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Health, Austerity and Economic Crisis: Assessing the Short-term Impact in OECD countries

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Health, austerity and economic crisis: assessing the short-term impact in OECD countries

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SUMMARY

The economic crisis that started in 2008 has had a profound impact on the lives of citizens. Millions of people lost their job, saw their life-savings disappear and experienced prolonged financial hardship. The economic crisis has also led a number of OECD governments to introduce austerity measures to reduce public deficits. The health sector, like many other social welfare programmes, has witnessed extensive spending cuts and has also been the subject of substantial reforms. The combined effects of economic crisis, austerity and reforms have led many OECD health systems into unchartered territory.

This paper looks at the impact of economic crisis on health and health care. It summarises findings from the published literature on the effects of economic crisis that took place over the past few decades and also describes recent health policy reforms, focusing on those countries where the economic crisis has hit hardest. Finally, this paper analyses the empirical relationship between unemployment and health care use, quality and health outcomes, using data from *OECD Health Statistics*. In doing so, it investigates whether the effects of unemployment on health outcomes have been extenuated by austerity measures.

Results show that economic downturns are associated with adverse outcomes for some, but certainly not all, health indicators. During times of economic crises, mental health deteriorates and the prevalence of communicable diseases appears to rise, but at the same time there are fewer deaths from transport accidents. There is less consistent evidence on the relationship between economic conditions and overall health outcomes such as mortality and health care quality. However, this paper finds that a higher rate of unemployment is strongly linked to lower health care use, which may have longer term consequences that are not yet evident in the available data. Recent health care austerity measures are associated with a decline in hospital admissions in OECD countries, but not in pharmaceutical consumption. This provides some evidence that falls in pharmaceutical expenditure can primarily be explained by efforts to negotiate lower prices and encourage use of cheaper bioequivalent generics.

While many of the health reforms undertaken since the start of the economic crisis can make a positive long-term contribution to the health system's productivity and efficiency, there may also be negative impacts. The short-term effects examined in this paper suggest that austerity measures have had mixed success in protecting patients from reduced health care access, but there remains an important need to actively monitor the wider long-term health impact of the economic crisis.

RÉSUMÉ

La crise économique qui a débuté en 2008 a eu d'importantes répercussions pour des millions de personnes, qui ont perdu leur travail ou l'épargne de toute leur vie et se trouvent confrontées à des difficultés financières de longue durée. La crise a également conduit plusieurs pays de l'OCDE à adopter des mesures d'austérité pour réduire leur déficit public. Le secteur de la santé, comme beaucoup d'autres programmes de protection sociale, a ainsi été soumis à d'importantes restrictions budgétaires et a fait l'objet de réformes de grande ampleur. Suite à l'effet conjugué de la crise économique, des mesures d'austérité et des réformes, les systèmes de santé de nombre de pays de l'OCDE doivent aujourd'hui se réinventer.

Ce document passe en revue les retombées de la crise économique sur la santé et les soins de santé. Il fait la synthèse des résultats de diverses publications sur les effets des crises économiques des dernières décennies et décrit les récentes réformes des politiques de santé, en s'intéressant plus particulièrement aux pays les plus touchés. Enfin, il analyse, à partir des *Statistiques de l'OCDE sur la santé*, les relations empiriques qui existent entre le chômage et l'utilisation, la qualité et l'efficacité des soins de santé. Dans cette optique, il s'interroge sur la question de savoir si les mesures d'austérité ont contribué à atténuer les effets du chômage sur les résultats en matière de santé.

Il ressort de cette analyse que les ralentissements économiques ont des effets négatifs sur certains indicateurs de santé – mais pas sur tous. Pendant les périodes de crise, on observe une détérioration de la santé mentale et une augmentation de la fréquence des maladies contagieuses ; mais le nombre de décès liés à des accidents de la route diminue. La relation entre la situation économique et les résultats d'ensemble en matière de santé, tels que la mortalité et la qualité des soins, est de moins en moins évidente. Néanmoins, il apparaît que plus le taux de chômage est élevé, plus le recours aux soins diminue, ce qui peut avoir des conséquences à long terme encore non perceptibles dans les données disponibles aujourd'hui. Les mesures d'austérité ont, semble-t-il, conduit au déclin des admissions hospitalières mais pas à la diminution de la consommation de produits pharmaceutiques. La réduction des dépenses pharmaceutiques qui a suivi les mesures d'austérité récentes s'explique principalement par les efforts menés pour faire baisser les prix et pour encourager le recours à des médicaments génériques bioéquivalents, moins coûteux.

Les réformes mises en œuvre dans le secteur de la santé depuis le début de la crise économique peuvent favoriser à terme la productivité et l'efficience du système, mais elles peuvent aussi avoir des conséquences négatives. S'agissant des effets à court terme, ce document montre que, si les mesures d'austérité ont contribué dans une certaine mesure à protéger les patients contre une réduction de l'accès aux soins, il importe de suivre activement l'incidence à long terme plus large de la crise économique sur la santé.

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1. DO ECONOMIC DOWNTURNS LEAD TO WORSE HEALTH OUTCOMES?

1. There is overwhelming evidence that higher incomes and wealth are strongly associated with better health. It may therefore seem intuitive to think that during times of economic crisis, when incomes drop, health outcomes could be adversely affected. However, the literature that has studied the health impact of economic downturns has shown very inconsistent results. A sizable number of influential papers demonstrate, in fact, that mortality rates tend to improve at a time when unemployment rises. Equally, there is a substantial amount of research that shows economic downturns are strongly associated with worse health, particularly in the area of mental health and some causes of mortality. These surprising, and seemingly contradictory, results have led to a body of research that seeks to provide a better understanding of how macroeconomic conditions can influence health outcomes.

2. This paper builds on these existing studies by first undertaking a review of the available empirical research and, second, undertaking a new piece of analysis using well-tested methodologies. The paper is structured as follows: the remainder of this section reviews the existing literature that examines the pathways by which macroeconomic conditions can affect health outcomes. These pathways provide the theoretical framework by which economic conditions can have direct and indirect effects on health outcomes.

3. The second section looks in more detail at the current crisis including the impact the crisis has had on health expenditure as well as the policy responses that have been implemented in numerous OECD countries. Section three present the results of a new empirical investigation looking at the links between macroeconomic indicators and health using the 2013 edition of OECD Health Statistics. In particular, it will examine the relationships between macroeconomic conditions and health care use, quality and health outcomes. Section four extends the analysis by investigating whether the relationship between economic downturns and health are influenced by changes to health expenditures. Section 5 will summarise the main findings and discuss some of the policy implications from the results of this paper.

4. Developing a greater understanding of the effects of the economic crisis on health remains an important topic for research and policy. Health systems need to respond appropriately to the potential challenges that emerge during times of recession. A greater understanding of possible changes to the population's health care needs can help facilitate better planning of the response. Similarly, a better understanding of population groups who are most likely to be affected by economic crisis can help target policy and care to those most in needs.

Economic crises can affect health outcomes through multiple channels

5. There is a rich body of evidence on the potential pathways through which economic shocks could affect health outcomes (Ruhm 2000; Marmot 2002; Bezruchka, 2009; Miller et al., 2009; Stevens et al., 2011). There are theories to suggest that worsening economic conditions can have deleterious impacts on health outcomes but, equally, there are many hypotheses that predict the opposite. Catalano et al. (2011) suggest that there are three broad mechanisms by which macroeconomic conditions can influence individual behaviours that, in turn, have an impact on health. These mechanisms are termed: (1) stress; (2) effect budgeting; and (3) frustration-aggression.

1. The stress mechanism predicts both positive and negative health impacts from economic downturns. Increased stress may arise due to greater employment uncertainty which, in turn, induces depression or anxiety (OECD, 2012). However, for those with stressful jobs, becoming unemployed may in fact reduce the prevalence of stress-induced illness. This mechanism can also be extended to physical stress, if occupational safety deteriorates or employees are willing to accept more dangerous conditions during economic downturns. On the other hand, recessions may reduce the number of risky jobs in the economy, thereby reducing physical stresses.

2. The effect budgeting mechanism can also have both positive and negative effects on health. On the negative side, this mechanism predicts that due to fewer financial resources some individuals will reduce their health investment activities. In particular, people may forego preventative care which can lead to adverse health consequences in subsequent years. On the positive side, loss in income could lead to less alcohol, tobacco or illicit drug consumption.

3. The frustration-aggression mechanism is based on the idea that individuals who are denied an expected reward may experience psychosomatic antecedents of aggression. Contracting economies may increase the perception of unfair loss and increase the incidence of violence as well as substance abuse among some individuals. By contrast, the frustration-aggression mechanism may also lead to an "inhibition effect", whereby individuals may change their behaviour to minimise the risk of job loss. This may include reducing the use of alcohol and illicit drugs, as well as avoiding antisocial behaviours that makes employees more likely to become unemployed.

6. In addition to the three individual behaviour mechanisms, economic downturns may also have *indirect effects* whereby economic shocks influence an individual's health without them changing their own behaviour. One example of this is that an economic downturn could reduce pollution levels which, in turn, may have a positive effect on health (e.g. reduced incidence of respiratory diseases). On the other hand, economic downturns could raise the risk of individuals becoming victims of crime (e.g. assault) if unemployment and income loss leads to an increase in criminal activity. Traffic fatalities provide another example of direct and indirect effect. Fewer people using motor vehicles to travel to work can lead to fewer motor vehicle accidents and deaths for those who stopped using their cars (direct effect) as well as for those who still use their cars (indirect effect).

7. The thing to note about the three individual behavioural mechanisms as well as the indirect effects is that none predict a singular direction by which macroeconomic conditions influence health. Under each mechanism there are countervailing responses that can lead to either positive or negative effects on health. Furthermore, the mechanisms are not mutually exclusive, and it is reasonable to consider that the aforementioned pathways operate simultaneously. This implies that empirical studies on the impact of economic recessions may produce varying results, depending on the study population, the outcome of interest and the context within which economic downturns take place. For example, social security provisions including social and health care services may mitigate the effects of recessions. That said, recessions may reduce the resources (both public and private) devoted to health care, leading to potential effects via lower access and lower quality of care. This has certainly been the case during the most recent recession, where a third of OECD countries reduced health care expenditure, and many more cut expenditure growth (Morgan and Astolfi, 2014; OECD, 2014).

8. Finally, economic downturns vary in their depth and length, which is also likely to have an influence on their impact on health. Shallow or short term downturns are less likely to invoke behavioural responses, as households can rely on savings or borrowing to retain spending patterns. More severe and long-term recessions, on the other hand, may lead to substantial changes when households' capacity to borrow diminishes. The longer the time period before normal consumption patterns resume, the more likely it is that health will be affected. Economic downturns also vary in type of industries affected which, in turn, leads to widespread heterogeneity across time and countries in the population groups most affected by recessions. Furthermore, economic downturns may be geographic, particularly if affected industries operate within certain regions of a country. Importantly, economic downturns do not affect all individuals equally. Those who remain employed may, in fact, see their available incomes and standards of living rise due to, for example, lower interest rates and mortgage costs.

9. Given the previous discussion on the countervailing pathways by which unemployment can plausibly lead to both better and worse health, is perhaps not surprising to find that empirical studies produce mixed results.

Studies show mixed results on the relationship between economic crises and health outcomes

10. The empirical field can be classified into two broad methodological approaches. The first approach uses individual level data to examine the health consequences of a person (or household) who has suffered an economic shock such as a job loss. The health impact is then compared to those who have not suffered a loss. The second approach is to use aggregate data to examine links between economic variables and health outcomes at a regional level. It compares and contrasts changes in unemployment across regions (such states, provinces or countries) with changes to, for example, mortality rates.

