National Health Policies and Population Health Outcomes in 17 OECD Countries: An Application of the Welfare State Regimes Concept

by

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Table of Contents

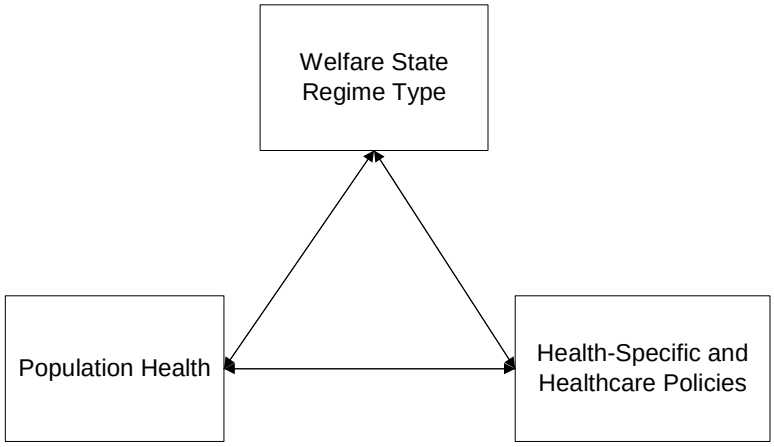
Chapter One: Introduction and Background

Introduction

This dissertation examines the extent to which established welfare state regime typologies, which classify and divide industrialized countries into groups based on the structures of their policies, can be applied to the study of population health and health policies. To achieve this, this dissertation examines in detail the relationships between these overall policy approaches (welfare state regimes), population health, and health policy.

Recent research in the population health field that has explored these relationships has examined only a narrow range of common measures. This dissertation uses a wider range of population health and health policy measures to assess the extent to which they embody the structures and outcomes associated with the various types of welfare states. To achieve this, this analysis uses hierarchical cluster analysis to determine the extent to which 17 OECD countries cluster into groupings that resemble established welfare state regime categories when health policy and population health measures are analyzed. The general conceptual framework for this analysis is shown in figure1.

Figure 1: Basic Framework



Separate hierarchical cluster analyses were performed for population health and health policy, using nine measures of each. The resulting clusters in each analysis were compared to each other as well as to established welfare state regime classifications. These analyses attempt to answer three main questions:

1) Does population health cluster into groups resembling welfare state regime groups?

2) Do health policies cluster into groups resembling welfare state regime groups?

3) Do population health and health policies generate similar clusters?

Overall findings are that population health measures generate country groupings that to a good extent do resemble welfare state regime types, while health policy measures do not. Also, health policy clusters do not resemble population health clusters. This suggests that overall national social policy approaches, as summarized by established welfare state regime groupings, do not necessarily associate with particular health policy structures. At the same time, the structure of other social policy areas (labour market, family, pension policies, etc that have been used to identify the welfare state regimes) may play a bigger role in producing particular health outcomes than health-specific policies do. Further, results indicate that measures of child health strongly resemble common welfare state regime groupings, while measures of adult health do not. This suggests that the preoccupation with child health measures in existing population health research (infant mortality rate, under-5 mortality, and low birthweight) may lead to misleading conclusions regarding the applicability of welfare state regimes typologies to population health.

This dissertation examines the issues and implications of these findings and also uses further cluster analyses to assess the roles played by each individual measure of population health and health policy. Finally, a model of civil society is developed to contextualize these findings and help guide the strategic application of the welfare state regimes concept to the study of health.

Background

Social researchers have long argued that developed countries fall into a few stable clusters that represent distinct policy orientations. Each cluster, or "welfare state regime", embodies a set of general ideologies regarding the ways in which social policies should support the welfare of the population. Certain regimes stress the public provision of welfare and universal access to services, while others emphasize private responsibility for one's welfare and only provide social support for individuals who are "poor enough" to qualify (means-tested access). Other regime types have policies based on historical church traditions and occupational and gender role distinctions. These general ideologies and social policy orientations affect policies in many areas, including labour market, family, unemployment, old age, and health policies.

Overview of Welfare State Regimes Typologies

Esping-Andersen (1990) illustrated that welfare states cannot simply be classified on a single continuum (for example, "leader – laggard" concepts), but rather that there are several main policy orientations that have been taken by particular groups of industrialized capitalist countries. Esping-Andersen identifies three "typical" clusters of welfare states in his analysis of sickness, unemployment, and pension benefits. It is crucial to emphasize that these welfare state regime types are *ideal* types, and that no

existing welfare state perfectly embodies any one of them. National welfare states are classified based on the ideal characteristics they most closely resemble. *Liberal* welfare states are dominated by the logic of the market.[1] Policies are based on the idea that people are responsible for their own welfare. Benefits that do exist are modest, often means-tested and stigmatizing. Countries identified by Esping-Andersen (1990) as most closely resembling the ideal characteristics of liberal welfare states are the United States, Canada, Australia, New Zealand, and the United Kingdom.[2]

Conservative/Corporatist welfare states are not as market-driven as liberal states. However, while dependence on the market is not as direct as it is in liberal welfare states, access to social supports is based on social security contributions, which are typically paid through employment. These regimes are generally shaped by historical church traditions, and this tends to determine their conservative attitudes towards the family and gender (C. Pierson, 1998:779).[3] These welfare states emphasize distinctions between occupational areas, and also support gender role distinctions (Korpi, 2000). Typical examples of countries most closely resembling conservative welfare state ideals are Austria, France, Germany, Belgium and Italy.

