)	78	Suicides increase during recessions Increase in mood disorders Some evidence of adverse selection into layoffs	Suicides concentrated in young men Worse mental health concentrated in younger ages Low SES is a moderator
Chronic Conditions (CVD, self-reported health; mortality from chronic conditions)	34	Better population health in terms of mortality from chronic conditions during recessions for non-working populations Long time lags make observed associations unlikely to be causal Extensive evidence of adverse selection into layoff	
Substance Abuse (Alcohol and Drug abuse; alcohol related mortality)	20	Two-fold effect in opposite directions. Decrease utilization overall, but increase in abuse. Evidence of adverse selection into layoffs	Young unemployed men
Infectious Disease (Tuberculosis, Pneumonia, Respiratory infections)	10	Increase in ID when public health infrastructure and economy are both in crisis Some evidence of quarantine effects during periods of increased unemployment	

### *Infectious Disease*

We found ten studies that assessed the relationship between recessions and infectious disease outcomes,<sup>12,17,37,39,59,155-159</sup> one of which was a systematic review.<sup>157</sup> The paucity of empirical studies and differing settings makes drawing conclusions difficult. In cases where the financial crisis was coincident with a rapid deterioration of the public health system that affected both disease surveillance and preventive health activities such as

vaccination, antibiotic prophylaxis or mosquito spraying (e.g., Greece circa 2009 and former Soviet Republics and Eastern Europe circa 1990), there appears to have been an increase in infectious disease, particularly in susceptible groups such as infants and the elderly.<sup>157</sup>

Studies of unemployment trends and deaths due to causes related to infections, particularly pneumonia and tuberculosis, find that greater unemployment is associated with decreases in deaths due to infectious disease.<sup>12,17,37,39,158</sup> A potential pathway put forth in a recent study suggests that less economic activity reduces the spread of communicable disease such as pneumonia or flu for workers through the essential quarantine of being unemployed and staying home.<sup>159</sup> However, the mechanistic pathway for why we see this relation in mortality for older populations is still unclear.<sup>37</sup> More research would be required to understand these relations though it seems that the severity of the downturn and the mode of transmission for the particular diseases matters most.

Table 2 summarizes our main findings for each category of diseases considered.

#### *Unemployment vs. Recessions vs. Downsizing*

The literature on the effects of recession on health and the effect of unemployment on health are intertwined because recessions lead to higher rates of unemployment generally. However the effect of recessions may extend beyond the direct effect of unemployment. Recessions would truly be bad for health if the health of remaining workers were affected by the increases in job insecurity and/or spillovers from austerity measures. Comparing the effect of economic downturns on populations who become unemployed to those who remain in employment but face an increased risk of unemployment and perhaps declining incomes is an important remaining gap, but with a growing evidence base.

The vast literature on downsizing suggests that those who maintain employment throughout recessions may still be adversely affected (for comprehensive reviews see<sup>160,161</sup>). A study comparing remaining workers at severely downsized plants compared to remaining workers at modestly downsized plants during the peak of the recent recession finds significant higher new cases of hypertension for the remaining worker at the severely downsized plants even after accounting for prior health.<sup>34</sup> Another study using neighborhood unemployment rates as the exposure of interest found that even those who remain employed report more depressive symptoms.<sup>114</sup> If confirmed, such results would merit close attention by policy makers given that remaining workers generally represent the largest and healthiest portion of the population.

## **Theme 2: Expansion and Utilization of Social Protection Programs Related to Health**

In addition to the research on how economic recessions affect health risks and health outcomes, there has been a parallel series of studies of the impact of recessions on the utilization of health-related social protection programs such as Medicaid. A common thread in this literature is that different groups of people affected by the recession have very different probabilities of enrollment into social protection programs, and the budgets for such programs are significantly affected by recession and austerity.

### *Healthcare expenditure and coverage*

The majority of literature on recessions and social protection programs relevant to health are focused on Medicaid and related public health insurance programs in the US. Most studies have focused on losses of employer-sponsored health insurance and their impact on Medicaid demand, budgets and eligibility policies. During the recent recession, employer-sponsored insurance coverage fell by nearly four percent (at least 11 million people) over the period from 2008 to 2010.<sup>162,163</sup> Not all of these individuals become uninsured, as a large number enrolled in Medicaid and the Children's Health Insurance Program (CHIP). At least 5.8 million people newly enrolled in Medicaid during the recession,<sup>164</sup> and a further CHIP stimulus is estimated to have covered 4.1 million children who would have otherwise lost coverage.<sup>165</sup> For those who did not qualify for Medicaid's income eligibility requirements (household income under \$44,000 USD for a family of four in 2009), provisions in the American Recovery and Reinvestment Act (ARRA) of 2009 further subsidized the Consolidated Omnibus Budget Reconciliation Act (COBRA). This provided some assistance with the cost of maintaining coverage among those becoming newly unemployed, but did not assist those who were uninsured before losing their jobs.

Some of the literature analyzing trends in insurance coverage in the US found that the number losing employer-sponsored insurance had already increased by 3.4 million between 2004 and 2006, despite improving economic conditions,<sup>166</sup> particularly among young, Latino, less educated, lower-income service sector workers.<sup>163</sup> However, the groups at highest risk for becoming newly uninsured during the recession appeared to be white, native-born citizens and residents of the Midwest and the South.<sup>167</sup> These groups failed to meet requirements to qualify for Medicaid. A nationally-representative poll suggested that, although the uninsured population remains disproportionately made up of younger people, the poor and racial/ethnic minorities, uninsurance rose fastest among the near-elderly, whites

and those with higher incomes.<sup>168</sup> A second analysis found that the groups most likely to be covered by Medicaid and related programs following loss of employer-sponsored coverage were women and children. Men in particular appeared to be at high risk for uninsurance following job loss.<sup>169</sup> Hence, eligibility for and accessibility to public insurance programs are misaligned with the demography of the newly unemployed. The overall number of uninsured grew by five million people from 2000 to 2004; increased more slowly by 2.1 million people from 2004 to 2007; and then again rose significantly during the Great Recession, rising by 5.7 million people from 2007 to 2010.<sup>170</sup> Some concerns were raised in the literature that public insurance may have had a “crowding out” effect to reduce employer-sponsored insurance by offering greater public sector coverage options,<sup>171</sup> but other analyses suggest this could not explain recessionary trends<sup>163</sup> given that loss of employer-sponsored coverage preceded the rise in public sector insurance stimulus.

Greatest demand for Medicaid has coincided with a period when the revenue to fund the program was lowest. Each increase of one percentage point in the national unemployment rate corresponded to approximately an additional one million Americans enrolling in Medicaid for coverage and another 1.1 million going uninsured.<sup>172</sup> However, each state’s allocation of funds for Medicaid fell by three to four percent as Medicaid expenditures rose and tax revenues fell during the recession.<sup>165</sup> Because of the requirement that states balance their budgets annually, declines in tax revenues have required them to either raise taxes or reduce spending. In some states the ability to raise taxes is constrained because of requirements for their legislatures to achieve super-majorities, in which two-thirds or three-quarters of the legislature is required to vote for such provisions. However, the alternative, limiting spending, reduces their ability to pay their share of Medicaid costs, such that the joint financing of Medicaid with the federal government means that each dollar of cuts to state Medicaid budgets confers a loss of at least a dollar of federal matching funds to each state. Federal financing for states accounts for between 50 and 76 percent of Medicaid program costs, depending on the state.<sup>165</sup> Medicaid spending accounts for 16 percent of national health spending, 42 percent of long-term care services, and about one-third of revenues for community health centers and public hospitals, thus having a major impact on the provision of care.