11. Both the individual data and aggregate data approaches have their strengths and weaknesses. The individual level approach is usually limited to a small set of health outcomes and often relies on self-reported evidence. Such studies also face difficulties in identifying potential indirect effects of recessions on people who have not been directly affected by the economic downturn. The aggregate data approach can only estimate a net impact of an economic recession, because the data cannot identify who has been affected and who has not. Both types of studies offer valuable evidence but the strengths and limitations are worth bearing in mind when interpreting the results.

12. Catalano et al., (2011) undertook a review of the empirical literature examining the impact of economic downturns on health. They focused their review on studies published between 1990 and 2010, and included a set of criteria to ensure that only studies with methodological rigour were included. Table 1 summarises their main conclusions by listing the number of papers that have found statistically significant evidence on the effect of economic downturns. It shows a number of health outcomes that have been studied, as well as the broad type of approach (individual or aggregate) that were used. For a full list of references identified in the review, see Annex A. Since the Catalano review, a number of studies have been published and these are reflected in the table and text below.

13. Individual level studies generally find that economic downturns are linked to worse mortality outcomes. An extensive meta-analysis of individual level studies found that the risk of dying was significantly greater among the unemployed compared to those who remained in employment (Roelfs et al., 2011). Collectively, the results of 260 studies included in the meta-analysis show that unemployment is associated with a 63% higher risk of mortality after controlling for age and other covariates. The risk of death was even higher for men, those of working age and for studies with a follow-up period of less than ten years. Nevertheless, some caution in interpreting these findings is required. Firstly, some studies have shown that controlling for health conditions in the analysis, greatly reduced the excess mortality risk among those who experience unemployment (Lundin et al., 2010). This suggests that those who become unemployed may have pre-existing health conditions, and are already at higher risk of death. Second, these studies examine the relative risk of mortality between the unemployed and employed. This leaves open the possibility that at least some of the difference is not just due to mortality risk among the unemployed but also the reduced risk among those who remain employed, particularly during times of economic crisis.

14. In terms of the impact on general mortality, there is a clear dichotomy between the individual and aggregate level studies. While individual level studies show that unemployment is linked to higher mortality, the majority of aggregate level studies show the opposite. In a series of studies, starting with the 2000 publication “are recessions good for your health”, Ruhm has shown that a 1% (100 basis points) increase in the unemployment rate is associated with a 0.54% decline in the overall mortality rate. Furthermore, the relationship is consistent across a number of major causes of mortality including cardiovascular disease, respiratory disease and, most strongly, for motor vehicle traffic accidents. The notable exception is suicide mortality which is shown to rise when unemployment goes up (Ruhm, 2000).

Table 1. Summary of previous empirical literature on the health effects of economic downturns published between 1990 and 2013

	Individual level studies		Aggregate level studies	
	No. of papers that show economic downturns lead to:		No. of papers that show economic downturns lead to:	
	Better outcomes	Worse outcomes	Better outcomes	Worse outcomes
General mortality		7	8	2
General morbidity		2		
Cardiovascular mortality/morbidity		5	3	3
Substance abuse	6	14	5	3
Violent behaviour	1	2	4	8
Depression/anxiety		24		1
Suicide		10	2	16
Fœtal death			3	
Infant mortality		1		9

Adapted from Catalano et al., 2011 and updated to include studies published to May 2014. Excludes studies where no significant results were found. For the full list of references, please see Annex A.

15. A sizable body of research has replicated Rhum's results within and across a number of countries, including Canada, Sweden, Spain and the United States as well as 13 European Union member countries and 23 OECD countries (e.g. Ruhm, 2003; Neumayer, 2004; Gerdtham and Ruhm 2006; Economou et al. 2008; Miller et al. 2009; Granados et al., 2011; Ariizumi and Schirle, 2012). The studies consistently show that economic downturns are associated with a fall in mortality but the strength of the relationship differs between countries and over time. The papers that cover the period between the 1970s and early 2000s generally find a statistically significant relationship, where a 1% increase in unemployment decreases total mortality by between 0.3 to 1.1%. However, more recent papers that use similar methodologies but cover more recent time periods, are generally concluding that the relationship between overall mortality and unemployment is statistically insignificant (McInerney and Mellor,2012; Stuckler et al., 2009; Ruhm 2013).

16. In terms of cardiovascular disease (CVD), a recent meta-analysis showed that greater job insecurity is linked to a higher probability of a coronary heart disease (CHD) event (defined as a CHD-related hospital admission or death) (Virtanen et al., 2013). Based on 17 separate cohort studies (with data from Belgium, Denmark, Finland, Germany, Sweden, the United Kingdom and the United States) the meta-analysis showed that those with high levels of self-reported job insecurity were 1.32 times more likely to have a CHD event than those who reported low job insecurity. However, the relative risk fell to 1.19 once socio-demographic and risk factors were taken into account. The authors conclude that job insecurity is "at best" only a moderate risk factor and that unobserved factors may still confound their finding.

17. The aggregate-level studies are evenly split in terms of predicting better or worse CVD outcomes. However, two of the studies that show worse CVD outcomes have been criticised for their methodology (Waggstaff 1985; Gravelle et al., 1981). This suggests that aggregate-level studies, on balance, find that higher unemployment is associated with fewer CVD events but individual level studies find that unemployment may have a modest adverse impact on cardiovascular disease outcomes.

18. The empirical results on the effect of job loss on health behaviours are decidedly mixed. In terms of alcohol consumption, most papers published since 1990 that use aggregate data have shown that higher unemployment rates are linked to lower per capita alcohol consumption and alcohol-related highway vehicle fatalities (Henkel, 2011; Cotti and Tefft, 2011). However, a more recent paper using data from the United States from 2001 to 2005 produced evidence that higher unemployment rates are positively related to binge drinking, alcohol-involved driving, and alcohol abuse and/or dependence (Dávalos et al., 2012). Evidence using individual-level data also produced inconsistent results (Henkel; 2011). While some individual-level studies show that drinking participation was not related to changes in the unemployment rate, there is some evidence to suggest that heavy drinking becomes less common during a recession (Ásgeirsdóttir et al., 2013; Rhum and Black, 2001).

19. A recent systematic review suggests that becoming unemployed reduces the chance that current smokers will quit smoking and, for adolescents, the effect of unemployment is to increase the likelihood that they will start smoking (Henkel, 2011). However, unemployment is linked to decreasing levels of tobacco consumption among smokers, with estimates suggesting that a one percentage point increase in unemployment can reduce the number of heavy and very heavy smoking by 1.0 and 1.1 per cent, respectively (Ruhm, 2005). More recent evidence from Iceland suggests that smoking prevalence fell after the financial crisis. While some of these findings may be attributed to a general declining trend and policy changes, the authors suggest that income falls and affordability played a significant role in explaining the decline in smoking (McClure et al., 2012). A recent paper by Ásgeirsdóttir et al. (2013) demonstrates that in Iceland the role of substantial price changes were the most important predictor of the behaviour changes.

20. Most, but not all, studies find evidence that adverse economic conditions leads to antisocial behaviours such as violence and substance abuse. While there are concerns about the causal direction between unemployment and antisocial behaviours (do antisocial behaviours lead to unemployment, or vice versa?) most studies use longitudinal data techniques to examine the temporal relationship. For example, Wood et al (2012) show that hospital admissions for child abuse rise the year after an increase in mortgage stress. Arkes (2007) shows that higher unemployment rates (measured at a state level) are strongly linked to increased substance abuse among US youth, particularly for illicit drug use. This leads the author to conclude that adverse economic conditions may lead to more drug sellers, so that a given teenager would be more likely to know someone who sells drugs.

21. As indicated by the number of studies shown in Table 1, the biggest focus of research in this field has been on mental health. Over 32 studies, using individual level data, have found that economic downturns and unemployment have a negative impact on mental health status, and increase the likelihood of attempted suicide. A recent study from Spain showed that patients attending primary health care centres were significantly more likely to report major depression, anxiety and alcohol-related disorders following the starts of the recession and those with mortgage stress had significantly elevated risk of major depression (Gili et al., 2013). The impact of economic downturns on mental health is corroborated by most aggregate level studies, particularly on the effect of suicide among men and those of working age who are most affected by higher unemployment. It should be noted that those with mental health conditions are at higher risk of becoming unemployed during times of economic downturn (Evans-Lacko et al 2013; OECD 2011). This suggests that during times of economic hardship, the unemployed population will have an even higher prevalence of people with mental health conditions and are at greater risk of worsening mental health status.

22. Only two studies appear to find contradictory evidence that economic downturns are associated with better mental health. However, one of these papers relates to German data during the period of reunification; an event which may have had an impact on the standard relationship between unemployment and suicide (Neumayer, 2004). The other paper is from Norway and applies time series analysis, treating Norway as one region, rather than a panel of regions, making it more difficult to statistically deal with unobserved effects (Barstad, 2008).

23. A number of studies have examined the links between economic conditions and infant health outcomes. The majority of these studies find that adverse economic conditions lead to worse health outcomes such as infant mortality, although there are a few other studies which do not show any significant links. This could be due to issues of sample size because infant mortality is a relatively rare event. Other studies have examined the long term health effects of being born during times of economic recessions. Studies from the Netherlands and Peru both show that those born during adverse economic times are at higher risk of mortality during childhood and adulthood at all ages (van den Berg et al., 2006; Uguero and Valdivia, 2010).

24. A systematic review of the literature on the impact of economic crisis on communicable diseases identified 37 studies, 30 of which reported worse infectious disease outcomes (Suhrcke et al., 2011). These studies report higher rates of infection due to poorer living conditions, reduce access to therapies and treatment retention as reasons for worse outcomes. However, it should be noted that a large number of these studies report on conditions in central and eastern European countries during the early 1990, at a time of economic and political turmoil. Studies from Germany, Japan and other OECD countries, reported fewer influenza and respiratory disease deaths during times when unemployment was high as opposed to low (Suhrcke et al., 2011). Nevertheless, a country's ability to respond to emerging risks is paramount to long-term health system goals. The dramatic rise in the number of new HIV cases reported since 2010 in Athens, Greece, among injecting drug users provides an example of this. Although opioid substitution and needle exchange programmes have expanded since the start of the outbreak, the initial response fell well short of recommended levels of access (ECDC, 2012). Alongside the HIV outbreak, there are also reports of increased mortality from influenza, emergence and spread of West Nile virus and the appearance of non-imported malaria (Bonova and Nikolopoulos, 2012). These cases provide examples of the potential long-term impact on health and costs when highly cost-effective prevention programmes are not fully implemented.

What could explain the mixed results in the empirical literature?

25. Improvements in health behaviours is one mechanism that can help explain the link between higher unemployment and better health. Under this mechanism, unemployment leads to a fall in income, which reduces expenditure on products such as alcohol and tobacco which, in turn, improves health status. However this does not rule out the possibility of other mechanisms simultaneously playing a role, such as the *indirect effect* mechanism. Miller et al. (2009), for example, found empirical evidence in favour of the *indirect effect* mechanism by examining the association between unemployment and mortality for different age groups in the United States. Similar to Ruhm's result, they too find that a 1% increase in unemployment is linked to a 0.47% fall in overall mortality. Interestingly, the association is only statistically significant among: (1) the very young; (2) people in their late teens and early twenties; and (3) older age groups. No significant associations between unemployment and mortality were found among those in their 40s and 50s, who are typically most affected by adverse economic conditions. Of the total number of deaths averted, 71% occur among those aged 80 and over and only 7% among those aged between 25 and 64. This result suggests that indirect factors that coincide with rising unemployment rates explain the fall in mortality. For example, rising unemployment may coincide with a reduction in pollution which, in turn, may have a positive health care effect. In their conclusions, Miller et al. (2009) suggest that economic conditions may also influence the quality, quantity and nature of health care, which in turn may impact on mortality.