The third ideal welfare state type is the *Social Democratic*. These welfare states can generally be conceived to be polar opposites of liberal regimes, in that they

[1] Ideologically, this regime type descends from ideas associated with Adam Smith and the belief in free-market capitalism with a minimum of state "interference" (Esping-Andersen, 1990, p. 9-10).
[2] Although, the United Kingdom does not actually come out as clearly liberal in Esping-Andersen's analysis. It does not rank highly for any particular system of stratification (1990, p. 74), and its decommodification index is closer to that of conservative welfare states than to most liberal welfare states (p. 92). However, the U.K. has generally been classified with the liberal regimes (see, for example, O'Connor, Orloff, and Shaver, 1999; Shaver, 1993-94; Street, 2001; Kangas and Palme, 1998).
[3] Conservative welfare states have ideological roots in conservative political economy, which gained strength after the French Revolution. It feared social levelling, and favoured a society that retained both hierarchy and class; for class, status and rank were seen as natural and given. It was class conflict that was not seen as natural (Esping-Andersen, 1990). Chancellor Bismarck, in pushing towards a social insurance system designed to be income-related in order to maintain hierarchy and prevent class solidarity in Germany was also crucial in the development of a conservative welfare state.

emphasise public responsibility for welfare and universal access to services and support. A main objective of policy is to ensure that individuals have access to support independently of market forces. Social spending tends to be high, while spending on transfers is comparatively low.[4] Typical examples of welfare states that most closely resemble social democratic ideals exist in Norway, Sweden, Finland, and Denmark.

Having been developed partly from Marxist ideology, welfare states regimes theories have often implicated liberal regimes as being "worse" while social democratic regimes are "better", even if not by the original proponents of the regimes idea. Partly, this comes from the assumption that 'liberal' welfare states are based upon the principles of neo-liberalism. However, may states, including Canada, have characteristics that reflect *welfare* liberalism, which sees government not as a necessary evil but a potentially positive force ensuring that individuals have an equal *opportunity* to pursue liberty (Ball et al., 2006). Nevertheless, within recent population health research, regimes theories have been applied to demonstrate the importance and usefulness of more robust public welfare policies. This is often done by illustrating that greater social equality occurs within social democratic welfare states. This does not diminish the usefulness of the regimes as they have been identified through empirical research, but it is an important consideration for research that compares the impact policies have on health.

It is important to consider the argument that the welfare state, which developed in most industrialized countries in the decades after WWII, has been in decline; a trend which began in the early 1980s or so (Olsen, 2002; Coburn). One of the main

[4] In order to operate, this form of welfare state must be committed to full employment because the cost of running a universalistic and decommodifying welfare state can only be achieved with as many people as possible working and the fewest possible number of people relying on social transfers (Korpi and Palme, 1998).

explanations for this has revolved around the argument that world trade agreements have freed capital to pursue profits by seeking the most attractive national environment (Greve, 1996; Standing, 1999; Gilbert, 2002). According to this perspective, governments have responded by trying to attract capital. This has involved reducing tariff barriers, loosening restrictions on foreign investment, deregulation, and other incentives (Olsen, 2002). This has served to increase the mobility of capital across national borders. In addition, an increase in inequality and unemployment has lessened welfare state revenue and placed social programs under financial stress (Korpi, 2003; Giaimo and Manow, 1999). A mechanism through which this occurs has been argued to be a loss of tax base as unemployment increases and the population ages (Wood 1995). Other economic arguments have pointed out that threats by businesses to relocate have been used by governments to justify corporate tax cuts (Huber and Stephens, 2001; Olsen, 2002; 1999). Further, as trade expands, corporations become less reliant on domestic markets and therefore have less interest in ensuring the welfare and buying power of the national population within which they have been embedded (Huber and Stephens, 1998; 2001; Olsen 1999).

A good amount of recent research, however, has investigated the question of whether economic globalization has actually resulted in a mass decline in welfare state provision. More and more commonly, researchers are concluding that while there have been significant cuts, universal decline has not occurred (Brooks and Manza, 2007; Iversen, 2001; Swank, 2002; Castles, 2004). This is also true of research that has used established measures of social policy outcomes (for example, Iversen and Cusack, 2000; Brady, Beckfield, and Seeleib-Kaiser, 2005). Brooks and Manza (2007) argue that

although there may be declines within specific kinds of social programs, there is little evidence of universal retrenchment. Welfare state regime groupings also remain evident in other policy areas, such as family policies (Pankratz, 2009). Further, as will be illustrated in the following section, very recent and ongoing population health research is focusing on the impacts of welfare state regimes on health (albeit with a narrow range of more general measures). Therefore, welfare state regimes typologies continue to be seen as a useful summary of national approaches to social welfare, including in recent health policy and population health research.

It may be argued that recent changes in the United States involving greater public access to healthcare suggests a shift in that country's liberal welfare state approach. However, enacted changes there are actually based on expanding access to the existing private system rather than the development of a public stream. Essentially, new policy is based on means-tested access to subsidies that help in affording private coverage. That is, one must be determined to be "poor enough" to qualify for public support, and this support will provide only for basic health coverage policies. Unlike Canada, wherein public funds are paid directly to the health service provider, subsidies in the U.S. will be paid to private insurers. While insurers will now be prevented from declining coverage to those with prior health problems, the addition of many previously uninsured people to the client base will potentially outweigh any losses. This remains within the scope of liberal welfare state policy structure. From a public ideology standpoint, resistance to the notion of public support for purchasing health services indicates the continued popularity of liberal welfare state policies.

Welfare State Regimes and Health Research

Arts and Gelissen (2002) argue that regime typologies are useful because they can be used not only as dependent variables but also as independent variables to explain cross-national variations in things like social attitudes and behaviour. Further, it has been suggested that the field of social epidemiology lacks a comprehensive model allowing for the systematic comparisons of the impacts various social policies have on health (Macinko, Shi, Starfield and Wulu, 2003).