The ARRA stimulus enacted in February 2009 provided \$103 billion USD in federal fiscal relief to state Medicaid programs over a period of 2.5 years.<sup>173</sup> Following the end of this stimulus, states variously engaged in cost containment actions ranging from restrictions on payments to providers and benefits, new copayments for beneficiaries and increased reliance on

Medicaid managed care.<sup>174</sup> There was marked variation in their responses, however. For example, according to surveys of state Medicaid providers, Illinois increased coverage of children from 185 to 200 percent of the federal poverty line and expanded coverage of parents; Virginia removed the Medicaid asset test for parents and adopted 12-month continuous eligibility in CHIP; and Iowa eliminated the requirement that a child be uninsured for a period of time prior to applying for CHIP. However, other states froze enrollment for varying periods of time, enacted more stringent enrollment and retention procedures like reporting and verification requirements on income and age, added various requirements for face-to-face interviews, and increased premiums while reducing durations of automatic enrollment.<sup>175</sup> These activities were found to increase barriers to Medicaid and CHIP enrollment in 23 states.<sup>176</sup>

Overall, Medicaid spending increased between 2007 and 2010 despite declines in total countrywide health spending. This was driven largely by greater Medicaid enrollment.<sup>177</sup> Even before the economic crisis, the rate of increase in overall healthcare spending was declining, though the causes of this stabilization in national cost growth rates are debated in the literature; they vary from reduced healthcare seeking due to high-deductible health plans to improved efficiency at hospitals and clinics.<sup>178</sup> On top of this pre-existing stabilization in average US healthcare costs, the recession further reduced utilization and associated expenses.<sup>179</sup> Medicaid made up 16 percent of these costs. Between 2010 and 2011, while Medicaid enrollment continued to grow as an additional 2.2 million people enrolled nationally, enrollment growth in the program slowed as the economy started to improve.<sup>180</sup> Since June 2007, just before the start of the recession, Medicaid enrollment has grown by over ten million people, over half of whom were children. The percentage of uninsured children actually declined slightly between 2007 and 2010, largely due to more children gaining coverage through Medicaid or CHIP.<sup>181</sup>

Two major papers revealed the effects of Medicaid and overall insurance during the recession. The first highlighted how increased federal Medicaid funding matched reductions in the states' share of Medicaid spending on state-funded behavioral health programs during the recession. In other words, as individuals lost employer insurance, federal spending on Medicaid buffered the impact by increasing spending on behavior health programs, largely comprised of mental health and substance abuse programs.<sup>182</sup> Second, the Oregon health experiment revealed that persons who were randomly assigned to get Medicaid coverage experienced lower rates of clinical depression than those not enrolled, suggesting that access to insurance *itself* can help buffer against poor mental health outcomes.<sup>183</sup>



*Other social protection programs*

Some public health literature has focused on how social protection programs other than healthcare insurance schemes may affect health outcomes during economic recessions. One analysis of econometric panel data covering prior recessions between 1970 and 2007 among 26 European Union countries found that public healthcare program spending actually had a less significant impact on mortality outcomes during recessions than did “active labor market programs”. Such programs are designed to quickly reintegrate unemployed workers back into the workforce. These labor market programs engaged the newly unemployed and private firms to place workers rapidly into paid jobs. The programs have had a more significant impact on suicide rates during prior economic recessions than did a variety of other social welfare programs including health spending, direct income support, housing support, and unemployment benefits.<sup>38</sup> Such programs appeared to explain the absence of any increase in suicide rates during economic recessions in Finland and Sweden.<sup>79,89,126</sup> Benefits appeared most likely to accrue among men, who were otherwise at the highest risk for suicide.

A second set of studies related to health has focused on food supports. The Supplemental Nutrition Assistance Program (SNAP), also known as food stamps, increased enrollment by 45 percent from January of 2009 to January of 2012, ultimately including about one in seven Americans.<sup>184,185</sup> An analysis using Current Population Survey data examined the effect of SNAP on poverty from 2000 to 2009, by adding program benefits to income and calculating how SNAP benefits affected the prevalence, depth, and severity of poverty. The analysis estimated a decline of 4.4 percent in the prevalence of poverty due to SNAP benefits. SNAP benefits had a particularly strong effect on child poverty, reducing its depth by an average of 15.5 percent and its severity by an average of 21.3 percent from 2000 to 2009. SNAP’s antipoverty effect peaked in 2009, when benefit increases were authorized by ARRA (increasing benefits to about \$1.50 USD per meal from two-thirds that level on average).<sup>186</sup> Ultimately this reduction in poverty was related to lower rates of food insecurity; while rates of hunger, as measured by a standardized, validated scale, increased in 2008 with the start of the recession, increased SNAP participation was associated with a subsequent stabilization then decline in hunger rates.<sup>187</sup> However, these beneficial statistics appeared to be concentrated among children, with adults and men in particular most likely to be excluded.

A third category of social protection programs did not involve direct enrollment of those affected economically by the recession, such as the unemployed; rather, these programs involved funding to local and federal

health departments charged with the task of providing community-wide public health services. Between 2008 and 2010, three cross-sectional surveys of a nationally representative sample of local health departments observed more than half were experiencing cuts to “core funding” activities that included basic services related to disease surveillance and local health statistics record-keeping.<sup>188</sup> In excess of 23,000 local health departments jobs were lost in 2008 and 2009. More than half of the departments had to reduce or eliminate at least one programmatic area, such as infectious disease surveillance. Internationally, the loss of public health department programs such as mosquito spraying has been associated with malaria outbreaks and resurgences.<sup>189</sup>

A parallel study of local “safety net” clinics, some of which are operated by local public health departments, was mixed and less severe according to a study of five metropolitan areas. Before the recession, many safety net providers reported treating more uninsured patients and facing tighter state and local funding, but federal expansion grants for community health centers increased capacity and programs to help direct people to primary care providers reduced an expected surge in emergency department use by the uninsured during the downturn. ARRA stimulus spending was also found to have partially offset reductions in state, local and private funding for the safety net hospitals surveyed.<sup>190</sup>

## **DISCUSSION**

In this study we reviewed the data on how health systems may be affected by recessions, in terms of both increased demand for health care and reduced resources with which to meet it. By examining previous recessions and early data on responses and effects of the current one, we can identify several implications for public health policy. Figure 1 depicts the conceptual model summary of our findings, which show how recessions produce individual-level economic shocks (e.g., job, income losses), which may be affected by both individual-level factors (e.g., vulnerability factors like pre-existing mental health disorders, or resilience factors like good social support), and by community-level social protection programs (e.g., active labor market programs). These programs also affect individual-level, downstream economic shocks on health outcomes, such as employer-based insurance losses, but are mediated by individual-level pre-existing health conditions.