26. The indirect pathway can help reconcile the contradictory results between the individual and aggregate level studies. The two types of studies can be reconciled if, firstly, those who are directly affected by economic downturns (e.g. through unemployment) suffer *direct* negative health consequences, but that those who are not directly affected (e.g. the young and the old) benefit *indirectly* from recessions. Secondly, the gains among those who benefit must be greater than the losses among those who are adversely affected by the economic downturn.

27. One distinct difference between the individual and aggregate level studies that can also help explain the diverging results is the length of follow-up. Typically, aggregate-level studies examine the instantaneous relationship between unemployment and mortality, whereas the individual-level studies generally examine the relationship over a longer period of time, depending on the available data. For example, Martikainen et al. (2007) measured mortality rates for a cohort of Finish men over seven years. Thus, if economic downturns have short-term positive impact on overall mortality but a negative impact over the longer term, the individual and aggregate level evidence could be reconciled.

28. The short and long run effect of unemployment on health has recently been studied by Bender et al. (2013) using European data. They find that over the short-run, higher unemployment is associated with lower overall mortality, but high unemployment over longer periods of time is associated with higher mortality. Data from the state of Pennsylvania reveals that the impact of a job loss on mortality rates persist for 20 years after the event with an estimated loss in life expectancy of 1.0–1.5 years for a worker displaced at age forty (Sullivan and Von Wachter. 2009)

There is clear evidence that economic downturns lead to lower health care use

29. The relationship between economic recessions and health care use is not absolutely clear. On the one hand, economic recessions can lead to higher health care needs, particularly in areas such as mental health which may, in turn, lead to higher health care utilisation. However, reduced incomes may have a countervailing effect on demand for health care particularly in health systems where there are substantial co-payments, or where health insurance coverage is voluntary or employment based.

30. On balance, the empirical evidence suggests that unemployment is likely to lead to less use of preventive health care service. While Ruhm (2000) shows no significant relationships between unemployment and preventive care, other studies have shown lower mammography, colonoscopy and dental care use (Catalono et al., 2003; Quin et al., 2009; Dorn et al., 2012). A more recent study from the United States finds that a 1% increase in the unemployment level is associated with 1.58% decrease in the number of preventive care services including cancer screening services, routine medical check-ups and influenza vaccinations (Tefft and Kageleiry, 2013). The study also finds that women and those from lower socioeconomic backgrounds are particularly sensitive to higher unemployment.

31. Using cross-national data, Lusardi et al. (2010) find that unemployment is negatively associated with routine health care use in all countries included in the study. The percentage of respondents who state that they have reduced health care use is 27% in the United States, 12% in France, 10% in Germany, 8% in the United Kingdom and 6% in Canada. The authors conclude that the level of out-of-pocket (OOP) costs combined with a drop in wealth is a major determinant in the fall in health care use during the crisis.

32. A recent paper from the United States suggests that prescribing patterns for mental health drugs rise during times of adverse economic conditions, although this finding is only significant for the North Eastern parts of the country. Prescriptions more generally rose across the United States during recessionary times (Bradford and Lastrapes, 2013). This finding was corroborated by Kozman et al. (2012) who found that a 1% rise in unemployment is associated with a 4% increase in statins and 3% increase PDE inhibitors

use. Leopold et al. (2014) find that pharmaceutical sale volumes moderately increased in six European countries but declined in two of the countries where the global financial crisis hit hard.

33. In Sweden and Denmark, job loss leads to a higher probability of hospitalisation for alcohol-related conditions, accidents and mental health conditions but not for cardiovascular diseases (Eliason and Storrie, 2009). In California, hospitalisations for mental health were directly related to stock market volatility, with admissions for anxiety, panic disorder, or major depression rising nearly instantaneously when daily stock returns fell (Engelberg and Parson, 2013). There is also a strong link between economic crisis and hospital visits in the United States, including increases in visits for preventable conditions and paediatric admissions for physical abuse (Curry and Tekin, 2011; Brooks-Gunn et al., 2013). Importantly, the rise in hospitalisation was strongly associated with rises in foreclosures and mortgage stress but not with other economic crisis events such as unemployment. Among elderly Medicare beneficiaries in the United States, higher unemployment rates are associated with increased inpatient use (McInerey and Mellor, 2012). Given that unemployment is unlikely to affect the demand for health care among this population group, supply-side factors may contribute to the rise in inpatient admissions. In particular, the authors speculate that during times of economic downturns, providers may be willing to accept more Medicare beneficiaries, thereby increasing health access to elderly patients.

34. Alongside the loss of income, economic crises may also lead to greater unmet health care needs, particularly among lower socioeconomic groups (OECD, 2013). An international survey of eleven OECD countries shows that, on average, around 15% of respondents said that costs stopped them from visiting their doctor, filling a script and/or undertaking a medical test at least once during the past 12 months (Schoen et al, 2010).

However, the effect of economic recessions on health care supply are not well understood

35. The effect of economic downturns on the supply of health care is a neglected field of research, even though there are plausible pathways by which recessions can alter the behaviours of health care providers. There is strong evidence that during times of recessions, demand for health care labour remains relatively stronger than that for non-health labour (Staiger et al., 2012). This is particularly true in countries with strong social or private insurance coverage because demand for health care is generally less affected than other sectors of the economy during recessionary times. The relatively weaker demand in the non-health labour market could make employment in the health care sector more attractive, potentially leading to more health professionals returning to the health workforce or increasing the number of hours worked. The greater supply of health care professionals may, in turn, provide health care employers with more choice and an ability to attract a higher quality workforce. Economic downturns may even have long-term effects on health care supply, with a survey of Spanish medical students showing that since 2008 a bigger percentage of medical school graduates are electing Family and Community Medicine (FCM) after more than a decade of decline in this field. The results showed that the perception of greater job availability in FCM was the biggest driver of this change by students (Harris et al., 2013).

36. Stevens et al. (2011) looked at the role of health care supply to help explain the aforementioned empirical conundrum whereby mortality rates decline when unemployment goes up. They investigated whether the fall in mortality rates in nursing homes can be explained by supply side factors. They find that during times of economic recession, employment (particularly nurses and nursing aids) in nursing homes goes up. While their analysis is by no means conclusive, several analytical tests support the notion that changes in the supply of labour in nursing home care are linked to falls in mortality for nursing home residents.

Few studies have examined the effect of policy in mitigating the recessionary impact on health – with surprising results

37. Only a few studies have examined the interactions between economic downturns, social policy and health. Cutler et al.(2002) focuses on Mexico in the mid-1990s and finds evidence that economic crisis is associated with higher mortality among some age groups, with evidence that these effects are directly related to the magnitude of the economic shock as well as the reductions in public sector medical services. As the number of physicians per capita falls, mortality among the youngest age groups, and particularly among child-bearing women, rises. The coefficients suggest that a decline of 1 per cent in public sector physicians leads to a 0.4 per cent increase in mortality rates among child-bearing women and a 0.25 per cent increase in mortality rates among children aged 0 to 4. The study concludes that the positive aspects of social safety nets are extremely important for poorer sections of the community in protecting them from severe economic downturns.

38. Gerdtham and Ruhm (2006) studied the relationship between unemployment and mortality across 23 OECD countries and investigated whether the strength of this relationship was affected by the amount of social spending in countries. They divided countries into three distinct groups based on the country's average public social expenditure as a percentage of GDP between 1990 and 1998. Their overall conclusion was that rising unemployment is linked to falling mortality rates across all countries and across all three social spending groups. However, the strongest relationship between unemployment and mortality was found in countries with low social spending, and the weakest relationship in countries with high social spending. One possible explanation is that countries with lower social protection programmes may also have more 'dangerous' jobs and worse job safety standards than countries with high social spending. This would also imply that when the economy and employment grows, mortality increases relatively more in low social spending countries than in high spending countries. It should be noted however that the Gerdtham and Ruhm (2006) results show a stronger relationship between unemployment and mortality for low spending countries across a broad range of mortality causes, not just those related to accidents. This suggests that other mechanisms, besides occupational hazards and stress, are also at play.

39. Stuckler et al. (2009) also examined the role between mortality, unemployment and social welfare programmes. In particular, they focus on deaths from suicide and find that countries with strong labour market programmes can mitigate adverse effect of unemployment. They estimate that a 1% rise in unemployment is associated with a 1.067% rise in suicide rates, but that an extra US $10 per capita spending in labour market programmes can mitigate the effect of unemployment by 0.38%. The results showed that if annual per capita labour market spending exceeded US $190, the effect of unemployment on suicide mortality could be completed mitigated. However, recent OECD analysis shows that in most countries spending on labour market programmes tend to expand only modestly during economic downturns (OECD, 2014a). These results underscore the important interactions between social policies and health outcomes.

40. In addition to the effect of labour market programmes, Stuckler et al (2009) also estimated the role of spending on unemployment cash benefits, health care, family benefits and housing support on suicide rates. Only the aforementioned spending on labour market programmes as well as family benefits were significantly associated with suicide. Health care spending was not significantly associated with suicide rates (Stuckler et al, 2009 – web appendix).

2. THE GLOBAL FINANCIAL CRISIS HAS LED GOVERNMENTS TO IMPLEMENT STRICT AUSTERITY MEASURES AND HEALTH SYSTEM REFORMS

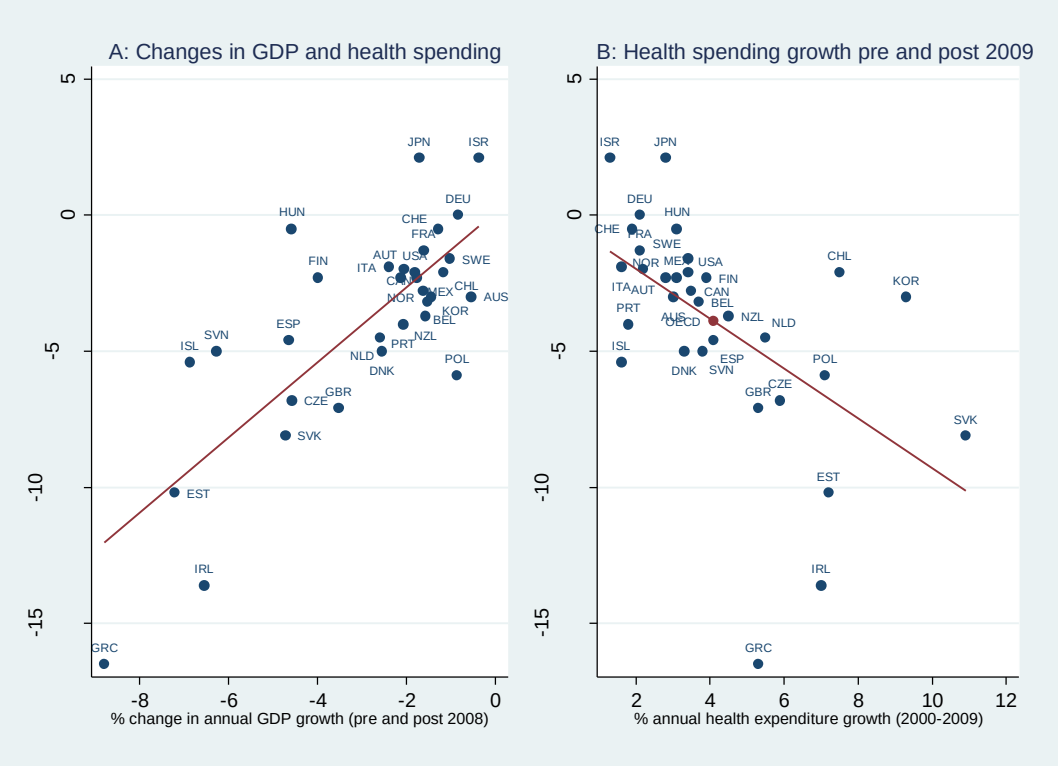
Health care spending stagnates across the OECD, with substantial falls in some countries