In responding to these ideas, recent research has begun to ask whether welfare state regimes can also help us to better understand international differences in health outcomes (for example, Chung and Muntaner, 2006, 2007; Saint-Arnaud and Bernard, 2003; Navarro et al., 2006; Macinko, Shi and Starfield, 2004; Lundberg et al., 2008; Hurrelmann, Rathmann and Richter, 2010). These authors argue that welfare state regime typologies present reliable and well-tested descriptions of national policy orientations that can be used to help explain health outcomes. In other words, if population health outcomes appear to be different for different welfare state regimes, it would suggest that particular national policy orientations lead to particular health outcomes.

Chung and Muntaner (2006) note that few studies have explored the relationship between political variables and population health in groups of countries, and that research that attempts to do this should consider the major differences that occur in policy approaches across the group of countries that are studied. For this reason, Chung and Muntaner argue, welfare state regimes typologies provide a solid and well-tested basis for achieving this. Chung and Muntaner (2006) and Macinko, Shi, Starfield and Wulu

(2003) note that the field of macro social epidemiology lacks comprehensive models for such work. As noted in the introduction, the concept of a "model of population health" that underlies this work means using welfare state regime typologies as categories that describe national general policy orientations. In other words, each welfare state regime represents a 'set' of policies and histories that may be influential in explaining health outcomes. Using these existing typologies, in a way, saves population health researchers the need to fully measure and assess policy areas that have already been studied in welfare state discourse (like family, labour market policies, social benefits and transfers and so on) when attempting to examine the connections between social policies and population health. It is for this reason that Chung and Muntaner (2006) apply the field of comparative welfare state politics to population health, and argue that further work should do this.

There are indications that welfare state regime, population health, and health-specific policies may influence each other. For example, in their subsequent examination of welfare state variables, Chung and Muntaner (2007) conclude that infant mortality rate and low birth weight rate do indeed reflect differences between welfare state regimes (suggesting that population health characteristics may be shaped by welfare state regimes). At the same time, Kangas examined several aspects of health insurance schemes (1994) and sickness allowance schemes (2004) and illustrated that Esping-Andersen's (1990) regimes typology is important for understanding national variation in these policies (suggesting that health-specific policy structures may reflect welfare state regimes). Finally, Chung and Muntaner (2006) note that their main indicator of health policy (public medical coverage, which they analyzed among general political factors)

was the most significant predictor of mortality outcomes (suggesting that health-specific policy may have a direct effect on population health).

Although existing research on welfare state regimes and health has not focused specifically on a wide range of population health outcome measures (see, for example, Chung and Muntaner 2006; 2007; Xu Ke Tom, 2006; Bambra, 2005; Saint-Arnaud and Bernard 2003; Navarro et al., 2006; Macinko, Shi and Starfield, 2004; Macinko, Starfield and Shi, 2003; Muntaner et al., 2002 and Conley and Springer, 2001, each of whom examine only one or two common indicators of population health), these indications that health policies and population health reflect welfare state regimes should be further explored. [5]

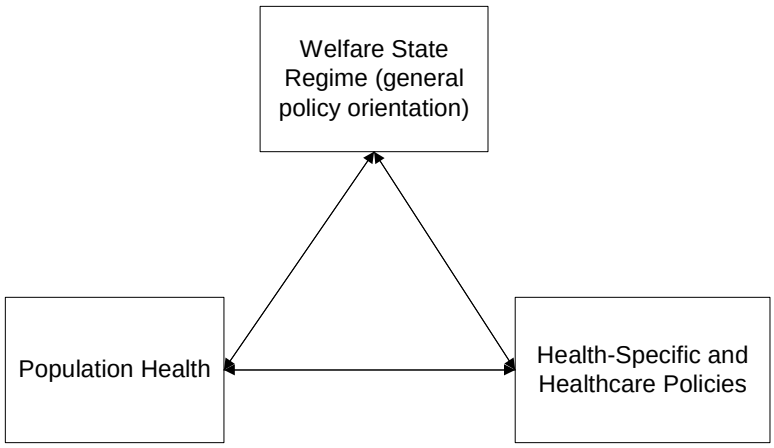
However, the danger that has emerged is that, given the above expansive documentation supporting the existence of welfare state regimes, such typologies may be uncritically applied to the study of health. For this reason, this analysis uses a much wider range of population health and health policy measures to more clearly assess the extent to which welfare state regime classifications may produce specific population health outcomes and/or particular forms of health policies.

Responding to these needs, this project will use hierarchical cluster analysis to examine national health policies and population health in 17 OECD countries representing a range of welfare states representing each of Esping-Andersen's (1990) regimes. As will be clarified in the methodology section, hierarchical cluster analysis is ideal for this project because it is exploratory in nature; from a statistical standpoint it can be applied without the prior assumption that welfare state regimes exist and then results can be compared to commonly identified regime configurations.

[5] A summary of the specific measures that have been used is given later in this document.

The overall aim of this project, then, is not to determine whether welfare state regimes exist (although the implications of these results for such a debate are discussed), but to study in more detail whether the regime groupings that have become widely accepted can be applied to the study of health policy and population health. In doing this, this analysis will address the fact that existing research has relied heavily on one or two main indicators of population health and health policy by including a wider range of measures. Further, this project will contextualize its findings by advancing a model of civil society developed by Navarro et al. (2006) and then expanded by Hurrelmann, Rathmann and Richter (2010). This model will illustrate the usefulness of the welfare state regimes concept and contextualize welfare state structures within a society that includes health policies as well as health outcomes for various segments of the population.

Figure 1: Basic Framework for Interpreting Findings



Chapter Two: Method

Countries included and rationale

There are two key issues concerning the selection of countries for this analysis. First, there must be a sufficiently large number of countries in order to allow for an assessment of whether or not welfare state regime clusters emerge. Therefore, there must be a range of countries that represent each of the major welfare state regimes.