Several conclusions can be drawn from the existing literature on this issue. First, there is strong, consistent evidence that recessions, and unemployment in particular, can be significantly damaging to mental

health, increasing the risk of suicide particularly for young men. While men are also at higher risk of substance abuse and suicide than women, single men are unfortunately excluded from many of the government programs that are typically in place to buffer individuals during periods of income loss, as food support, unemployment support and housing support programs tend to be more extensively targeted at women and children. Indeed, there is evidence that in countries where the social safety net covers both genders more equitably, such as Sweden and Finland, the increase in suicides during recession is smaller. Further investigations suggest that active labor market programs, which seek to reintegrate newly-unemployed workers into the workforce rapidly, offering hope to those affected, can significantly reduce suicide independent of other factors.

By contrast to these mental health findings, the evidence on recessionary influences on substance abuse shows that simple conclusions from the observed reductions in alcohol or tobacco use during recessions may be deceptive. While overall alcohol use trends decrease, there is a subpopulation at risk for heavy bingeing. This, again, appears to be concentrated among young men, consistent with prior literature from the Russian financial crisis and other economic downturns, during which men at high risk of unemployment, and with low social support, were at highest risk of alcohol abuse and dependence.<sup>191</sup>

By contrast, evidence for the relationship between recessions and chronic health conditions has important methodological limitations. Given that these conditions and their exacerbations take a long time to manifest, it is not surprising that studies that have tried to account for previous health have failed to find strong evidence that these conditions are affected by recessions. The existing evidence suggests that for conditions related to health behaviors, such as cardiovascular disease and diabetes, prolonged unemployment and recessions may be detrimental to health outcomes. Beyond behaviors, the loss of health insurance may be another pathway in which recessions affect these conditions, and populations that are missed by automatic stabilizers are at highest risk.

The evidence on recessions and infectious diseases similarly shows that major outbreaks of communicable diseases typically occur only when basic public health infrastructure breaks down. In cases where recessions are followed by severe austerity or political instability that undermine the public health infrastructure, infectious disease outbreaks are likely to become a concern, though there may be some quarantine benefits to high levels of unemployment for common infectious diseases like influenza and pneumonia.

Early work has demonstrated that the relationship between income, social safety nets such as food assistance, and longer-term health outcomes such as nutrition requires bolstering to protect health during times of fiscal austerity. It is important to note that budgetary stimulus appears to compensate for some of the worst consequences of financial loss during periods of mass unemployment. In the US, the most recent recession exacerbated preexisting trends of declining employer-sponsored health insurance, but for children, mothers, and the poor, Medicaid picked up some of the slack. The fact that we observe more adverse outcomes for men and the near poor is notable in that they are excluded from many US safety net programs. Similarly, other social programs may have done more to protect health than previously recognized. The expansion of Medicaid, SNAP, and unemployment benefits under ARRA likely had substantial buffering effects, especially on poor women and their children. More evidence from cross-country (or cross-state) analyses can assist us to further evaluate the extent to which key safety net programs protect health, allowing us to discover more findings like the suicide-mitigating impact of active labor market programs. For example, exploiting the variation in states' Medicaid expansion of coverage to men under the Affordable Care Act may be particularly useful in future studies.

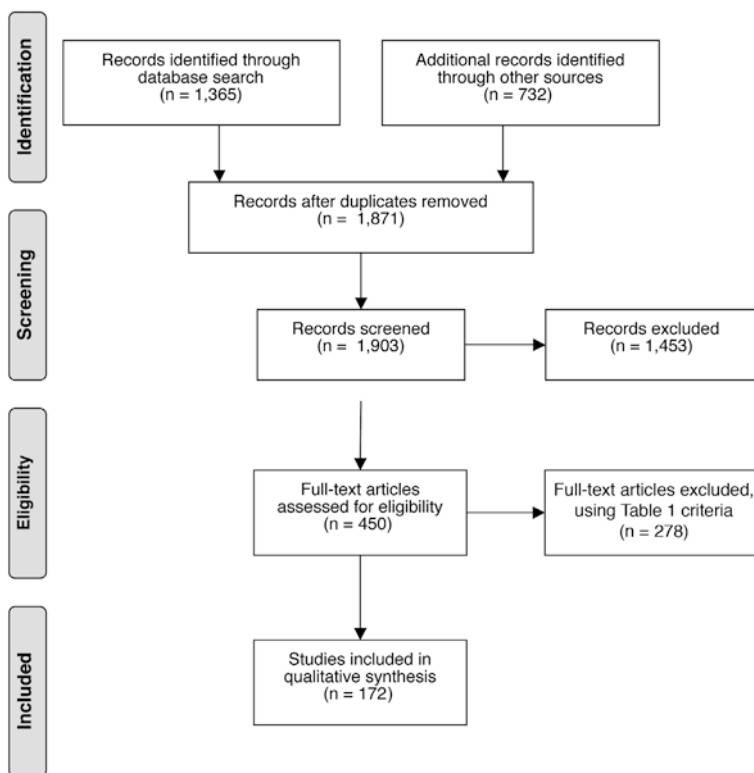
Our review also uncovered large gaps that remain in the literature. For instance, the recent recession was accompanied by substantial changes in the populations' housing situation. While there exists some literature examining housing instability amongst the chronically homeless, those studies are generally not relevant to those families who have experienced new foreclosures, and who may have continuing obligations to lenders, and are largely a different population that has not previously accessed homeless services. Studies examining housing and health are needed, particularly foreclosures and compensatory behaviors among the most vulnerable groups, such as "doubling up" with family, which increased 25 percent for the young in the recent US downturn.<sup>192</sup> This places both financial burdens on families that may affect healthcare expenditures, as well as posing infectious disease threats in settings of crowding (e.g., tuberculosis, scabies) and the risk of chronic housing instability for the young who are facing unemployment and its associated mental health and substance abuse risks.

In summary, the existing literature offers some clues that particularly young men may be most vulnerable to mental health and substance abuse effects of recessionary unemployment, but programs in the public health sector as well as in the labor market sector may serve as effective buffers. Furthermore, the impact of stimulus on safety net programs buffering

health appears to be significant, not only for health insurance coverage through Medicaid, but also via other social protection programs. Recessions appear to be most risky when social safety net programs are weak, drugs and alcohol are poorly-controlled and widely available, and people face low social support.