41. Since the start of the financial and economic crisis, growth in health spending has slowed markedly in almost all OECD countries. After years of continuous growth of around 5% per annum, average health spending across the OECD grew at only 0.1% and 0.5% in 2010 and 2011, respectively (Morgan and Astolfi, 2014). The most recent available data suggests that expenditure is increasing again, the rates of growth are well below their pre-crisis levels and is still negative in a number of European countries (OECD, 2014b). Ten OECD European countries spent less on health in 2011 compared with 2009[1]. Greece and Ireland have experienced the sharpest declines with per capita health care spending. In Greece, health expenditure fell by around 11% in both 2010 and 2011 and in Ireland it decreased by 7.7% in 2010 and a further 3% fall in 2011. Spending drops in Iceland, Portugal and Spain were not as big but were still greater than the OECD average fall of around 4.3%. Only in Israel and Japan has health spending growth accelerated since 2009. In Germany, Hungary and Switzerland growth rates have remained relatively steady

42. The countries hit hardest by the economic crisis have witnessed the biggest health expenditure cuts. The fall in GDP that occurred over the 2008-2010 period was a strong predictor of health care expenditure cuts. On average, a 1% drop in GDP corresponded with a 1.38% drop in health expenditure (Figure 1). However, health care expenditure fell by more than that in countries such as Greece and Ireland and less in countries such as Iceland, Slovenia and Hungary. A further predictor of cuts was the rate of health care expenditure growth prior to the crisis. Countries with higher rates of growth before the crisis tended to have bigger falls in health spending after the crisis. On average, for every 1% of additional pre-crisis health expenditure growth there was a 0.9% drop in health expenditure after the crisis.

[1] Greece, Ireland, Iceland, Estonia, Portugal, Spain, Denmark, United Kingdom, Slovenia and Czech Republic (Morgan and Astolfi, 2014)

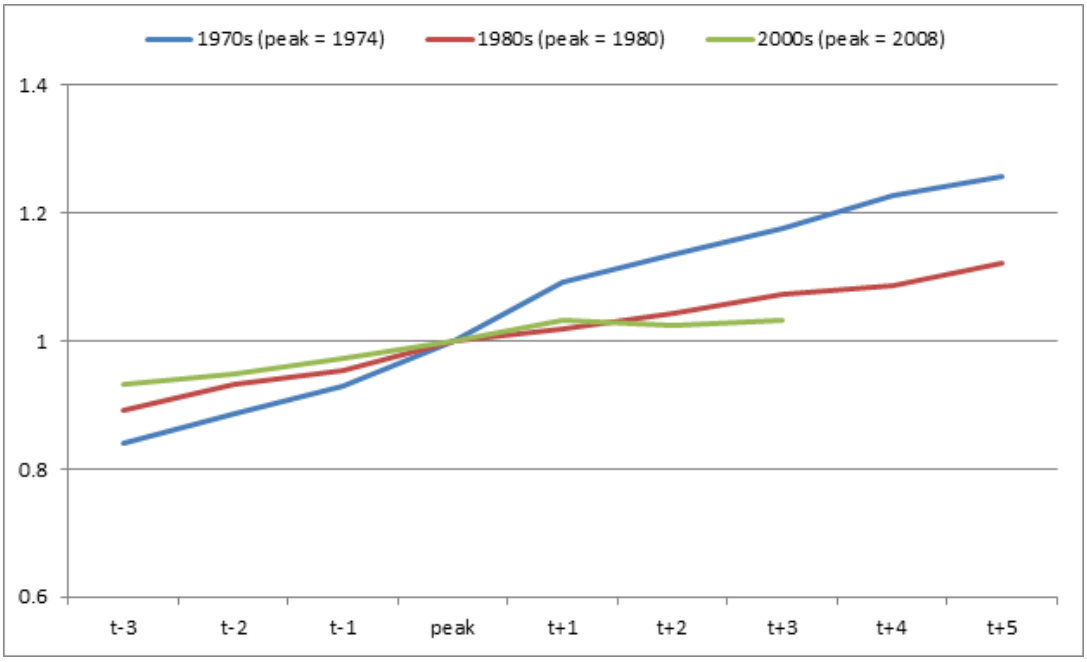
Figure 1. Health expenditure falls most in countries hit hard by the recession and with high pre-crisis health expenditure growth



Source: OECD Health Statistics and OECD Annual National Accounts Statistics

43. The post-2008 recession has been substantially different to previous economic downturns. This recession was in many ways deeper, has lasted longer and has experienced weaker recovery than previous recessions such as those experienced in the 1970s and 1980s (OECD 2012). Patterns of health care expenditure have also been remarkably different during the psot-2008 recession. Figure 2 shows the trends in health care expenditure growth during three different recessionary phases. In each of the phases, the health expenditure was set equal to one at the point in time just prior to the start of the recession (peak year). Expenditure growth during the recession of mid-70s showed little sign of abating after the start of the recession. During the 1980s, although overall health expenditure had slowed there was little evidence of impact following the start of the recession. However, in the 2000s, health expenditure slowed remarkably one year after the start of the recession. This shows that not only has the most recent recession been severe in terms of its effect on wealth, incomes and unemployment, it has also been remarkable in terms of impact on health care financing.

Figure 2. Growth in health expenditure during economic crisis (economic peak = 1)



Source: OECD Health Statistics

44. The cuts in expenditure following the financial crisis have come through two paths. The first path occurs through existing health system characteristics whereby households may reduce their health care consumption. This is particularly true in systems where insurance is tied to employment. In such cases, greater unemployment is likely to lead to lower insurance coverage which, in turn, leads to lower consumption. For example, in the Unites States, growth in health care goods and services spending in 2011 was the lowest rate on record but were, to a considerable degree, attributed to the reduction in the number of people with private health insurance (Hartman et al, 2013). Losing health coverage reduces an individual's well-being not just when they are sick and in need of health care but also through the loss of reassurance - knowing that they are covered in case anything happens. Other systems, where co-payments play a dominant role may also automatically reduce health expenditure, as household reduce health consumption in light of lower incomes.

45. The second path is through an active policy agenda to reduce public spending on health. The financial crisis has forced many countries to implement, often severe, budgetary measures to reduce government spending. The main targets for fiscal consolidation have varied across countries but many have included the health care sector. The next section provides an overview of the main health policy responses that have been implemented in the wake of the financial crisis.

Countries have used a variety of policy instruments to cut health care expenditure and restructure the health system

46. Even in countries that have, by and large, avoided the economic crisis, governments have introduced health care savings measures to reduce government expenditure and debt. For example, in Australia, the Government introduced means testing and new indexation arrangements for the private health insurance rebate and also introduced measures to reduce prices for off-patent pharmaceuticals. For this reason, policy measures taken in reaction to the crisis are not always easy to identify and distinguish from previously planned measures to contain health care costs (Mladdovsky *et al*., 2012).

47. This section summarizes some of the main policy instruments used to implement health care reforms, focusing on countries that have undertaken substantial austerity measures in health care in light of the financial crisis. This summary is based on a 2011 survey of European health policy experts reported in Mladdovsky *et al*., 2012. These have been updated through country-specific reports in the literature. Annex B provides more detail of specific policy examples by country.

48. Policy responses have varied in their timing. In countries, such as Ireland, Italy and Portugal the health care sector was initially isolated from public austerity measures but as the full extent of the financial crisis unfolded, expenditure cuts were introduced in subsequent budgets. At the start of the crisis, some countries introduced measures to provide greater health care protection. For example, Belgium extended eligibility to reduced co-payments and in the United States health insurance was subsidised for those who became unemployed.

49. The magnitude of reforms and the speed of their implementation have been quite extraordinary. Many of the reforms have the capacity to improve the efficiency and quality of the health care system over the longer term. Nevertheless, some reforms have attracted considerable critique and have been politically contentious among broad sections of the community as well as parts of industry, as demonstrated by strike actions and threats to stop supplying medical products. It should also be recognised that not all reforms have gone to plan. As outlined in the regular reviews conducted by the European Commission and European Central Bank, there have been delays in implementing some reforms and in some instances have led to unintended consequences including, for example, shortages in medical supplies and continuing arrears in paying providers of health care.

50. The following discussion provides examples of some of the main instruments used by countries in their efforts to reduce health care expenditure and restructure national health care systems. While a substantial number of papers have been written on crisis-related reforms, the literature does not provide complete coverage. The summary reported here does not attempt to list all reforms. Instead it aims to capture the different types of reforms as well as identify some common approaches that have been implemented in many countries. In general terms, health care policy response to the financial crisis can be categorised as follows:

1. Changes to public financing (e.g. increase revenue through taxes/ levies/premiums);
2. Reducing coverage (e.g. eligibility criteria for population groups , changes to the benefit basket or increases in co-payments);
3. Cutting the prices paid for publicly financed health care (e.g. cuts to the price of medical goods and salaries).
4. Reducing the supply of services, through cuts in the number of facilities, beds or personnel.
5. Structural reforms aimed at changing the incentives in the system or price negotiations.

Public financing reforms

51. In light of the economic downturn, governments' capacity to raise additional revenue has been limited. Nevertheless, a number of countries have introduced new financing arrangements to broaden revenue bases, create greater flexibility and equity in financing health care.

52. Ireland introduced the universal social charge (USC) in 2011; a progressive tax of between 2% and 7% of annual earnings. The USC is payable for those with incomes over €10,036 and the rate levied depends on income level and age. The USC replaces the proportional health levy which was an earmarked health tax set at 4% of income (2% prior to 2009) (Briggs, 2013). Slovenia introduced measures to improve revenue collection and also broadened income categories over which contributions were payable. Estonia

increased tobacco and alcohol levies, although this continued a previous trend to raise prices for these goods. In Portugal, pensioner's contribution to the public sector's insurance fund was increased, and in Greece civil servants now contribute 5.1% of their salary towards social health insurance, which was previously met through the state budget.

53. Some countries have also increased value-added tax (VAT) rate on some health care products. Greece increased their VAT on medicines from 9% to 11%, before reducing them 6.5% in 2011. Estonia increased their VAT on medicines from 5% to 9%. The UK increased VAT on over-the-counter medication to 20% (from a reduced rate of 15%). Other countries that have increased VAT on medicines by 1% include the Czech Republic, Finland, Portugal and Poland (Vogler, 2011).

54. Countries have also imposed higher taxes on goods such as alcohol and tobacco. While such taxes are primarily seen as a source of fiscal revenues, greater emphasis has recently been placed on the potential health benefits of such measures. Furthermore, several OECD governments have passed legislation to increase existing taxes or to introduce new taxes on foods high in salt, sugar or fat in the past few years. These measures may not be crisis-related and may, in fact, be part of on-going health promotion reforms; nevertheless in countries such as France and Hungary, where these taxes are tied, they provide additional revenues for health and social services (Sassi, 2013).

55. To control persistent health care financing deficits, a number of countries introduced (or reinforced) budget compliance measures, particularly at the regional health levels. In Italy, for example, regional deficits peaked in 2004, representing around 7.5% of public health funding available in that year. To curtail public spending deficits, the 2010-12 *Health Pact*, focused on reducing hospital beds, the number of admissions and average length of stay, as well as improving procurement mechanisms (de Belvis et al., 2012). While annual deficits continue to be a feature of Italy's health care system they have been declining substantially in recent years, following on from concerted efforts to improve financial accountability.