The second key issue is making sure that reliable, comparable data is available for all of the countries in the analysis. For cluster analysis to work, every variable must have a value for each case. Therefore, every measure of population health and health policy must be available for all of the countries. Because this analysis will be using a wider range of measures for health policy and health, it is more difficult to use all of the countries used in other analyses.

I have identified the point at which the number of countries in the analysis is optimal relative to the number of comparable measures that exist for each of them. In this way, I have identified a core of 17 OECD Countries for which the range of available data is optimal. In other words, if I add another country (regardless of which one), the number of measures available for the group of countries decreases greatly. If I take a country off the list of 17, there is not a meaningful increase in the number of measures that are available. Table 1 lists the countries that will be used.

Table 1: The 17 Countries in the Analysis

United States	Spain	Denmark
United Kingdom	Italy	Austria
New Zealand	Netherlands	Norway
Australia	France	Finland
Canada	Switzerland	Sweden
Belgium	Germany	

These countries represent a good mix of countries from each of the major regime types as well as some countries that traditionally have been difficult to classify. Moreover, the other welfare state regime studies cited throughout this paper used between 18 and 20 countries – so using a wider range of measures in the health field does not necessitate the exclusion of many countries. At the same time, these 17 countries are all countries that have been included in the existing body of work upon which my project aims to build.

Measures of Population Health and Health Policy

This analysis requires two sets of measures: a set of population health (health outcome) measures, and a set of health policy measures. There are several general issues regarding the selection of individual measures. The following section outlines the measures that have been used in existing research on population health and welfare states, and then gives the measures that will be used in this study and discusses the rationale behind the selection.

Measures of Population Health and Health Policy that have been used in other macro comparative research

In order to facilitate theoretical continuity, measures of population health and health policy should include the measures that have been used in existing research. As described throughout this document, there is a growing body of literature that has measured health policy and population health, but studies only use one or two indicators of each. For example, when compiling a list of all of the measures used by Judge et al. (1998), Conley and Springer (2001), Muntaner et al (2002), Saint-Arnaud and Bernard (2003), Macinko, Shi and Starfield (2004), Bambra (2005), Navarro et al (2006), Navarro et al. (2003), Chung and Muntaner (2006, 2007), Xu Ke Tom (2006), the following measures are found.

Table 2: Summary of all measures used in the above studies

Population Health	Health Policies
Life expectancy at birth	Public expenditure on health (%GDP)
Infant mortality rate	Public expenditure on health (% of all public spending)
Low birth weight rate	Number of physicians per 1,000 population
Under 5 mortality rate	% of population with public health coverage
	Private health expenditure as % of GDP
	Private hospital beds as % of total hospital beds
	Hospital beds/1000 population
	Per capita medical expenditure
	Total health expenditure (public plus private)
	% of health spending that is public

In comparative health research, then, a relatively small number of measures have been used for health policies and especially population health. In addition, individual studies have not combined more than a few measures in one analysis. A full review of comparative research performed by Beckfield and Krieger (2009) revealed that almost every study of population health relied on a small number of health measures, and those

that used up to four measures were using ones other than those included in the analysis performed here, and which are not available for a large number of countries.

Measures of Population Health

The four measures in table 2 are available for all 17 countries in this analysis in an easily comparable form. Table 3 lists the specific measures of population health that will be used. Infant mortality rate (IMR) is probably the most commonly used measure of health in cross-national research, and is a "generally accepted social indicator of a nation's health and quality of life" (Conley and Springer, 2001, p.770). Further, Conley and Springer (2001) note that IMR is sensitive over a short time frame to health policy changes (as opposed to measures like life expectancy). It is important that population health measures used in this analysis measure things that can theoretically be affected by policies (general welfare state regime policies and health-specific policies). For example, Conley and Springer (2001) illustrate that while IMR has a biological determinant, it is also affected by a wide range of social, behavioural, and policy characteristics. For these reasons, IMR will be included in this analysis.

Chung and Muntaner (2006) suggest that under-five mortality rate (U-5MR) is less prone to under-reporting than infant mortality rate, and that it is a better measure of child health, where IMR is more a measure of general maternal health and immediate health care supports. U-5MR adds the dimension of child health, which is affected by the extent to which healthcare supports exist for families with young children. For this reason, U-5MR will be included in this analysis.

Low birth weight rate (LBWR) has also been used in recent research. While LBWR is potentially a predictor of IMR, and has been questioned based on its

heterogeneity (David, 2001), it enriches the measurement of general maternal health and availability of immediate support by accounting for cases where children are born in a less healthy state but do not die. Chung and Muntaner (2006) argue that in their analyses as well as others, LBWR is a sensitive measure of societal impact on child health.

The final measure of population health that has been used consistently in recent research is Life expectancy at birth (LEAB). Like IMR, this is a measure that has been extensively used as a measure of the quality of life for a population. For this analysis, this measure will capture the extent to which a society provides supports for any and all factors that may cause death. The logic underlying the use of LEAB in research has been the assumption that better health extends an individual's life. It is worth noting that the most commonly used measures of population health in macro policy research have relied mostly on child health indicators. Only one of the four dominant measures (life expectancy at birth) measures an aspect of adult health (with the possible exception that LBW reflects maternal health as well).

In order to enrich the assessment of the extent to which a population can lead healthy lives, it is important to measure the extent to which relatively healthy portions of the population die early. For this reason, the age-standardized adult mortality rate (AMR) will be included. This will be measured as the probability of dying between the ages of 15 and 60. This age range is generally considered to be the most healthy demographic in terms of susceptibility to disease and illness. A low AMR suggests that certain forms of support are available to the population and are being accessed.