### Appendix 1

#### *Study Identification, Screening and Inclusion Process*



#### **Acronyms List:**

ARRA = American Recovery and Reinvestment Act  
 CHIP = Children's Health Insurance Program  
 COBRA = Consolidated Omnibus Budget Reconciliation Act  
 SNAP = Supplemental Nutrition Assistance Program

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**REFERENCES**

1. Grusky DB, Western B, Wimer C, (editors.). *The Great Recession*. New York (NY): Russell Sage Foundation Publications; 2011.
2. Monea E, Sawhill IV. Simulating the effect of the “Great Recession” on poverty. Brookings; 10 September 2009. Available from URL: <http://www.brookings.edu/research/papers/2009/09/10-poverty-monea-sawhill> (Accessed 3 October 2013).
3. Iglehart JK. Expanding eligibility, cutting costs —a Medicaid update. *N Engl J Med*. 2011;366:105-7.
4. Neumayer E. Recessions lower (some) mortality rates: evidence from Germany. *Soc Sci Med*. 2004;58:1037-47.
5. Bor J, Basu S, Coutts A, McKee M, Stuckler D. Alcohol use during the Great Recession of 2008-2009. *Alcohol Alcohol*. 2013;48:343-8.
6. Boyd DJ. The bursting state fiscal bubble and state Medicaid budgets. *Health Aff (Millwood)*. 2003;22:46-61.
7. Beeuwkes Buntin M, Haviland AM, McDevitt R, Sood N. Healthcare spending and preventive care in high-deductible and consumer-directed health plans. *Am J Manag Care*. 2011;17:222-30.
8. Dooley D, Catalano R. Why the economy predicts help-seeking: a test of competing explanations. *J Health Soc Behav*. 1984;25:160-76.
9. Dooley D, Fielding J, Levi L. Health and unemployment. *Annu Rev Public Health*. 1996;17:449-65.
10. Catalano R, Goldman-Mellor S, Saxton K, Margerison-Zilko C, Subbaraman M, et al. The health effects of economic decline. *Annu Rev Public Health*. 2011;32:431-50.
11. Dooley D, Prause J. *The Social Costs of Underemployment*. New York (NY): Cambridge University Press; 2004.
12. Ruhm CJ. Are recessions good for your health? *Q J Econ*. 2000;115:617-50.
13. Ruhm CJ. Healthy living in hard times. *J Health Econ*. 2005;24:341-63.
14. Ruhm CJ. A healthy economy can break your heart. *Demography*. 2007;44:829-48.
15. Ruhm CJ, Black WE. Does drinking really decrease in bad times? *J Health Econ*. 2002;21:659-78.
16. Gerdtham U, Ruhm CJ. Deaths rise in good economic times: evidence from the OECD. *Econ Hum Biol*. 2006;4:298-316.
17. Miller DL, Page ME, Stevens AH, Filipinski M. Why are recessions good for your health? *Am Econ Rev*. 2009;99:122-7.
18. Tapia Granados JA, Diez Roux AV. Life and death during the Great Depression. *Proc Natl Acad Sci U S A*. 2009;106:17290-5.
19. Sullivan D, von Wachter T. Job displacement and mortality: an analysis using administrative data. *Q J Econ*. 2009;124:1265-306.
20. Martikainen P, Mäki N, Jantti M. The effects of unemployment on mortality following workplace downsizing and workplace closure: a register-based follow-up study of Finnish men and women during economic boom and recession. *Am J Epidemiol*. 2007;165:1070-5.

21. Garcy AM, Vågerö D. The length of unemployment predicts mortality, differently in men and women, and by cause of death: a six year mortality follow-up of the Swedish 1992-1996 recession. *Soc Sci Med.* 2012;74:1911-20.
22. Kondo N, Subramanian SV, Kawachi I, Takeda Y, Yamagata Z. Economic recession and health inequalities in Japan: analysis with a national sample, 1986-2001. *J Epidemiol Community Health.* 2008;62:869-75.
23. Åhs A, Westerling R. Self-rated health in relation to employment status during periods of high and of low levels of unemployment. *Eur J Public Health.* 2006;16:294-304.
24. Morris JK, Cook DG, Shaper AG. Loss of employment and mortality. *BMJ.* 1994;308:1135-9.
25. Browning M, Heinesen E. Effect of job loss due to plant closure on mortality and hospitalization. *J Health Econ.* 2012;31:599-616.
26. Mustard CA, Bielecky A, Etches J, Wilkins R, Tjepkema M, et al. Mortality following unemployment in Canada, 1991-2001. *BMC Public Health* 2013; 13:441.
27. Lavis J. *Unemployment and Mortality: A Longitudinal Study in the United States, 1968-1992.* Hamilton: Centre for Health Economics and Policy Analysis, McMaster University; 1998.
28. Bartley M. Unemployment and ill health: understanding the relationship. *J Epidemiol Community Health.* 1994;48:333-7.
29. Blakely T. Unemployment and mortality: learning from the past in times of resurging unemployment. *J Epidemiol Community Health.* 2010;64:3-4.
30. Schmitz H. Why are the unemployed in worse health? The causal effect of unemployment on health. *Labour Econ.* 2011;18:71-8.
31. Wagenaar AF, Kompier MA, Houtman IL, van den Bossche SNJ, Taris TW. Employment contracts and health selection: unhealthy employees out and healthy employees in? *J Occup Environ Med.* 2012;54:1192-200.
32. Lundin A, Lundberg I, Hallsten L, Ottosson J, Hemmingsson T. Unemployment and mortality--a longitudinal prospective study on selection and causation in 49321 Swedish middle-aged men. *J Epidemiol Community Health.* 2010;64: 22-8.
33. Bockerman P, Ilmakunnas P. Unemployment and self-assessed health: evidence from panel data. *Health Econ.* 2009;18:161-79.
34. Modrek S, Cullen MR. Health consequences of the 'Great Recession' on the employed: evidence from an industrial cohort in aluminum manufacturing. *Soc Sci Med.* 2013;92:105-13.
35. Virtanen P, Janlert U, Hammarström A. Suboptimal health as a predictor of non-permanent employment in middle age: a 12-year follow-up study of the Northern Swedish Cohort. *Int Arch Occup Environ Health.* 2013;86:139-45.
36. Suhrcke M, Stuckler D. Will the recession be bad for our health? It depends. *Soc Sci Med.* 2012;74:647-53.