Coverage reforms

56. Some countries have introduced measures to reduce health care coverage for certain population groups. The Czech Republic and Spain reduced public health entitlements for undocumented foreign nationals, though access to emergency services and maternal health has been maintained. This measure has aroused a great deal of controversy in Spain, as many undocumented foreigners have low incomes. It is worth noting, however, that few countries guarantee full health care services for their undocumented foreigners.

57. In Greece, coverage for unemployed people has historically been time limited with benefits reducing for some health care services after 12 months of unemployment. This has raised concerns about the large number of long-term unemployed who may no longer have access to a range of health care services in the wake of the economic crisis. In its July 2013 review, the European Commission noted that the Greek authorities need to develop a structural long-term solution as well as temporary measures to assist the estimated 100.000 persons who are no longer covered because of their long-term unemployment status, including the distribution of health vouchers (EC, 2013).

58. A number of countries have re-examined the benefit basket and have excluded certain products and services from public coverage. Estonia abolished cash benefits for dental checks for adults (van Ginneken, 2012). However, most of the reforms in this area have affected pharmaceuticals. Portugal has delisted some over-the-counter drugs and Greece has re-introduced a positive list for pharmaceutical coverage. The Czech Republic is continuing their review of all medicines (Vogler et al., 2011).

59. One of the areas where there has been considerable policy action is co-payments. For pharmaceuticals, countries such as Austria and Belgium introduced automatic annual increases in co-payments, France decreased their 35% reimbursement level to 30% in 2011 and Denmark increased co-payments for fertility drugs. Iceland increased co-payments twice in 2010 and 2011 for prescription drugs (Vogler, 2011). Estonia introduced a 15% co-payment for inpatient nursing care (van Ginneken 2013). Spain introduced income-dependent co-payments for medicines including for most pensioners with limits depending on their pension level (Casino, 2012). Australia introduced caps on the public contribution for specific out-of-hospital services including private obstetrics and assisted reproductive technology services in 2010, which has resulted in higher co-payments for these services (van Gool et al., 2011).

60. In Ireland, citizens eligible under the General Medical Services (GMS) scheme are exempt from a range of co-payments for medical services and pharmaceuticals. Prior to the reforms, GMS covered around 37% of the Irish population including everyone over the age of 70. In 2009, the government introduced a means test for those older than 70 to determine their eligibility for free pharmaceuticals. Those who lost GMS status became eligible for Drug Payment Scheme (DPS), which covers pharmaceutical costs once patients pay the first €120 in monthly expenses. This monthly co-payment rate was also increased from €100 to €120 (Kenneally et al., 2012). These measures were introduced alongside increases in co-payments for public and private inpatient beds and emergency departments for those without a medical card.

61. In Portugal, the government has increased user charges for some vaccines, doctor declarations and some non-prescription pharmaceuticals as well as some drugs used in the treatment of mental health conditions. However, because of pricing reforms (see below), a number of pharmaceuticals are now cheaper to patients than they were before the reforms. In 2012, co-payments for primary care rose from €2·25 to €5·00; emergency visits in primary health-care centres rose from €3·80 to €10·00. Simultaneously, the government expanded eligibility rules for co-payment exemptions, with an official estimate that more than 70% of the population will be granted a partial or total exemption to user charges (Barros, 2012).

Prices paid reforms

62. By far the most common policy responses have been to reduce the prices paid for publicly financed health care. Such measures have included cuts to the price of medical goods, particularly pharmaceuticals, where countries have renegotiated the prices paid for drugs and have introduced policies to encourage the consumption of generics.

63. There have been widespread price cuts for generics. Spain reduced their generic prices by 30%, Italy by 12.5% and Ireland by 20% to 30%. Ireland also cut prices by 40% for 300 common off-patent drugs (Vogler et al., 2011, Keneally, 2013; de Belvis 2012). In 2011 these two measures alone were expected to save €200 million in Ireland, out of a €2 240 million total pharmaceutical budget.

64. Other countries, including Portugal, Greece and Switzerland have instigated routine reviews to investigate the prices paid for pharmaceuticals. Countries have introduced or reformed their reference pricing mechanism by expanding price comparisons with other countries. Greece reduced the price caps for generic drugs from 70% to 40% of the corresponding originator's price before patent expiry and originator prices are automatically cut by 50% upon entry of the first generic. On average, wholesale prices for pharmaceuticals were cut by 21.5% in 2010 and a further 10.2% in 2011 (Vandoros and Stargardt, 2012).

65. Governments have also reduced wages of the health workforce as well as administrative staff. Several countries including Greece, Ireland, Iceland and Estonia have reduced nursing wages in response to the crisis as well as the wages of salaried GPs. In Portugal, the wage bill was cut by reducing overtime

wage rates in half. In Greece, salaries and benefits of health workers have been cut by €568 million. In Ireland, professional fees were reduced by 8% in 2009 and a further 5% in 2010 and 2011. In Spain salaries were cut by 5-7% for all civil servants, including most health care personnel in 2010.

66. Reforms targeting the prices paid for health services permit volumes of care to be maintained, at least over the short run. To a considerable extent, these reforms were well targeted. Many of the countries that introduced these reforms were, by international standards, paying higher than average prices. However, such policies have not been without controversy and resulted in considerable labour unrest in the health sector and political pressure from industry groups. Over the longer run, wage cutting policies may reduce the supply of labour among health care professionals and create subsequent health care shortages. The short and long-term consequences of these reforms therefore need to be monitored actively, particularly in the area of labour supply as well as other medical supplies where there have been threats of shortages.

Supply side reforms

67. Some countries have targeted the supply of health care through policies to reduce the health workforce and related administrative personnel as well as merging of facilities, and reduction of some institutional capacity.

68. The absolute number of doctors has continued to grow in most OECD countries during the 2008-09 recession and afterwards, although the rate of growth has slowed down in countries such as Greece. This result can, in part, be explained by the policy to reduce the number of temporary staff and replacement staff, although it should be noted that Greece still has the highest number of doctors per capita among OECD countries. In Ireland, a number of changes that affect the medical workforce have been introduced, including non-replacement of staff on leave, end of temporary contracts and voluntary redundancies as well as reduced agency and locum staffing. In Catalonia, Spain, redundancies for temporary health sector workers were introduced, with the Catalan Institute of Health reducing its personnel from 46 000 to 42 000 (Gené-Badia et al., 2012). At the same time, primary care workers have increased their working hours from 35 to 37.5 per week (Gallo and Gené-Badia, 2013).

69. Hospital capacity has also been a policy target with cuts to the number of beds in Greece, Ireland, Italy Portugal and Spain, (Mladdovsky et al, 2012; Gené-Badia et al., 2012; de Belvis et al., 2012). It should be noted however that the number of beds per head of population has been falling over time in a large number of OECD countries, and that some of the cuts since the start of the recession reflect a continuation of existing trends. In Portugal, the Memorandum of Understanding (MOU) with the European Commission (EC), the European Central Bank (ECB), and the International Monetary Fund (IMF) explicitly included measures to concentrate and rationalise state hospitals and health centres with a view to reducing capacity[2].

70. In Italy, the Health Pact reforms stated that the regions reduce the number hospital beds (4 beds per 1000 population vs. 4.5 currently) (de Belvis, 2012). A number of countries have merged or rationalised some health care institutions in the wake of the economic crisis. Iceland reduced the number of rural health centres from 20 to 12 and Portugal reduced the number of primary care centres

Structural reforms

71. Countries such as Greece, Portugal, Ireland and some others have undertaken a number of structural reforms through changes in payment mechanisms, mergers of key institutions and purchasing

[2] MoUs have also been signed by Ireland, Spain and Greece.

arrangements. These reforms are likely to require longer lead-in times before they have the desired effect but can have important implications on the long-term efficiency and productivity of the health care system.

72. Countries such as Greece are implementing output-based funding mechanisms for hospital which have been shown to improve productivity elsewhere, as it provides hospitals with a greater incentive to improve the volume of services at a cost that is in line with the DRG-based price. While it is too early to assess the impact of this measure, 85% of hospitals can now report complete DRG reimbursement data (Polyzos et al., 2013). It has also effectively merged all existing individual health insurance schemes into the central EOPYY (the National Organisation for the Provision of Health Services), with the intention to merge inherited assets into EOPYY as well as streamline administrative and medical staff (EC, 2013).

73. Portugal has reformed payment mechanisms for dialysis, converting from a fee-for-service system to a capitation model. The model bundles payments for a range of dialysis-related services including dialysis treatment, laboratory and imaging tests and medications for a number of comorbidities including anaemia, bone mineral disease and cardiovascular disease (Ponce et al., 2012). The weekly bundled payment equates to €537 per patient (as at 2011), which is comparable to the US payment rate but lower than other European countries (Vanholder et al., 2012). The model also specifies a range of process and outcome quality targets that includes the rates of hospital admissions and mortality. To receive payments, dialysis providers must meet the clinical quality targets. Failure to meet these targets results in Ministry of Health warnings, followed by payment suspensions and potential withdrawal of clinical licences. A preliminary (albeit not independent) analysis of around half of all clinics revealed improvements in all quality indicators between 2008 and 2011. Across clinics, the average performance was in line with all quality targets except one. Furthermore, the study estimates a cost savings of around 10.5% (Ponce et al., 2012).

74. The MOU signed by the Greek government with the so-called Troika[3] placed substantial emphasis on the expansion of information technologies to improve the health care sector's capacity to measure and report performance, reduce transaction costs, minimise waste and improve quality. Greece has trialled an electronic referral system for civil servants. The trial has shown that it can produce faster referral times, improve information flows and reduce costs. However, the number of doctors using the system rapidly declined a few months into the trial prompting authorities to make use of the referral system mandatory for all contracted physicians. Expansion of the project has been recommended to cover all social security funds (Souliotis et al., 2013). Countries such as Ireland, Portugal and Estonia have also invested heavily in their ICT infrastructure to improve reporting and performance management within its major health care institutions. These initiatives, while still in their early days, may have long term effects on the quality and efficiency of the health care system.

75. One of the most important areas of reform has been on the use and access of generic medications. Countries such as Portugal have introduced procedures to improve the timeliness by which generic medications become available. Greece has introduced tendering for hospital medication supplies that prioritises generics over originator drugs, and has already produced substantial savings (Vandoros and Stragadt, 2012). Greece has also mandated prescribing on the basis of chemical substance rather than brand name and chemists have to dispense the cheapest generic available. A similar reform was also introduced in Spain where, in addition, generic prescribing was incorporated in a pay-for-performance scheme for general practitioners (Gené-Badia et al., 2012).

[3] The troika comprises the European Commission (EC), the European Central Bank (ECB), and the International Monetary Fund (IMF)

76. One of the other main targets of several MOU signed by countries has been on procurement processes. Spain has introduced centralised procurement to improve purchasing of supplies, save energy, adequacy in drugs packaging and price freezes for certain drugs. The first centralised purchase of drugs in December 2012 is expected to save €80 million (Gallo and Gené-Badia, 2013. Greece, re-established the Health Procurement Committee which oversees the Health Services Procurement Program (referred to as PPYY). Health care providers submit their requests for health care products including devices and hospital drugs to PPYY. The program has responsibility for coordinating requests, tendering processes, timely payment and budgeting alongside a number of other functions. The hospital drug procurement part of the program has reportedly saved 57% (or €49 million) for 23 active ingredients (Kastanioti et al., 2013).