Another measure that will be included is the incidence of tuberculosis (TB). Tuberculosis is a communicable disease that can be affected by public health and

vaccination programs. The incidence of TB is affected by public health education (and its effect on behaviour), vaccination availability, and diagnosis and screening programs. For the same reasons, incidence of HIV will also be included as a measure of population health. This measure assesses the extent to which public health promotion affects people's decisions regarding risky behaviour. Since HIV/AIDS is also related to unsafe drug use, this measure captures the extent to which the unregulated use of substances persists. Moreover, some countries have or are developing programs that encourage safer use of needles. Therefore, incidence of HIV infection provides another good measure of health that can be affected by various policies.

The eighth measure of population health that will be used in this analysis is Potential Years Life Lost to communicable diseases (PYLL-Com). This measure captures the impact of a range of diseases that are often preventable and can be affected by the availability of healthcare as well as the effectiveness of public health campaigns. Unlike the incidence measures above, PYLL-Com assesses the extent to which people actually die as a result of a communicable disease. In other words, this measure captures the outcome of the contraction of communicable diseases rather than just how often cases occur. Therefore, this measure also assesses the effectiveness and accessibility of health care supports that exist for those who are ill with a life-threatening disease.

The final measure of population health will be Potential Years Life Lost to diabetes (PYLL-Dia). Diabetes, while partly genetic, is affected by behavioural factors, which can be affected by public health programs. More importantly in this analysis, PYLL-Dia assesses the extent to which supports exist (educational, social and medical) that can help affected individuals manage the disease and thereby extend their lives. If

more years are lost, it is an indication that individuals within the population do not have sufficient resources and support for managing this condition.

Taken together, the measures in table 3 include several key and commonly used measures of longevity (and theoretically, health) across various age ranges, the extent to which individuals contract illnesses where public health campaigns and programs can reduce contraction, the extent to which people who do contract communicable diseases can be treated through medical intervention, and the extent to which people are able to manage chronic conditions (in this case, diabetes).

Table 3: Measures of Population Health

Measure	Data Source
Under-5 mortality rate (deaths/1,000 live births under age 5)	World Health Organization
Life expectancy at birth (both sexes)	World Health Organization
Infant mortality rate (deaths/1,000 live births under age 1)	World Health Organization
Adult mortality rate (deaths/1,000 population aged 15 – 60)	World Health Organization
Low birth weight rate (% of live births that are under 2,500 grams)	OECD Health Data 2008
Incidence of HIV (per million population per year)	World Health Organization
Incidence of tuberculosis (per 100,000 population per year)	World Health Organization
Potential years of life lost to communicable diseases	World Health Organization
Potential years of life lost to diabetes	OECD Health Data 2008

Measures of Health Policy

Looking back at table 2, there is a wider range of health policy measures that have been used in recent research. For theoretical continuity, the essence of these measures should also be included in this analysis. It is important to note, however, that these measures do not actually measure policy itself. In reality, these concepts measure health

system outputs. This is justifiable here because these are the same kinds of measures that have been used in research aiming to examine the connections between policies, health, and welfare states. It is, however, an important distinction in order to be clear about what this analysis is actually doing. Further, this helps address the fact that some of these measures may be partially demand-driven. For example, policies that are in place may facilitate or allow the spending levels that exist, but they are not necessarily *intended* to mandate the existing levels of spending. In this way, expenditure and resource measures account for the outputs from the policy structures but not the embodiment or intent of the policies themselves.

Therefore, this analysis examines health policies in the context of population health and welfare state regimes under the assumption that systematic differences between the measured outputs reflect systematic differences between the structures of the health policies themselves. A good example is that the United States; despite the fact that its policy orientation advocates private rather than public spending, it actually spends a lot of public money on healthcare. There, public expenditure on healthcare makes up only 46% of total health expenditure, and yet this public portion amounts to more money per capita than any other country spends, with the exception of Norway. When the entire cost of healthcare (private and public) is considered, the U.S. spends at least double and in many cases three times the amount per person than other industrialized countries. In that case, regardless of the *intent* of the health policies, their structure has produced extremely high healthcare costs, both public and private. This is due to demand-driven costs that are necessitated and/or facilitated by the structure of their system. Expenditure measures therefore capture important structural differences between healthcare systems

even where expenditures are unintended outcomes of particular policy structures (in other words, cost-driven).

There are several expenditure/cost-based measures that capture the expenditures either mandated by health policies or necessitated by the costs allowed by their structure and implementation. First, public expenditure on health (as % of GDP) is a good measure of monetary commitment to healthcare relative to a country's overall wealth. This also addresses the extent to which health services are a social priority. Where expenditure is demand-driven, this measure captures the extent to which resulting healthcare costs are covered by public sources. This measure is often considered the standard expenditure measure for cross-national comparisons. This is largely because it is inherently standardized relative to the size of each nation's economy – that is, it considers a country's national economic capacity (Olsen, 2002). This is important because countries with less overall wealth may not be able to spend more in absolute terms, even if a service is a serious priority. An important caution, though, is that with this measure, decreases in a country's GDP give the impression of increased commitment to program expenditures since the same expenditure will now make up a greater proportion of the remaining GDP. However, if a reduction in national wealth does not lead to a reduction in spending on a particular program, it can be assumed that the program is of some priority.

A second measure, public expenditure on health as a proportion of all public spending, is a measure of the extent to which public spending, where it is used, is focused on health-specific policies. This shows the extent to which health policies are emphasized within government budgets for healthcare and are a public priority.

Although this measure may be seen as a relatively weak indicator of a country's "welfare effort" relative to its overall resources (Olsen, 2002), it adds an accounting for decisions about where money available for social welfare is allocated.

A third measure, public expenditure on health as a proportion of total health spending, measures the extent to which healthcare requires access to private resources. This measure addresses the general public/private expenditure ratio. This is also fundamental since policies involving private cost-sharing or out-of-pocket payment reduces health service usage and increases inequality of access to care (Wendt, 2009; Van Doorslaer et al., 2006; Thomson and Mossialos, 2004). This indicates the extent to which a state will allow known social welfare requirements to go uncovered, reflecting faith that the market can provide for individual welfare needs.