37. Stevens AH, Miller DL, Page ME, Filipski M. The Best of Times, the Worst of Times: Understanding Pro-cyclical Mortality. National Bureau of Economic Research Working Paper No. 17657; December 2011.
38. Stuckler D, Basu S, Suhrcke M, Coutts A, McKee M. The public health effect of economic crises and alternative policy responses in Europe: an empirical analysis. *Lancet* 2009;374:315-23.
39. Stuckler D, Meissner C, Fishback P, Basu S, McKee M. Banking crises and mortality during the Great Depression: evidence from US urban populations, 1929-1937. *J Epidemiol Community Health*. 2012;66:410-9.
40. Swendsen J, Conway KP, Degenhardt L, Glantz M, Jin R, et al. Mental disorders as risk factors for substance use, abuse and dependence: results from the 10-year follow-up of the National Comorbidity Survey. *Addiction* 2010;105:1117-28.
41. Catalano R. An emerging theory of the effect of economic contraction on alcohol abuse in the United States. *Soc Just Res*. 1997;10:191-201.
42. Ben Lakhdar C, Bastianic T. Economic constraint and modes of consumption of addictive goods. *Int J Drug Policy* 2011;22:360-5.
43. Bolton K, Rodriguez E. Smoking, drinking and body weight after re-employment: does unemployment experience and compensation make a difference? *BMC Public Health*. 2009;9:77.
44. Brenner MH. Relation of economic change to Swedish health and social well-being, 1950-1980. *Soc Sci Med*. 1987;25:183-95.
45. Giatti L, Barreto SM, César CC. Informal work, unemployment and health in Brazilian metropolitan areas, 1998 and 2003. *Cad Saude Publica*. 2008;24:2396-406.
46. Houdmont J, Kerr R, Addley K. Psychosocial factors and economic recession: the Stormont Study. *Occup Med (Lond)*. 2012;62:98-104.
47. Kozman D, Graziul C, Gibbons R, Alexander GC. Association between unemployment rates and prescription drug utilization in the United States, 2007-2010. *BMC Health Serv Res*. 2012;12:435.
48. Makela P. Alcohol-related mortality during an economic boom and recession. *Contemp Drug Probs*. 1999;26(3).
49. Mark TL, Levit KR, Vandivort-Warren R, Buck JA, Coffey RM. Changes In US spending on mental health and substance abuse treatment, 1986-2005, and implications for policy. *Health Aff (Millwood)*. 2011;30:284-92.
50. Novo M, Hammarström A, Janlert U. Smoking habits—a question of trend or unemployment? A comparison of young men and women between boom and recession. *Public Health*. 2000;114:460-3.
51. O'Dowd A. Recession could increase alcohol and drug addiction and mental health problems, watchdog warns. *BMJ*. 2009;339:b3361.
52. Reine I, Novo M, Hammarström A. Does the association between ill health and unemployment differ between young people and adults? Results from a 14-year follow-up study with a focus on psychological health and smoking. *Public Health*. 2004;118:337-45.



53. Sand J, Välikoski A, Nordback I. Alcohol consumption in the country and hospitalizations for acute alcohol pancreatitis and liver cirrhosis during a 20-year period. *Alcohol Alcohol*. 2009;44:321-5.
54. Vijayasiri G, Richman JA, Rospenda KM. The Great Recession, somatic symptomatology and alcohol use and abuse. *Addict Behav*. 2012;37:1019-24.
55. Wagenaar AC, Streff FM. Macroeconomic conditions and alcohol-impaired driving. *J Stud Alcohol*. 1989;50:217-25.
56. Walberg P, McKee M, Shkolnikov V, Chenet L, Leon DA. Economic change, crime, and mortality crisis in Russia: regional analysis. *BMJ*. 1998;317:312-8.
57. Cotti C, Dunn R, Tefft N. The Dow is killing me: risky health behaviors and the stock market. *Social Science Research Network*; 25 January 2013.
58. McClure CB, Valdimarsdottir UA, Hauksdottir A, Kawachi I. Economic crisis and smoking behaviour: prospective cohort study in Iceland. *BMJ Open*. 2012;2(5).
59. Kentikelenis A, Karanikolos M, Papanicolas I, Basu S, McKee M, Stuckler D. Health effects of financial crisis: omens of a Greek tragedy. *Lancet*. 2011;378:1457-8.
60. Collis J, Grayson A, Johal S. Econometric analysis of alcohol consumption in the UK. HMRC working paper 10. HM Revenue & Customs; December 2010.
61. Ayers JW, Althouse BM, Allem J-P, Childers MA, Zafar W, et al. Novel surveillance of psychological distress during the great recession. *J Affect Disord*. 2012;142:323-30.
62. Banks MH, Jackson PR. Unemployment and risk of minor psychiatric disorder in young people: cross-sectional and longitudinal evidence. *Psychol Med*. 1982;12:789-98.
63. Barr B, Taylor-Robinson D, Scott-Samuel A, McKee M, Stuckler D. Suicides associated with the 2008-10 economic recession in England: time trend analysis. *BMJ*. 2012;345:e5142.
64. Brown DW, Balluz LS, Ford ES, Giles WH, Strine TW, et al. Associations between short-and long-term unemployment and frequent mental distress among a national sample of men and women. *J Occup Environ Med*. 2003; 45:1159-66.
65. Burgard SA, Seefeldt KS, Zelner S. Housing instability and health: findings from the Michigan Recession and Recovery Study. *Soc Sci Med*. 2012;75: 2215-24.
66. Caplan RD, Vinokur AD, Price RH, Van Ryn M. Job seeking, reemployment, and mental health: A randomized field experiment in coping with job loss. *J Appl Psychol*. 1989;74:759-69.
67. Carlisle D. Public health in a recession. *Nurs Times*. 2008;104:20-3.
68. Clark AE, Oswald AJ. Unhappiness and unemployment. *Econ J*. 1994;104:648-59.
69. Coile CC, Levine PB, McKnight R. New measures of the costs of unemployment: evidence from the subjective well-being of 2.3 million Americans. NBER Working Paper 16829. The National Bureau of Economic Research; February 2011.

70. Collier R. Recession stresses mental health system. *CMAJ*. 2009;181:E48-9.
71. Crombie IK. Can changes in the unemployment rates explain the recent changes in suicide rates in developed countries? *Int J Epidemiol*. 1990;19:412-6.
72. Davalos ME, French MT. This recession is wearing me out! Health-related quality of life and economic downturns. *J Ment Health Policy Econ*. 2011;14:61-72.
73. Dollard MF, Winefield AH. Mental health: overemployment, underemployment, unemployment and healthy jobs. *Adv Ment Health*. 2002;1:170-95.
74. Fryer D, Fagan R. Toward a critical community psychological perspective on unemployment and mental health research. *Am J Community Psychol*. 2003;32:89-96.
75. Gili M, Roca M, Basu S, McKee M, Stuckler D. The mental health risks of economic crisis in Spain: evidence from primary care centres, 2006 and 2010. *Eur J Public Health*. 2012;23:103-8.
76. Giuntoli G, South J, Kinsella K, Karban K. Mental health, resilience and the recession in Bradford. York: Joseph Rowntree Foundation; 25 July 2011.
77. Gordo LR. Effects of short-and long-term unemployment on health satisfaction: evidence from German data. *Appl Econ*. 2006;38:2335-50.
78. Gunnell D, Lopatatzidis A, Dorling D, Wehner H, Southall H, Frankel S. Suicide and unemployment in young people. Analysis of trends in England and Wales, 1921-1995. *Br J Psychiatry*. 1999;175:263-70.
79. Hagquist C, Silburn SR, Zurbrick SR, Lindberg G, Ringbäck Weitoft G. Suicide and mental health problems among Swedish youth in the wake of the 1990s recession. *Int J Soc Welfare*. 2008;9:211-9.
80. Hyypä MT, Kronholm E, Alanen E. Quality of sleep during economic recession in Finland: a longitudinal cohort study. *Soc Sci Med*. 1997;45:731-8.
81. Jenkins R, Fitch C, Hurlston M, Walker F. Recession, debt and mental health: challenges and solutions. *Ment Health Fam Med*. 2009;6:85-90.
82. Katikireddi SV, Niedzwiedz CL, Popham F. Trends in population mental health before and after the 2008 recession: a repeat cross-sectional analysis of the 1991-2010 Health Surveys of England. *BMJ Open*. 2012;2(5).
83. Knapp M. Mental health in an age of austerity. *Evid Based Ment Health*. 2012;15:54-5.
84. Liem R, Rayman P. Perspectives on Unemployment, Mental Health, and Social Policy. *Int J Ment Health*. 1984;13:3-17.
85. Lindström M. Psychosocial work conditions, unemployment and self-reported psychological health: a population-based study. *Occup Med (Lond)*. 55:568-71.
86. Maier R, Egger A, Barth A, Winker R, Osterode W, et al. Effects of short-and long-term unemployment on physical work capacity and on serum cortisol. *Int Arch Occup Environ Health*. 2006;79:193-8.
87. McKee-Ryan F, Song Z, Wanberg CR, Kinicki AJ. Psychological and physical well-being during unemployment: a meta-analytic study. *J Appl Psychol*. 2005;90:53-76.