77. In Estonia, pre-crisis reforms had focused on centralising aspects of health care financing and planning, including collection of funds. In the early 2000s, Estonia introduced a central Health Insurance Fund to pool funds and purchase services, with four regional branches. These reforms allowed policy-makers to intensify many on-going reforms in the wake of the crisis, including hospital restructuring, strengthening of primary care and price negotiations for medical goods (van Ginneken et al ., 2012).

3. WHAT CAN *OECD HEALTH STATISTICS* REVEAL ABOUT THE LINKS BETWEEN UNEMPLOYMENT AND HEALTH AND HEALTH CARE?

78. To shed new light on the links between recessions and health, this section presents an empirical analysis of the relationship between unemployment and a large number of health indicators. It uses the 2013 edition of *OECD Health Statistics* incorporating data from 1997 to 2011, providing a maximum number of 15 years of data per country, including up to three years' worth of data since the start of the global recession. The analytical approach follows that of Ruhm's (2000) aggregate-level analysis which has been replicated in numerous other studies. *OECD Health Statistics* are utilised by looking at the relationship between unemployment and various indicators of health, across countries and within countries over time. For more information on the econometric technique used in the analysis see Annex C..

79. The analysis investigates the relationship between unemployment and fifty-one different indicators of health outcomes, health-risk behaviours, quality of care and health care use. Table 2 summarises the main results. The full results can be found in Annex D.

Mortality and quality of care

80. The analysis investigated the relationship between unemployment and all-cause mortality as well as five specific causes. The results reveal that higher unemployment is associated with lower all-cause mortality but suicide rates appear to increase. However, the evidence for these indicators only reached weak statistical significance levels[4].The evidence relating to transport accident deaths was stronger and showed that as unemployment goes up mortality rates go down. None of the other mortality indicators examined in this analysis reached conventional levels of statistical significance (see Annex D).

81. Results for the quality indicators show that there is a weak association between unemployment and 30-day case-fatality rate for ischemic stroke. The analysis suggests that this case-fatality rate declines

[4] It should be noted that Greek mortality statistics are only reported up to 2010 at this stage. There have been some reports that suicides have increased in Greece in 2011.

when unemployment rises. However, a stronger association was found for obstetric trauma, showing that it rises alongside unemployment. Some caution about the interpretation of this finding is warranted as there may be several reasons that could explain this result. For example, an increase in obstetric trauma could be an indication of worsening quality if resource constraints prohibit professionals from providing optimum care. The result may also be explained by the additional financial pressure faced by prospective mothers, preventing them from seeking adequate pre-natal care and therefore present higher risks during childbirth. Higher obstetric trauma may also reflect changes in the risk-profile of women who are having babies during times of recession. This could occur, for example, when during times of recession low-risk women reduce the number of babies they have compared to those who are generally more high-risk.

Health care use

82. In terms of hospital admissions, the results show that hospital admissions relating Chronic Obstructive Pulmonary Disease (COPD) declined when unemployment goes up, although this association was only weakly significant. COPD admissions are often regarded as an indicator of primary care quality, as good care in this sector can often reduce the need COPD-related hospitalisations. However, the COPD-admissions are also affected by other factors; particularly smoking rates. The analysis also investigated the relationship between unemployment and eight other causes of hospitalisations (including all-cause). None of these were significantly associated with unemployment rates.

83. A number of other health indicators of health care use showed stronger associations with unemployment. The analysis shows that an increase in unemployment is associated with fewer doctor consultations, CT and MRI scans and knee replacements for the over 65s.

Pharmaceutical use

84. Consumption of pharmaceuticals is shown to decline as unemployment rises. The results reach levels of statistical significance in the majority of pharmaceutical groups as well for the overall pharmaceutical consumption. Despite the strong links between economic downturns and mental health, there is no evidence that the consumption of anti-depressants is linked to the unemployment rate.

Lifestyle indicators

85. The analysis on lifestyle indicators show that most risky-behaviours appear to decline when unemployment rises; although none of the indicators reached statistical significance (results not shown in Table 2 but are presented in Annex D).

Table 2. Relationship between an increase in unemployment and health indicators

Health indicator	**Higher unemployment is associated with….**	**Statistical significance level**
Mortality rates (per 100 000 population)		
All-cause	↓	*
Transport	↓	***
Suicide	↑	*
Quality of care		
30-day case-fatality rates following admission for ischemic stroke	↓	*
Obstetric trauma without instrument (per 100 000 hospital discharges)	↑	**
Health care use		
COPD-related hospital admissions per 100 000 population	↓	*
Dr consultations per capita	↓	***
CT scans per 1000 population	↓	**
MRI scans per 1000 population	↓	*
Knee replacement per 100 000 population over 65	↓	*
Pharmaceutical consumption^ (defined daily doses per 1000 population)		
Alimentary tract and metabolism	↓	**
Blood and blood forming organs	↓	***
Musculo-skeletal system	↓	*
Nervous system	↓	*
Lipid modifying agents	↓	**
Genito urinary system and sex hormones	↓	*
All ATC^ groups	↓	***

* = some evidence where p<0.1 ** = moderate evidence where p<0.05; *** = strong evidence where = p<0.01; Only results where the relationship between unemployment and health indicator reaches at least weak evidence levels are shown. Results for all health indicators analysed are shown in Annex D. Data source: OECD Health Statistics, 2013. The upward pointing arrows indicate a positive relationship (i.e. if unemployment goes up so does the indicator) and downward pointing arrows indicate a negative relationship (i.e. if unemployment goes up, the indicator does down). ^ grouped by Anatomical Therapeutic Chemical (ATC) classification system

4. WHAT HAS BEEN THE SHORT-TERM INFLUENCE OF AUSTERITY AND UNEMPLOYMENT ON HEALTH INDICATORS?

86. This part of the analysis looks at the associations between unemployment and health in countries where there have been extensive cuts in health expenditure growth compared to those countries where cuts have been more modest. It investigates the extent to which cuts to health expenditure has influenced the relationship between unemployment and health indicators.

87. For the purpose of this analysis, countries are categorised into one of two groups depending on the cuts to health expenditure experienced after 2009. The 14 countries in the "high cut" group experienced cuts to health expenditure growth greater than the OECD average, and/or negative health expenditure growth rate after 2009. The remaining 20 countries were placed in the "modest" group (see Annex C for more information). This approach is designed to test if the role of unemployment is different between these two sets of countries. The inference is that the impact of the recession (as proxied by the unemployment rate) on health outcomes and health care use is influenced by health expenditure.

88. Out of the 51 health indicators tested[5], there were six indicators where some significant differences between the "modest" and "high" countries were detected; although for four of these the statistical evidence can only be regarded as weak ($p< 0.1$). Table 3 summarises the main results for these six indicators. More detailed results are reported in Table D2 in annex D.

Table 3. Evidence of differences between "high" and "modest" health expenditure cut countries

In countries with high cuts to health expenditure, an increase in unemployment is associated with:	**Statistical significance level**
• fewer alcohol-related deaths compared to modest health expenditure countries	*
• more obstetric trauma compared to modest health expenditure countries	**
• fewer respiratory-related hospital admissions compared to modest health expenditure countries	*
• fewer overall hospital admissions compared to modest health expenditure countries	**
• fewer knee replacement operations compared to modest health expenditure countries	*
• greater consumption of pharmaceuticals for the nervous system compared to modest health expenditure countries	*

* = some evidence where $p<0.1$ ** = moderate evidence where $p<0.05$;

89. The strongest level of evidence was found for obstetric trauma, where higher unemployment is significantly associated with a higher number of events in countries that have experienced higher cuts to health expenditure growth. In countries with modest cuts, the relationship with unemployment is negative albeit not statistically significant. As noted previously, there needs to be some caution about interpreting this finding as the results could be explained by several factors, including changes to the way obstetric

[5] All indicators tested are listed in Table D1 of Annex D

services are delivered, higher barriers to access adequate maternity services during recessionary times as well as changes to the risk profile of women having babies during economic downturns.

90. The role of unemployment is also significantly different between modest and high cut to growth countries when it comes to hospital admissions. In modest countries, higher unemployment is significantly associated with increases in the number of hospital admissions, whereas the result for high cuts to growth countries show that higher unemployment is related to fewer hospital admissions. In some ways, this would appear to be an obvious finding and shows that the expenditure cuts appear to have impacted the volume of services provided. However, the hospital result is in contrast with the results for the pharmaceutical indicators, where there is no evidence of lower consumption in high expenditure cut countries. This would indicate that the high expenditure cut countries have been able to protect the volumes of pharmaceutical consumed.

5. POLICY AND RESEARCH IMPLICATIONS

91. This paper has provided an overview of the recent literature that examines the links between economic downturns and health outcomes and health care use. It has also summarised some of the main policy instruments that OECD countries have used to reform their health systems and reduce health expenditures. Finally, this paper has utilised *OECD Health Statistics* to examine the links between unemployment, health expenditure and an extensive number of health indicators, relating to health outcomes, health care quality, lifestyles and health care use. This final section of the paper summarises the findings and draws out the main policy conclusions as well as highlight potential gaps and areas for further research.

Mental health needs rise during economic downturns and health systems need to be able to respond

92. Empirical analysis, including that of this paper, strongly shows that mental health is adversely affected by economic downturns. This is a consistent picture that emerges for a range of mental health indicators and a large number of countries. Yet, in the empirical analysis presented in this paper, there is no evidence that these higher expected needs are being met through higher hospital admissions or pharmaceutical consumption for mental health. This is perhaps a sign of further stress on mental health systems that are unable to respond and provide adequate treatment during times of high need. The clear lesson is that providers need additional capacity to respond to the additional mental health needs during times of economic downturns. The additional capacity to deliver effective treatments may not only have important health benefits but also economic benefits in terms of improved employment prospects, labour market productivity, and higher wages (OECD 2014c).

In the short-term, overall mortality rates have not been adversely affected by the economic downturn

93. There is a split in the literature with some studies showing that economic downturns are associated with a worse positive effect and others a negative. In part, these mixed results may be explained by the different types of methodologies used. In addition, more recent papers tend to find little evidence that adverse economic conditions increase mortality rates. This is consistent with the empirical analysis in this paper. There is no evidence, at this stage, of an extensive change in overall mortality, even in the group of countries that have been hard hit by the economic crisis. However, this may purely be a reflection of short-term observation period that is currently available for analysis. Most countries observed in this

analysis report data up to 2011, providing only a limited number of data points since the start of the recession. There may well be longer-term health implications arising from the global recession that are not yet evident in the data. That said, there is consistent evidence that adverse economic conditions lead to fewer deaths from transport accidents.

There is a need for public health vigilance during times of economic crises

94. There is evidence from the literature that unemployment is associated with a rise in communicable diseases, although most of this evidence comes from central and eastern countries from the early 1990s during times of much economic and social turmoil. Thus the generalizability of these studies may be limited. The empirical analysis in this report has no way of directly examining this although hospital admissions for infectious diseases does rise when unemployment goes up (though not significantly). Nevertheless, alongside evidence of rising HIV in Greece, the importance of the public health agencies' role in minimising the risk of harm from infectious diseases should be highlighted. This is true at all times but perhaps even more so during times of economic downturns when risks may be higher especially among some vulnerable population groups.

Falling incomes and austerity have affected health care use

95. It is clear that families reduce their health care consumption during times of economic crises. The empirical analysis confirms that higher unemployment is related to fewer doctor consultations, diagnostic exams and some procedures. This may be a reflection of households reducing their health care use after a loss of income but may also be a response to rising out-of-pocket costs. Evidence from other studies suggests that people on low-incomes are more likely to forego medical care than those on higher incomes. This creates a situation where those who are most in need of health care are also most likely to forego care. This points to the need for countries to implement counter-cyclical social policies that can protect those hit hardest by economic downturns to not only prevent poverty (OECD 2014a) but also maintain needed health care consumption.