A final expenditure measure, total per capita health expenditure (including public and private spending), captures how expensive a system is relative to the size of the population it serves, whether the costs are driven by inefficiencies or the amount of care that is purchased. Therefore, even though this measure does not make the distinction between public and private, it is a good way to assess differences between healthcare systems. This measure is limited by the fact that some countries can spend more than others overall (Olsen, 2002). For example, the United States has allowed healthcare costs to skyrocket partly because it has had the ability to cover the costs in one way or another.[6] Nevertheless, this measure considers the size of each country's population, which is important when examining a service-heavy aspect of the welfare state since cost is greatly affected by the number of people who access those services. Despite the

[6] For example, the United States has a relatively unique ability to raise its debt ceiling when deemed necessary.

limitations of each of these measures, when taken together they cover a broad range of spending aspects, and the analysis performed here will also consider each measure separately.

The other health system output measures given in table 2 deal more with the front-line accessibility of health care. First, physician density (per 1,000 population) is a good measure of the extent to which primary care is available. It also captures policies that facilitate or hinder the licensing of primary care physicians.

Another measure that has been used is hospital bed density (per 1,000 population). Like physician density, hospital bed density is a good indication of welfare state priority regarding how many beds are needed as well as the extent to which hospital care is available to the population. In this analysis, the specific indicator used will be the number of acute care beds per 1,000 population. In addition, the number of acute care staff per acute care bed will be used to account for the extent to which the state places emphasis on individual-level care for people once they are in the system. Bambra (2005) analyzed the proportion of hospital beds that are private versus public, however the data used came from a 1998 OECD report, and the data is more than 10 years old. In addition, there are several other measures included in this analysis that account for the extent to which healthcare is financed through private versus public means.

The proportion of the population that has public health coverage is a commonly used measure that captures the extent to which individuals are granted access to healthcare resources. Public access to at least basic healthcare is a good axis upon which to differentiate between welfare states. It can be surmised that public access to healthcare resources independently of personal income and wealth will have an effect on the health

of a population, especially since health outcomes have been connected with socio-economic status (see for good reviews Lynch et al., 2004, Beckfield, 2004, and Gravelle et al., 2002).

Taken together, the above measures cover the essence of the group of indicators that have been used throughout recent research and analyzing them together will generate a better overall assessment of their collective impact. In order to better account for the extent to which healthcare systems cover their populations, a final measure that will be included in this analysis is the proportion of children who have been immunized for measles. This measure accounts for the extent to which a healthcare system makes care available to children as well as the extent to which public health initiatives have informed their populations of important health issues and the status of disease. Table 4 gives the nine measures of health system outputs (policy measures) that will be used in this analysis.

Table 4: Measures of Health System Outputs

Measure	Data Source
Public expenditure on health (% GDP)	World Health Organization
Public expenditure on health (% of all public spending)	World Health Organization
Public expenditure on health (% of total health spending)	World Health Organization
Per Capita total expenditure on health	World Health Organization
Number of physicians/1,000 population	World Health Organization
% of population with public health coverage	OECD Health Data 2008
% of children immunized for measles (OECD Health Data)	OECD Health Data 2008
acute care beds / 1,000 pop (OECD Health Data)	OECD Health Data 2008
acute care staff / acute care bed (OECD Health Data)	OECD Health Data 2008

Rationale for using cluster analysis and Important Considerations

As analyses of Esping-Andersen's (1990) welfare state regime typology took shape, Kangas (1994) suggested that while regression and qualitative-comparative methods are useful, "cluster analysis seems to be a sufficient method to evaluate the adequacy of Esping-Andersen's typology" (p.357). This seems to be largely because a dendrogram can show not only emerging clusters, but also the relative distances between them as they converge in a step-by-step fashion. As long as the scale of each variable is standardized, Kangas argues, cluster analysis can make an important contribution to understanding welfare state regimes and determining the delineations between them. After examining basic measures of health provision using several methods, Kangas (1994) suggests that regression-type analyses, qualitative comparisons and cluster analyses support a similar welfare state regime pattern and should therefore be seen not as mutually exclusive methods, but rather as "alternative or parallel research options for expanding our understanding of social reality" (p.362). Despite this, cluster analysis has been relatively underused in welfare state regimes analyses, especially with regard to health and health policy.

Saint-Arnaud and Bernard (2003) suggest that welfare state research using cluster analysis is uncommon, but that this type of analysis should be used more. In their analysis of overall welfare state policies, they test regimes theories created by Esping-Andersen (1990) as well as a fourth regime type called the "Latin rim", which consists of southern European countries (typologies based on the perceived need for this fourth regime were proposed by Leibfried (1992), Ferrera (1996) and Bonoli (1997). Although the extent to which the Latin rim countries are distinct enough to be considered a separate

regime is heavily debated (Esping-Andersen, for example, does not agree), Saint-Arnaud and Bernard (2003) include such a configuration in an effort to test its accuracy relative to that of Esping-Andersen's configuration.

Saint-Arnaud and Bernard (2003) argue that hierarchical cluster analysis is the most appropriate method for testing regimes configurations because it allows the grouping of countries that have similar characteristics across a set of measures. Their rationale for this is:

> (Hierarchical cluster analysis) divides a set of cases (the countries) into ever more numerous and specific subsets, according to the distance measured among all pairs of cases, taking into account their position across the whole set of variables under analysis. Given that this inductive method is based exclusively on similarities among the cases, its results depend only on two factors: on the one hand, the actual structure of the observed phenomenon, and on the other hand, the methodological decisions concerning the choice of cases and variables, as well as the statistical method used to identify subsets (510).