88. Novo M, Hammarström A, Janlert U. Do high levels of unemployment influence the health of those who are not unemployed? A gendered comparison of young men and women during boom and recession. *Soc Sci Med.* 2001;53:293-03.
89. Ostamo A, Lönnqvist J. Attempted suicide rates and trends during a period of severe economic recession in Helsinki, 1989-1997. *Soc Psychiatry Psychiatr Epidemiol.* 2001;36:354-60.
90. Owen K, Watson N. Unemployment and mental health. *J Psychiatr Ment Health Nurs.* 1995;2:63-71.
91. Pesonen TM, Hintikka J, Karkola KO, Saarinen PI, Antikainen M, Lehtonen J. Male suicide mortality in eastern Finland--urban-rural changes during a 10-year period between 1988 and 1997. *Scand J Public Health.* 2001;29:189-93.
92. Platt S. Unemployment and suicidal behaviour: a review of the literature. *Soc Sci Med.* 1984;19:93-115.
93. Rantakeisu U, Jönsson LR. Unemployment and mental health among white-collar workers—a question of work involvement and financial situation? *International Journal of Social Welfare,* 12(1):31-41.
94. Rantakeisu U, Starrin B, Hagquist C. Unemployment, shame and ill health—an exploratory study. *Int J Soc Welfare.* 1997;6:13-23.
95. Roberts H, Pearson JC, Madeley RJ, Hanford S, Magowan R. Unemployment and health: the quality of social support among residents in the Trent region of England. *J Epidemiol Community Health.* 1997;51:41-5.
96. Rodriguez E, Lasch K, Mead JP. The potential role of unemployment benefits in shaping the mental health impact of unemployment. *Int J Health Serv.* 1997;27:601-23.
97. Sareen J, Afifi TO, McMillan KA, Asmundson GJG. Relationship between household income and mental disorders: findings from a population-based longitudinal study. *Arch Gen Psychiatry.* 2011;68:419-27.
98. Schaufeh WB. Unemployment and mental health in well- and poorly-educated school-leavers. Netherlands: Kluwer Academic Publishers; 1992.
99. Schuring M, Burdorf A, Kunst A, Voorham T, Mackenbach J. Ethnic differences in unemployment and ill health. *Int Arch Occup Environ Health.* 2009;82: 1023-30.
100. Schwefel D, John J, Potthoff P, Hechler A. Unemployment and mental health: perspectives from the Federal Republic of Germany. *Int J Ment Health.* 1984;13:35-50.
101. Solantaus T, Leinonen J, Punamaki R-L. Children's mental health in times of economic recession: replication and extension of the family economic stress model in Finland. *Dev Psychol.* 2004;40:412-29.
102. Stuckler D, Basu S, McDaid D. Depression amidst depression: mental health effects of the ongoing recession. London; Personal Social Services Research Unit.

103. Stuckler D, Basu S, Suhrcke M, Coutts A, McKee M. Effects of the 2008 recession on health: a first look at European data. *Lancet*. 2011;378:124-5.
104. Taris TW. Unemployment and mental health: a longitudinal perspective. *Int J Stress Management*. 2002;9:43-57.
105. Turner JB, Turner RJ. Physical Disability, Unemployment, and Mental Health. *Rehabilitation Psychol*. 2004;49:241-9.
106. Valkonen T, Martikainen P, Jalovaara M, Koskinen S, Martelin T, Makela P. Changes in socioeconomic inequalities in mortality during an economic boom and recession among middle-aged men and women in Finland. *Eur J Public Health*. 2000;10:274-80.
107. Viinamäki H, Hintikka J, Kontula O, Niskanen L, Koskela K. Mental health at population level during an economic recession in Finland. *Nord J Psychiatry*. 2000;54:177-82.
108. Viinamäki H, Koskela K, Niskanen L, Arnkill R, Tikkanen J. Unemployment and mental wellbeing: a factory closure study in Finland. *Acta Psychiatr Scand*. 1993;88:429-33.
109. Viinamäki H, Koskela K, Niskanen L. The impact of unemployment on psychosomatic symptoms and mental well-being. *Int J Soc Psychiatry*. 1993;39:266-73.
110. Warr P. *Work, Unemployment and Mental Health*. Oxford University Press; 1987.
111. Weaver JD. Economic recession and increases in mental health emergencies. *J Ment Health Adm*. 1983;10:28-31.
112. Weich S, Lewis G. Poverty, unemployment, and common mental disorders: population based cohort study. *BMJ*. 1998;317:115-9.
113. Weston-Cox P. The impact of the economic downturn on environmental health services and professionals in North Carolina. *J Environ Health*. 2012;74:16-20.
114. Wight RG, Aneshensel CS, Barrett C, Ko M, Chodosh J, Karlamangla AS. Urban neighbourhood unemployment history and depressive symptoms over time among late middle age and older adults. *J Epidemiol Community Health*. 2013;67:153-8.
115. Winkelmann L, Winkelmann R. Why are the unemployed so unhappy? Evidence from panel data. *Economica*. 1998;65:1-15.
116. Yamasaki A, Sakai R, Shirakawa T. Low income, unemployment, and suicide mortality rates for middle-age persons in Japan. *Psychol Rep*. 2005;96:337-48.
117. Yoon J-H, Junger W, Kim B-W, Kim Y-J, Koh S-B. Investigating the time lag effect between economic recession and suicide rates in agriculture, fisheries, and forestry workers in Korea. *Saf Health Work*. 2012;3:294-7.
118. Zavras D, Tsiantou V, Pavi E, Mylona K, Kyriopoulos J. Impact of economic crisis and other demographic and socio-economic factors on self-rated health in Greece. *Eur J Public Health*. 2012;23:206-10.