96. Numerous countries have increased the level of co-payments but at the same time, some have also extended the number of exemptions (or reductions) for co-payments for particular population groups, particular the most vulnerable. This will hopefully dampen the negative impact that co-payments may have on the efficient and equitable distribution of care. Nevertheless, co-payments remain a blunt policy instrument that can have many unintended consequences particularly when the economic crisis simultaneously reduces incomes for many citizens. The risk remains that citizens forego effective care that can have long-term adverse health outcomes.

97. A further aspect of co-payments that will require careful monitoring are the potential incentives they create for patients seeking care in parts of the health care system where their costs can be minimised. For example, higher primary care co-payments may increase incentives to seek care in the emergency department. However, these incentives may not always align with delivering care in the most appropriate place. This would entail that the co-payments become distortionary and act as barrier to efficient care provision.

Health care austerity is linked to lower hospital activity but not pharmaceutical consumption

98. The empirical analysis in this paper has attempted to disentangle the impact of economic downturns and health care austerity measures for a large range of health indicators. The strongest evidence can be found in the rate of hospital admissions. In countries with modest cuts to health expenditure, higher unemployment is associated with higher hospital admission rates – reflecting perhaps an ability in these countries to respond to a higher demand during times of recession. The opposite relationship is true in

countries with high cuts to health expenditure, where higher unemployment is associated with fewer hospital admissions. This provides some indication that in those countries with high levels of health expenditure cuts, resource constraints are starting to have an impact on the activity levels of the acute care sector. That said, it is not clear from the available data whether patients are treated in other parts of the health care system, have to wait longer, or go by without treatment.

99. In many instances, the primary reform target for many governments has been to reduce the prices paid for pharmaceuticals, particularly in countries with extensive cuts to health care expenditure. The result from the empirical analysis in this paper suggests that for some classes of drugs, the volume consumed falls as unemployment rises. However, the fall in volume has not been further affected in countries that introduced high cuts to health expenditure. The results therefore indicate that cuts to pharmaceutical expenditure have, by and large, been achieved through reductions in drug prices, rather than volumes. This is consistent with the analysis by Leopold et al (2014) which found that overall sale values fell but that volumes were fairly stable (moderately rising in some countries but falling in others).

100. It should be noted that countries that have suffered the most severe economic shock are also more likely to have made high cuts to health expenditure. This implies that the empirical analysis may be attributing some of the results to expenditure cuts, when in fact it is possible that outcomes such as hospital admissions fall more dramatically at very high levels of unemployment.

Despite the large body of studies, important knowledge gaps on the health impact of economic downturns persist

101. This paper has critically reviewed the extensive (and growing) body of literature on the links between macroeconomic conditions and health. Many different health indicators have been analysed but some important gaps remain. In particular, there is a lack of understanding of how the relationship between economic downturns and health can be mitigated. For example, there are only a small number of studies that look at whether the effect of unemployment on health outcomes is different in countries with strong social protection versus those with weaker schemes. There is also a need for more evidence on the long-term effects of unemployment on health outcomes, particularly when unemployment persists over longer periods of time. This particularly true in the case of the most recent economic downturn as health care system's capacity to cope with changing health care needs may be affected by the resource constraints that have been imposed in a large number of countries.

102. The breadth of policy reforms has varied dramatically across countries. In a few, there has been rapid structural change, whereas in a greater number of countries, changes have been limited to parametric change (reductions in salaries, pharmaceutical prices, increases in co-payments). The most common changes have been to reform pharmaceuticals both to pay less at a national level and to encourage more use of generics; increase co-payments; and to centralise purchasing or provision of health goods and services. That said, a number of reforms have attracted considerable critique and political unrest among workers, industry and the general population. This, alongside the speed at which some of the reforms have been implemented, suggests that the impact of the reforms need to be closely monitored, and that governments maintain flexibility in their ability to respond when unintended consequences arise. However, the ability to respond is often hampered by gaps in the available data. In an era where many economic indicators are routinely reported for the previous month or quarter, several years can often go by before health indicators such as mortality rates are published.

6. CONCLUSION

103. This paper has shown that economic downturns are associated with adverse outcomes for some, but certainly not all, health indicators. There is overwhelming evidence that mental health deteriorates and the prevalence of communicable diseases appears to rise during times of economic crisis. This paper finds that higher rates of unemployment are strongly linked to lower health care use, which may have longer term consequences that are not yet evident in the available data.

104. The financial crisis has pushed many countries to undertake more in depth structural reforms such as new output-based hospital funding systems, centralisation of pharmaceutical purchasing powers and greater investments in the health information infrastructure, including additional efforts in e-prescribing, electronic health records, as well as administrative datasets. These efforts are already being used to improve quality through the establishment of targets, benchmarking, public reporting and performance management. These structural reforms have the potential to make important long-term contributions to the health system's productivity and efficiency. As countries emerge from the crisis, the future policy agenda must continue to look towards these structural changes to provide important lessons for the future.

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ANNEX A

List of references in Table 1

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ANNEX B

Country	Reform	Detail
Czech Republic	Public financing responsibilities	- 30% decrease in Ministry of Health budget in 2010 -Planned increases in tobacco and alcohol taxes in 2012.
	Coverage	- Health Technology Assessments to be used from 2012/13 to define basic benefit package -Mandatory use of a positive list of drugs for university hospitals. - Reduction of some public entitlements for foreign nationals. -Increase in inpatient charge from CZK60 to 100 per day
	Prices paid	- 10% cut in salary expenditure for public administration employees (front-line staff exempted). - Freeze in hospital reimbursement.
	Supply	
	Structural changes	Move towards hospital output based payments mechanisms. - Simplified procedures for generic drugs to enter market. - Auctions for medical equipment.
Estonia	Public financing responsibilities	-24% cut in Ministry of Health expenditure, primarily through cuts in non-communicable diseases programmes. - Depletion of insurance fund reserves - Continuation of on alcohol and tobacco tax increases.
	Coverage	- Reduction in sick leave benefits and entitlements, with greater responsibility on employers. -15% co-insurance rate for nursing inpatient care. - Abolishment of cash benefits for adult dental checks
	Prices paid	- Measures to encourage take-up among patients of lowest price drug. - Extension of reference pricing arrangements for low price medications.
	Supply	
	Structural changes	
Greece	Public financing responsibilities	-Commitment to reduce health expenditure by 0.5% of GDP in 2011. - Cut €840 million through hospital operating budget cuts. - Contribution rate of 5.1% of civil servants salary towards social health insurer fund (previously met through state budget).
	Coverage	-Harmonisation of various insurance funds benefit packages. -Poor and uninsured to be treated at designated hospitals and prescribed generic medicine. - Increase in user charges from €3 to €5 for public outpatient facilities; some user charges for vulnerable groups removed.
	Prices paid	-Reduce VAT for medications. - Salary cuts for health care workers. - Cuts to pharmacy profit margin. -Salaries and benefits cut by €568 million
	Supply	- Reduction in temporary staff. - Reduce number of replacement staff
	Structural changes	-Reintroduction of positive lists for medications, with a focus on generics. -Liberalisation of pharmacies -Hospital output based funding used for hospital budget from 2013.

Country	Reform	Detail
		- Merge regional health authorities. - Merge hospitals and introduce private capital funding to build new health facilities. - Centralized procurement arrangements.
Iceland	Public financing responsibilities	Approximately 5% per annum budget cuts to health including equipment, drugs, patient transport and the National University Hospital
	Coverage	-Provide free of charge dental care for low-income households. -Increase emphasis on occupational rehabilitation to prevent employees on extended sick leave from losing jobs.
	Prices paid	- More stringent requirements to prescribe generic medicines. - Cuts in overtime and shift allowances.
	Supply	-Reduce the number of rural health centres from 20 to 12. - Cuts in number of personnel.
	Structural changes	- Merging of Departments of Health and Social Affairs
Ireland	Public financing responsibilities	2009: Health levy: -doubled to 4% if income < €75k per annum - increased to 5% if income > €75K per annum 2011: Universal Social - tax on income between 2% and 7% depending on age and income. Exempt for those earning incomes less than €10,036
	Coverage	-€30 million cut in dental care for medical card holders. -Raising income tests for medical card entitlement for those aged over 70. - From 2009, user charges increase for public and private inpatient beds, emergency departments and drugs for those without a medical card (2/3 of population) - From 2010, 50c charge per prescription for those with a medical card up to a maximum of €10 per family, per month.
	Prices paid	- Renegotiation of prices paid to pharmaceutical companies. - Reduced professional fees of 8% in 2009 and further cuts of 5% in 2010 and 2011. - 24-34% reduction in pharmacy fees.
	Supply	- Hospital capacity reduced by 519 beds. - Capital budget for 2009 reduced by 26% - 1 in 4 planned health buildings cancelled/delayed. - non-replacement of staff on leave, end temporary contracts and voluntary redundancies, reduced agency and locum staffing.
	Structural changes	
Portugal	Public financing responsibilities	- Further 5.8% health care budget cut in 2012 (following on from cuts in previous years). - Increase in pensioner's contribution to the public sector's insurance fund.
	Coverage	- Public Sector Health Fund (ADSE) will stop covering: work accident claims and professional diseases, clinical trials, unconventional therapeutics and aesthetic surgery in 2011. -In 2011, ADSE coverage is made optional for all public sector workers. -Compliance measures to impose user charges.

Country	Reform	Detail
		- Increase in user charges for some vaccines, doctor declarations and some non-prescription pharmaceuticals as well as some drugs used in the treatment of mental health conditions. - In 2012, co-payments for primary care rose from €2·25 to €5·00; emergency visits in primary health-care centres rose from €3·80 to €10·00.
	Prices paid	- Centralized procurement for medications and diagnostic tests. - Price reductions for high-priced generic drugs, biological pharmaceuticals, medical imaging, diagnostic tests and haemodialysis of between 3 to 10%. - Salary freeze. - Freeze on promotion for administrative staff. - target to save 5% in every department/ medical service excluding personnel costs.
	Supply	-50% cut in government infrastructure spending in 2009. -reduction in hospital beds and primary health care centres.
	Structural changes	- Move towards capitation payment model in dialysis
Slovenia	Public financing responsibilities	- Introduced measures to improve revenue collection and broadening of income categories over which contributions were payable. - Reduction in National Health Insurance Fund coverage of certain medicines, dental prosthesis, and certain ophthalmological appliances – although most patients use voluntary health insurance to offset rises in user charges.
	Prices paid	- Price renegotiations with medicine suppliers. - Price reductions for dialysis. - Salary freezes in public sector. - Cuts to health care service payments ranging from between 2.5 to 5%.
	Supply	
	Structural changes	
Spain (national)	Public financing responsibilities	- 10% cut of total health spending in 2011. - Income dependent co-payments for medicines including most pensioners with limits depending on their pension level. - Co-pay system extended to orthoprostheses, dietary products, and non-urgent ambulance trips
	Coverage	- Restrict access to care for foreign visitors - Removal of the medical card for around 500 000 undocumented immigrants, entitling them only to emergency medical care and assistance with pregnancy and childbirth.
	Prices paid	- 5-7% salary reductions for all civil servants, including most health care personnel in 2010. - Measures to increase use generic medications. - Alterations to the packaging of drugs to only last the duration of treatment.
	Supply	
	Structural change	Purchasing of drugs at national instead of regional level

ANNEX C

105. The analysis investigates the relationship between unemployment and health-related outcomes. It focuses on indicators where the previous literature has shown some important results, including overall mortality rates as well as specific causes of mortality such as cardiovascular disease, respiratory disease, alcohol-related deaths, suicide and transport related deaths. The analysis also look at the relationship between unemployment and quality of care, including case-fatality rates after heart attack and stroke and patient safety events in hospital. In addition, a variety of health care utilisation indicators including hospital admissions and procedures, doctor consultations, and pharmaceutical consumption are examined. All health indicators have been taken from OECD Health Statistics and have been transformed into their natural logs. Missing data were extrapolated only if a country was missing an observation for a specific year and where such missing data points were bounded non-missing data. Annual country-specific data on unemployment were taken from the OECD's Labour Force Statistics. A separate regression, using the same independent variables, is estimated for each health indicator using robust standard errors, clustered on the basis of the country.