Indeed, this procedure attempts to identify relatively homogeneous groups of cases based on selected characteristics, using an algorithm that starts with each case in a separate cluster and combines clusters until only one is left. Saint-Arnaud and Bernard (2003) also note that, with cluster analysis, "only the empirical associations that emerge among these indicators will dictate how the countries are grouped" (505). This allows for an exploratory examination of health system outputs and population health without assuming at the outset that welfare state regimes exist (a common issue identified in welfare state research by Kasza, 2002).

Wendt (2009) uses cluster analysis in classifying European healthcare systems, arguing that it is appropriate because it attempts to maximize homogeneity within groups and heterogeneity between groups using several characteristics of each case. Wendt uses hierarchical cluster analysis, which starts with each country representing its own case and

then combines similar cases until finally all countries are together in one cluster. This allows for a step-by-step analysis of how similar countries are to each other rather than simply deriving a singular set of clusters.

Sharkh and Gough (2010) apply cluster analysis in an effort to identify welfare regimes among 65 non- or less-industrialized non-OECD countries ("global welfare regimes"), indicating that cluster analysis is a good descriptive method allowing for exploration. This is central to Sharkh and Gough's analysis since they are examining a wide range of countries that have not been abundantly classified in such a way. For this project, however, the exploratory nature of cluster analysis remains important, since the analysis seeks to explore a wider range of health policy and population health measures in order to identify regime clusters that can then be compared to those established using other measures (or a narrower range of measures).

Powell and Barrientos (2004) test Esping-Andersen's (1990) welfare regimes typology using measures of active labour market policies (that is, policies that actually attempt to increase access to the market and employment). They use hierarchical cluster analysis, suggesting that it is a heuristic technique that can be used to explore patterns of similarity and dissimilarity.

Jensen (2008) uses cluster analysis to identify a distinction between welfare regime clusters based on transfers versus regimes that may be found using measures of social services instead. Jensen argues that, because Esping-Andersen's three regime types are not theoretically linear in nature (that is, conservative states are not seen as "between" the other two types, but rather different), regression methods undermine

regimes analyses. Because of this, Jensen argues, cluster analysis (and factor analysis) is more appropriate for testing and identifying welfare state regimes configurations.

In the framework used for this analysis (figure 1), the existence of welfare state regimes is accepted, given the great amount of work that has continually borne them out. This is why recent research in the population health field to which this project aims to contribute has also assumed that welfare state regimes exist. The key question for this project is whether the concept of welfare state regimes can be useful for the study of population health and health policies. Therefore, this analysis uses the existence of welfare state regimes as representative of the overall policy orientation of a state – in other words, as the anchor to which population health and health systems outputs are compared. In this way, the concept of welfare state regimes as well as the way each country has commonly been classified based on policy areas other than health is compared with the formation of clusters that emerge during an analysis of population health and health policy measures. In other words, the welfare state regimes concept can be useful for the study of health, but this application begins with determining the extent to which the regime memberships as commonly identified are reflected in analyses of health and health policy. If, for example, commonly classified liberal states do not cluster together in this analysis, this affects the way in which the regimes concept can be applied to the study of health. Because of this, the exploratory nature of hierarchical cluster analysis is appropriate for this project.

This method also allows the use of a dendrogram to illustrate the theoretical point at which further cluster breakdowns are no longer useful, and therefore allows for an examination of clusters that may include any number of regimes. This may be crucial

given that cluster analyses, since it is fundamentally different in orientation to other common analyses in the field, either leads to clusters that are not the same as those in proposed welfare state typologies (for example, Saint-Arnaud and Bernard, 2003), or generate different clusters when different but related variables are used (for example, Chung and Muntaner, 2007).

Standardization

The data I am using for health system outputs and population health satisfies the requirements for hierarchical cluster analysis. The analysis can use interval level quantitative data or binary data, and all of the variables in this analysis are measured at the interval level. However, the range of possible absolute values for each measure varies widely. This is because some of my measures range between, for example, 0.1 and 0.8 (if they are % of GDP expenditure variables), while others use much larger absolute values (for example, life expectancy at birth). Without standardization, greater weight will be given to differences in measures with higher absolute values. This is because a difference in life expectancy between two countries can be up to several years (say, 80 and 77, which is three whole numbers). Differences between values on measures with smaller absolute values, like % GDP expenditure measures, vary by amounts less than whole numbers (for example, 0.2 to 0.1). Therefore, in this analysis, standardization is necessary.

Cluster analysis allows for a variety of methods for standardizing values. Standardizing with z-scores is based on the actual dispersion of values as measured by variance and standard deviation. Using this method, values are assigned to cases based on their relative position above or below the mean score on that variable. Specifically,

each value is expressed as a number of standard deviations above or below the average. A specific representation of dispersion is important, especially considering the distance measurement method that this analysis will use (see below for discussion and rationale for this choice). Therefore, this analysis will standardize data using z-scores.

Measuring Distances

For interval-level data, there are a variety of distance measures that can be used for generating clusters. The most commonly used method is the Euclidian method, which unlike other distance measures for interval-level variables (like cosine or Pearson), measures straight-line distance. Often, distance values are squared (Squared-Euclidean distance) in order to place progressively greater weight on objects that are further apart. This measurement may give better 'resolution' to smaller distances, but only insofar as it actually loses resolution when distances are greater. This analysis will use the Squared-Euclidean distance measure, but will be replicated using Euclidian distance in order to verify the stability of the clustering – this is a verification technique suggested by Dolnicar (2002). This is also important for this analysis given that Squared-Euclidean distance measurement, by exaggerating distances between cases that are further apart, also increases the impact of outliers. Given the well documented evidence that the United States is a serious outlier in most policy and health measures, the replication using Euclidean measurement will assess the extent to which this issue is having an effect on clustering.