119. Zunzunegui MV, M F, Gauvin L, Raynault MF, Douglas Willms J. Community unemployment and immigrants' health in Montreal. *Soc Sci Med.* 2006;63:485-500.
120. Koo J, Cox WM. An economic interpretation of suicide cycles in Japan. *Contemporary Econ Pol.* 2008;26:162-74.
121. Alvaro-Meca A, Kneib T, Gil-Prieto R, Gil de Miguel A. Epidemiology of suicide in Spain, 1981-2008: a spatiotemporal analysis. *Public Health.* 2013;127:380-5.
122. De Vogli R, Marmot M, Stuckler D. Excess suicides and attempted suicides in Italy attributable to the great recession. *J Epidemiol Community Health.* 2013;67:378-9.
123. Yamauchi T, Fujita T, Tachimori H, Takeshima T, Inagaki M, Sudo A. Age-adjusted relative suicide risk by marital and employment status over the past 25 years in Japan. *J Public Health.* 2013;35:49-56.
124. Milner A, Page A, LaMontagne AD. Duration of unemployment and suicide in Australia over the period 1985-2006: an ecological investigation by sex and age during rising versus declining national unemployment rates. *J Epidemiol Community Health.* 2013;67:237-44.
125. Dooley D, Prause J, Ham-Rowbottom KA. Underemployment and depression: longitudinal relationships. *J Health Soc Behav.* 2000;41:421-36.
126. WHO Regional Office for Europe. Impact of economic crises on mental health. Copenhagen: World Health Organization; 2011.
127. Hagquist C, Starrin B. Youth unemployment and mental health—gender differences and economic stress. *Int J Soc Welfare.* 2007;5:215-28.
128. Adelman RA, Nwanze CC. The impact of the economy and recessions on the marketplace demand for ophthalmologists (an American Ophthalmological Society thesis). *Trans Am Ophthalmol Soc.* 2011;109:49-65.
129. Bambra C. Yesterday once more? Unemployment and health in the 21st century. *J Epidemiol Community Health.* 2010;64:213-5.
130. Benavides FG, Garcia AM, Sáez-Lloret I, Librero J. Unemployment and health in Spain The influence of socio-economic environment. *Eur J Public Health.* 1994;4:103-7.
131. Brenner MH, Mooney A. Unemployment and health in the context of economic change. *Soc Sci Med.* 1983;17:1125-38.
132. Burgard SA, Kalousova L, Seefeldt KS. Perceived job insecurity and health: the Michigan Recession and Recovery Study. *J Occup Environ Med.* 2012; 54:1101-6.
133. Cook D. Unemployment and health during a recession. *Practitioner.* 1985;229: 559-62.
134. Falck S. Recession blues. Coping with economic uncertainty. *Respir Ther.* 1983;13:71-2,76,89.
135. Franks PJ, Adamson C, Bulpitt PF, Bulpitt CJ. Stroke death and unemployment in London. *J Epidemiol Community Health.* 1991;45:16-8.

136. Freidl W, Fazekas C, Raml R, Pretis M, Feistritzer G. Perceived social justice, long-term unemployment and health. *Soc Psychiatry Psychiatr Epidemiol.* 2007;42:547-53.
137. Harris E, Harris M, Lee P, Powell Davies G. Taking action to address the health impact of unemployment: experiences from south-western Sydney. *Health Promot J Austr.* 1999;9:115-20.
138. Henriksson KM, Lindblad U, Agren B, Nilsson-Ehle P, Råstam L. Associations between unemployment and cardiovascular risk factors varies with the unemployment rate: The Cardiovascular Risk Factor Study in Southern Sweden (CRISS). *Scand J Public Health.* 2003;31:305-11.
139. Janlert U. Unemployment and blood pressure in Swedish building labourers. *J Intern Med.* 1992;231:241-6.
140. Junankar PN. Unemployment and mortality in England and Wales: a preliminary analysis. *Oxford Econ Papers.* 1991;43:305-20.
141. Kristjuhan U, Taidre E. The last recession was good for life expectancy. *Rejuvenation Res.* 2012;15:134-5.
142. Kwon S, Jung Y, Islam A, Pande B, Yao L. The impact of the global recession on the health of the people in Asia. In: Bauer A, Thant M, (editors). *Poverty and Sustainable Development in Asia.* Manila; Asian Development Bank; 2010. p.405-24.
143. Lahelma E, Rahkonen O, Huuhka M. Changes in the social patterning of health? The case of Finland 1986-1994. *Soc Sci Med.* 1997;44:789-99.
144. Lundberg O, Diderichsen F, Yngwe MA. Changing health inequalities in a changing society? Sweden in the mid-1980s and mid-1990s. *Scand J Public Health Suppl.* 2001;55:31-9.
145. Piette JD, Rosland AM, Silveira MJ, Hayward R, McHorney CA. Medication cost problems among chronically ill adults in the US: did the financial crisis make a bad situation even worse? *Patient Prefer Adherence.* 2011;5:187-94.
146. Weber A, Lehnert G. Unemployment and cardiovascular diseases: a causal relationship? *Int Arch Occup Environ Health.* 1997;70:153-60.
147. Weber A, Piechulek H. The impact of the global recession on the poor and vulnerable in the Philippines and on the social health insurance system. In: Bauer A, Thant M, (editors). *Poverty and Sustainable Development in Asia.* Manila; Asian Development Bank; 2010. p. 425-40.
148. Carlier BE, Schuring M, Lötters FJB, Bakker B, Borgers N, Burdorf A. The influence of re-employment on quality of life and self-rated health, a longitudinal study among unemployed persons in the Netherlands. *BMC Public Health.* 2013;13:503.
149. Hauksdóttir A, McClure C, Jonsson SH, Olafsson O, Valdimarsdóttir UA. Increased stress among women following an economic collapse--prospective cohort study. *Am J Epidemiol.* 2013; epub ahead of print.
150. Kim JM, Son N-H, Park E-C, Nam CM, Kim TH, Cho W-H. The relationship between changes in employment status and mortality risk based on the Korea Labor and Income Panel Study (2003-2008). *Asia Pac J Public Health.* 2013; epub ahead of print.