106. The panel structure of OECD Health Statistics is utilised by looking at the relationship between unemployment and various indicators of health, across countries and within countries over time. *OECD Health Statistics* incorporating data from 1997 to 2011 are used for the analysis, providing a maximum number of 15 years of data per country (including up to three years since the start of the recent global recession). Longer panel data series were available for some indicators but were not used in order to reduce additional complexities that arise when analysing datasets that have a small number of regional observations but have long time-series.

107. The analytical approach follows that of Ruhm's (2000) aggregate-level analysis which has been replicated in numerous other studies (see e.g. This approach incorporates country effects to account for systematic and time invariant differences between countries (e.g. persistent lifestyle differences between countries) and also controls for determinants of health that vary over time by including time period fixed-effects variables. These variables can account for changes that occur over time such as advances in widely used medical technologies. The role of unemployment on a range of health indicators (such as mortality rates) is identified from within-country variations relative to changes in other countries. For health indicators which have not been age-sex standardised, demographic control variables such as the percentage of the population over 65 are included in the model.

108. The model used in the econometric analysis is as follows:

$$Ln(y_{it}) = \alpha_i + \beta * U_{it} + \gamma * X_{it} + S_i * T + \varphi_t + \varepsilon_{it} \qquad \text{equation 1}$$

109. Where *y* is the natural logarithm of a health outcome of interest (e.g. mortality rate) in country *i* at time *t*. α is a vector of country dummy variables and φ represents a vector of year dummy variables, β estimates the relationship between unemployment rate U; S represents the country specific time trends and ϵ is the error term. Here, X represents a set of demographic variables for each country's age profile. These demographic variables were only included in the model when the outcome indicator, y, was not age standardised in OECD Health Statistics.

110. The second model to test whether there are differences in the relationship between unemployment and health in countries with modest and high cuts to health expenditure is given by:

$$Ln(y_{it}) = \alpha_i + \beta_1 * U_{it} + \beta_2 * U_{it} * E_i + \gamma * X_{it} + S_i * T + \varphi_t + \varepsilon_{it} \quad \text{equation 2}$$

111. This is a replica of the first equation, except that the unemployment variable is interacted with a dummy variable E, which indicates whether a country belongs to the modest or high health expenditure cut group. To determine whether country was in the modest or high category, two criteria applied. First, all countries with negative health expenditure growth in 2009-11 were classified as "high". Second, countries with a greater than average cut in health expenditure growth (-4%) were also classified as "high". All other countries were classified as "modest". The countries with above and below average cuts in health care expenditure growth are listed in the table below.

Table C1: Categories for high and modest cuts to health expenditure growth

High cuts to health expenditure growth countries				**Modest cuts to expenditure growth countries***			
	Annual average growth rate in current health expenditure per capita, in real terms		**Drop in growth**		**Annual average growth rate in current health expenditure per capita, in real terms**		**Drop in growth**
	2000-09	**2009-11**			**2000-09**	**2009-11**	
Greece	5.3	-11.1	-16.5	Australia	3.0	0.0	-3.0
Ireland	7.0	-6.6	-13.6	Austria	2.2	0.2	-2.0
Iceland	1.6	-3.8	-5.4	Norway	2.8	0.5	-2.3
Estonia	7.2	-3.0	-10.2	Belgium	3.7	0.6	-3.2
Portugal	1.8	-2.2	-4.0	Mexico	3.1	0.7	-2.3
United Kingdom	5.3	-1.8	-7.1	France	2.1	0.7	-1.3
Denmark	3.3	-1.8	-5.0	Canada	3.5	0.8	-2.8
Slovenia	3.8	-1.2	-5.0	New Zealand	4.5	0.8	-3.7
Czech Rep.	5.9	-0.8	-6.8	United States	3.4	1.3	-2.1
Spain	4.1	-0.5	-4.6	Switzerland	1.9	1.4	-0.5
Italy	1.6	-0.4	-1.9	Finland	3.9	1.6	-2.3
Netherlands	5.5	1.0	-4.5	Sweden	3.4	1.8	-1.6
Poland	7.1	1.2	-5.9	Germany	2.1	2.1	0.0
Slovak Rep.	10.9	2.8	-8.1	Hungary	3.1	2.6	-0.5
				Israel	1.3	3.4	2.1
				Japan	2.8	4.9	2.1
				Chile	7.5	5.5	-2.1
				Korea	9.3	6.3	-3.0

* Note: Turkey and Luxembourg did not have complete data to calculate growth rates over the period. However, on the basis of available evidence, these two countries have been placed in the 'modest' group.

ANNEX D

112. The coefficients reported below, indicate the percentage rise in the health/health care indicator that is associated with a 1% (100 basis points) increase in unemployment. For example, for general mortality, a 1% increase in unemployment in countries with high cuts in health expenditure is associated with a 0.18% fall in mortality.

Table D1. Estimated relationships between unemployment and health indicators

Outcome variable		**Unemployment coefficient**	**Standard error**	**p-value**	**Obser-vations**
Mortality rates per 100 000 population	**Overall (all cause)**	**-0.0018**	**0.0009**	**0.062**	**472**
	Alcohol related	-0.0253	0.0169	0.144	445
	Cardiovascular	-0.0011	0.0015	0.483	472
	Transport	**-0.0175**	**0.0039**	**0.000**	**472**
	Suicide	**0.0052**	**0.0031**	**0.095**	**472**
	Infant	-0.0001	0.0038	0.975	505
Case-fatality rates	30-day acute myocardial infarction	0.0035	0.0052	0.507	281
	30-day Haemorrhagic. stroke	0.001	0.0051	0.845	272
	30-day ischemic stroke	-0.0104	0.006	0.093	273
Avoidable admissions	Asthma-related	0.0001	0.0121	0.994	205
	COPD-related	**-0.0111**	**0.0063**	**0.087**	**205**
	Diabetes-related	0.0008	0.0081	0.923	166
Patient safety (per 100 000 hospital discharges)	Foreign body left	0.0356	0.029	0.235	111
	Postoperative p. embolism or DVT	0.0007	0.0102	0.946	113
	Postoperative sepsis	0.0055	0.0151	0.717	113
	Obstetric trauma with instrument	0.0115	0.0178	0.525	140
	Obstetric trauma without instrument	**0.0337**	**0.013**	**0.018**	**140**
Lifestyle	Alcohol consumption	-0.0052	0.004	0.201	459
	Cigarettes per smoker per day	-0.0088	0.0069	0.214	290
	% daily smokers (15+)	-0.0012	0.0016	0.483	423
	% daily smokers (15-24)	0.0046	0.0078	0.556	269
Hospital admissions (per 100 000 population)	Infectious diseases	0.0066	0.0057	0.25	420
	Mental health disorders	-0.0003	0.0048	0.955	415
	Circulatory diseases	-0.003	0.003	0.323	420
	Respiratory diseases	-0.0023	0.0031	0.454	420

Outcome variable		Unemployment coefficient	Standard error	p-value	Obser-vations
	Injury	0.0011	0.0031	0.721	420
	All	-0.0003	0.0018	0.857	420
Health care use (per capita)	**Dr consultations**	**-0.0048**	**0.0017**	**0.008**	**436**
	CT scans	**-0.0164**	**0.0076**	**0.045**	**134**
	MRI scans	**-0.0428**	**0.0225**	**0.073**	**133**
	Cataract procedures	-0.0119	0.0103	0.257	306
	Caesarean sections	-0.0065	0.004	0.124	243
	Hip replacement (over 65)	0.003	0.0043	0.498	240
	Knee replacement (over 65)	**-0.0171**	**0.0086**	**0.058**	**217**
Pharmaceuti-cal consumption (DDD per 1 000 population)	**A-Alimentary tract and metabolism**	**-0.0139**	**0.0066**	**0.047**	**250**
	B-Blood and blood forming organs	**-0.0177**	**0.0053**	**0.003**	**245**
	C-Cardiovascular system	-0.0056	0.0036	0.138	248
	G-Genito urinary system and sex hormones	**-0.017**	**0.0093**	**0.081**	**241**
	H-Systemic hormonal preparations, excluding sex hormones and insulins	-0.0065	0.0047	0.185	241
	J-Antiinfectives for systemic use	0.0001	0.0028	0.978	250
	M-Musculo-skeletal system	**-0.0107**	**0.0055**	**0.064**	**250**
	N-Nervous system	**-0.0085**	**0.0048**	**0.088**	**248**
	R-Respiratory system	-0.0129	0.0085	0.145	248
	All_ATC types	**-0.0106**	**0.0027**	**0.001**	**235**
	C02-Antihypertensives	-0.0056	0.0082	0.497	271
	C07-Beta blocking agents	-0.0037	0.0028	0.2	278
	C10-Lipid modifying agents	**-0.0202**	**0.0074**	**0.012**	**253**
	N02-Analgesics	-0.0161	0.0136	0.249	256
	N05B-Anxiolytics	-0.0086	0.0087	0.332	256
	N05C-Hypnotics and sedatives	-0.0278	0.0293	0.354	245
	N06A-Antidepressants	-0.0059	0.0051	0.257	285

Text in **bold** if p-value<0.1

113. Table D2 reports the results obtained when modelling equation 2. The results show whether the relationship between unemployment and a given health outcome is different in countries with modest health expenditure cuts, compared to those with high cuts. All outcome variables reported in Table were D1 were estimated using this model, but only in six cases were results found to be statistically significant. These are reported in Table D2. In every other instance, estimated coefficients for unemployment were not markedly different in high expenditure cut countries.

114. In interpreting the results, estimated coefficients for the high health expenditure cut countries should be added to the coefficient results for those with modest cuts. For example, in modest expenditure cut countries a 1% (100 basis points) increase in unemployment is associated with a 2.18% increase in alcohol-related mortality (although this result is not significantly different from zero). In high expenditure cut countries, a 1% increase in unemployment is associated with a 3.58% (=0.0218 + (-0.0576)) decrease in alcohol-related mortality. The result in high expenditure countries is significantly different from modest expenditure cut countries at the p=0.094 level.

Table D2. Testing for differences in the role of unemployment: regression results

		Alcohol related mortality	**Obstetric trauma without instrument**	**Hospital admissions - respiratory diseases**	**Hospital admissions - all causes**	**Knee replace-ment procedures (over 65)**	**Pharma-ceutical consumption-ATC N-Nervous system**
Modest expenditure cut countries	Co-efficient	0.0218	-0.0281	0.0087	0.0063	0.0052	-0.0279
	standard error	0.0279	0.0268	0.0059	0.003	0.012	0.0133
	p-value	0.44	0.307	0.151	0.046	0.668	0.048
High expenditure cut countries	Co-efficient	-0.0576	0.0663	-0.0131	-0.0079	-0.0237	0.023
	standard error	0.0333	0.026	0.0065	0.0038	0.0131	0.0133
	p-value	0.094	0.019	0.052	0.046	0.084	0.099
Observations		445	140	420	420	217	248

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