151. Eliason M, Storrie D. Does job loss shorten life? *J Human Resources*. 2009; 44:277-302.
152. Eliason M, Storrie D. Job loss is bad for your health - Swedish evidence on cause-specific hospitalization following involuntary job loss. *Soc Sci Med*. 2009;68:1396-406.
153. Tsai SL, Lan CF, Lee CH, Huang N, Chou YJ. Involuntary unemployment and mortality in Taiwan. *J Formos Med Assoc*. 2004;103:900-7.
154. Ledermann S. *Alcool, Alcoolisme, Alcoolisation: Mortalité Morbidité Accidents du Travail.*, vol. Institut National d'Etudes Demographiques, Travaux et Documents. Paris: Presses Universitaires de France; 1964. [In French]
155. The Henry J. Kaiser Family Foundation. Recession Prompting Increase in Number of People with HIV Seeking Public Services in California. KFF; 1 June 2009.
156. Arinaminpathy N, Dye C. Health in financial crises: economic recession and tuberculosis in Central and Eastern Europe. *J R Soc Interface*. 2010;7:1559-69.
157. Sührcke M, Stuckler D, Suk JE, Desai M, Senek M, et al. The impact of economic crises on communicable disease transmission and control: a systematic review of the evidence. *PLoS One*. 2011;6:e20724.
158. Winston CA, Navin TR, Becerra JE, Chen MP, Armstrong LR, et al. Unexpected decline in tuberculosis cases coincident with economic recession - United States, 2009. *BMC Public Health*. 2011;11:846.
159. Markowitz S, Nesson E, Robinson J. Are pink slips better than flu shots? The effects of employment on influenza rates. NBER Working Paper 15796. The National Bureau of Economic Research; March 2010.
160. Davis JA, Savage G, Stewart RT. Organizational downsizing: a review of literature for planning and research. *J Healthc Manag*. 2003;48:181-99.
161. Quinlan M, Bohle P. Overstretched and unreciprocated commitment: reviewing research on the occupational health and safety effects of downsizing and job insecurity. *Int J Health Serv*. 2009;39:1-44.
162. Fronstin P. The impact of the recession on employment-based health coverage. *EBRI Issue Brief*. 2010;342:1-22.
163. Gould E. Employer-sponsored health insurance erosion accelerates in the recession. *Int J Health Serv*. 2012;42:499-537.
164. The Henry J. Kaiser Family Foundation. Medicaid enrollment growth during the economic recession, December 2007 to December 2009. KFF.
165. Rowland D. Health care and Medicaid--weathering the recession. *N Engl J Med*. 2009;360:1273-6.
166. Holahan J, Cook A. The U.S. economy and changes in health insurance coverage, 2000-2006. *Health Aff (Millwood)*. 2008;27:w135-44.
167. Holahan J. The 2007-09 recession and health insurance coverage. *Health Aff (Millwood)*. 2011;30:145-52.
168. Carrier E, Yee T, Garfield RL. The uninsured and their health care needs: how have they changed since the recession? Washington (DC); The Henry J. Kaiser Family Foundation; October 2011.

169. Cawley J, Simon KI. Health insurance coverage and the macroeconomy. *J Health Econ.* 2005;24:299-315.
170. Holahan J, Chen V. Changes in health insurance coverage in the Great Recession, 2007-2010. Washington (DC): The Henry J. Kaiser Family Foundation; December 2011.
171. Kaiser Commission on Medicaid and the Uninsured. Expansions in public health insurance and crowd-out: what the evidence says. The Henry J. Kaiser Family Foundation; 1 October 1999.
172. Holahan J, Bowen Garrett A. Rising unemployment, Medicaid and the uninsured. The Henry J. Kaiser Family Foundation; 9 January 2009.
173. Kaiser Commission on Medicaid and the Uninsured. Impact of the Medicaid Fiscal Relief Provisions in the American Recovery and Reinvestment Act (ARRA). Washington (DC): The Henry J. Kaiser Family Foundation; 1 October 2011.
174. Smith VK, Gifford K, Ellis E, Rudowitz R, Snyder L. Moving ahead amid fiscal challenges: a look at medicaid spending, coverage and policy trends results from a 50-state Medicaid budget survey for state fiscal years 2011 and 2012. Washington (DC): The Henry J. Kaiser Family Foundation; 1 October 2011.
175. The Henry J. Kaiser Family Foundation. Progress on health coverage is threatened as states continue to face growing pressures to control costs. KFF.
176. Cohen Ross D, Cox L. Beneath the surface: barriers threaten to slow progress on expanding health coverage of children and families. The Henry J. Kaiser Family Foundation; 29 September 2004.
177. Young K, Garfield R, Clemans-Cope L, Lawton E, Holahan J. Enrollment-driven expenditure growth: Medicaid spending during the economic downturn, FY2007-2011. Washington (DC): The Henry J. Kaiser Family Foundation; 18 April 2013.
178. Roehrig C, Turner A, Hughes-Cromwick P, Miller G. When the cost curve bent--pre-recession moderation in health care spending. *N Engl J Med.* 2012;367:590-3.
179. Martin A, Lassman D, Whittle L, Catlin A. Recession contributes to slowest annual rate of increase in health spending in five decades. *Health Aff (Millwood).* 2011;30:11-22.
180. Smith VK, Gifford K, Ellis E, Rudowitz R, Snyder L. Hoping for economic recovery, preparing for health reform :a look at Medicaid spending, coverage and policy trends. Results from a 50-state Medicaid budget survey for state fiscal years 2010 and 2011. The Henry J. Kaiser Family Foundation; 2 September 2010.
181. Alker J, Mancini T, Heberlein M. Uninsured Children 2009-2011: charting the Nation's progress. Georgetown University Health Policy Institute, Center for Children and Families; October 2012. Available from URL: <http://ccf.georgetown.edu/wp-content/uploads/2012/10/Uninsured-Children-2009-2011.pdf> (Accessed 7 October 2013).



182. Levit KR, Mark TL, Coffey RM, Frankel S, Santora P, et al. Federal spending on behavioral health accelerated during recession as individuals lost employer insurance. *Health Aff (Millwood)* 2013;32:952-62.
183. Baicker K, Taubman SL, Allen HL, Bernstein M, Gruber JH, et al. The Oregon experiment--effects of Medicaid on clinical outcomes. *N Engl J Med.* 2013; 368:1713-22.
184. Wilde PE. The new normal: the Supplemental Nutrition Assistance Program (SNAP). *Am J Agricultural Econ.* 2013;95:325-31.
185. US Department of Agriculture, Economic Research Service. American Recovery and Reinvestment Act of 2009. USDA ERS. Available from URL: <http://www.ers.usda.gov/topics/food-nutrition-assistance/supplemental-nutrition-assistance-program-%28snap%29/arra.aspx>.
186. US Department of Agriculture, Economic Research Service. Allieviating poverty in the United States: the critical role of SNAP benefits. ERR132. USDA ERS; April 2012. Available from URL: <http://www.ers.usda.gov/publications/err-economic-research-report/err132.aspx>.
187. Coleman-Jensen A, Nord M, Andrews M, Carlson S. Household food security in the United States in 2011. ERR141. US Department of Agriculture Economic Research Service; September 2012. Available from URL: <http://www.ers.usda.gov/publications/err-economic-research-report/err141.aspx>.
188. Willard R, Shah GH, Leep C, Ku L. Impact of the 2008-2010 economic recession on local health departments. *J Public Health Manag Pract.* 2012; 18:106-14.
189. Cohen JM, Smith DL, Cotter C, Ward A, Yamey G, et al. Malaria resurgence: a systematic review and assessment of its causes. *Malar J.* 2012;11:122.
190. Felland LE, Cunningham PJ, Cohen GR, November EA, Quinn BC. The economic recession: early impacts on health care safety net providers. *Res Brief.* 2010;15:1-8.
191. Tomkins S, Saburova L, Kiryanov N, Andreev E, McKee M, et al. Prevalence and socio-economic distribution of hazardous patterns of alcohol drinking: study of alcohol consumption in men aged 25-54 years in Izhevsk, Russia. *Addiction.* 2007;102:544-53.
192. U.S. Census Bureau. Households Doubling Up. U.S. Census Bureau; 2011. Availble from URL: <http://blogs.census.gov/2011/09/13/households-doubling-up/>.