Amalgamation/Linkage

Hierarchical cluster analysis begins the clustering process seeing each case as its own cluster. Then, the analysis attempts to determine which cases should be grouped

together, and this is achieved through a series of steps. In the first step, the two cases that are closest together are combined into a cluster. In the second step, the case that is closest to either of the first two is considered. If that third case is closer to a fourth case than it is to either of the first two, the third and fourth cases become the second two-case cluster; if it is closer to one of the original two cases, it is clustered with them. This process is repeated until each case has been considered, and the completion of this series of steps constitutes the completion of the first stage. Cases that are sufficiently distant from the other cases can remain a separate cluster by themselves until the next stage. This process is then repeated using the new set of clusters in order to 'cluster the clusters'. Additional stages are completed until all cases are combined into one single cluster, a process that can take a smaller number of stages if cases are close together. When more than one variable is entered into the analysis, the mean value for each case across the variables is used.

The second and subsequent stages are more complex since each cluster now contains more than one case and therefore more than one value. Therefore, the analysis must be able to identify a specific location for each cluster so that it can measure distances between them. At this point a rule is needed to determine the location that can be assigned to the cluster as a whole. There are several commonly used rules. One is 'nearest neighbour' or 'single-linkage', where the distance between clusters is measured as the distance between the two cases (one from each cluster) that are the closest together. However this method links clusters based on two cases that happen to be closest together and therefore does not fully account for how cases are distributed within each cluster. Another common method, 'complete linkage', measures the distance between clusters as

the distance between the cases within each that are the farthest apart. However, this method also does not fully account for within-cluster distribution.

The unweighted pair-group average (also known as between-groups linkage) method calculates the distances between all pairs of cases, where each pair consists of one case from each cluster. Then this method calculates the average distance between all of the pairings and uses that value as the distance between the clusters. This method can be weighted based on the number of cases within each cluster (weighted pair-group average) in order to account for the possibility that some clusters are much larger than others. In this analysis, because there are only 17 cases, this form of weighting can create misleading cluster distances.

The distance between clusters can also be calculated as the distance between each cluster's centroid. A centroid is the average point in multidimensional space between the cases within a cluster. This is not the same as the average value for the measure. When distances between cases are calculated, cases are plotted within a multidimensional space in such a way that distances between plots represent, as closely as possible, the distances between all other cases. This requires a plot that has more than one dimension, and the greater the number of dimensions there are, the more space the calculation has within which to position cases relative to one another. The centroid is the location of the center point in the plot among cases within a cluster.

A final common amalgamation rule is Ward's method. This method attempts to minimize the sum of squares error. In general, this means minimizing the amount of information that is lost by joining two clusters together. "Error" is defined by the calculation as the distance between each case and the centroid for its cluster (referring to

the distance plot as described above), measured as the number of squared standard deviations. The total sum of squares is the total error for all cases in all clusters. When clusters are combined, the centroid against which cases' locations are assessed changes, and since clusters are getting bigger, total error increases. Ward's method combines the two clusters which, when combined, generate the smallest increase to the total error (the minimum increase in the error sum of squares). For this analysis, unweighted pair-group average (between-groups linkage) will be used. This helps ensure that specific differences between countries are accounted for relative to one another at the case-by-case level even when measuring distance between clusters.

Number of Clusters

Since this analysis takes an exploratory approach to the clustering patterns of population health and health system outputs, it is not necessary to have a predetermined number of clusters to identify. This issue will be addressed through the use of a dendrogram. A dendrogram is a figure that illustrates the cases that are clustered together after each stage (as described above), making it possible to visually scan the formation of clusters as their membership expands. That is, the dendrogram maps out the results of each stage of the amalgamation process as discussed above. In this way, the statistical analysis itself is not based on the assumption that welfare state regimes exist, but rather allows for an exploration of whether the regimes are evident across measures of health systems outputs and/or population health. Therefore, from a statistical analysis standpoint, the number of clusters will not be predetermined.

Number of Cases and Measures

Dolnicar (2002) noted that many studies applied the method without having a sufficient number of cases. Saint-Arnaud and Bernard (2003) commit this error, applying cluster analysis with 20 countries (cases) and entering between 16 and 35 variables into each of their analyses.

It is important to highlight that welfare state regimes research is limited in the number of cases it can use because of the relatively low number of industrialized countries with available data. Dolnicar (2002) suggests that there are limited rules surrounding cluster analysis, and that it is important to critically evaluate whether the number of variables being used is too high for the number of cases. Dolnicar also points to Formann (1984), who gives statistical criteria. Formann (1984) illustrates that in order for clustering outcomes to be stable, there must be at least 2^k cases, where k is the number of variables. According to Formann, this is the lowest number of cases that should be used, with the ideal being $5x2^k$. The point for this project is that, regardless of where one draws the line for the "necessary" number of cases, Formann (1984) and Dolnicar (2002) illustrate that findings are more reliable as the number of cases increases relative to the number of variables. To be as safe as possible given the low number of cases in this analysis while still including a useful range of measures, Formann's base suggestion will not be violated. In other words, no cluster analysis performed here will include more than four measures at once and the majority will include only two or three. Regardless of whether one can identify an objective cut-off line, this approach balances the intention of including a wider range of measures with the need to generate reliable findings.

Since there are 17 countries (cases), the maximum number of variables that will be entered into the cluster analysis is four ($2^4 = 16$). With four variables, an analysis can be done with 16 cases. At the same time, the variables chosen for this analysis each measure an important aspect of health policy or population health. In addition, it is one of the key goals of this project to expand upon the number of population health and health system output measures that are included within analyses. Therefore, in order for cluster analysis to be meaningful, this requirement must be reconciled with the fact that there are nine measures of health systems outputs and nine measures of population health that measure important aspects of each concept.

A common way of reducing the number of variables is through factor analysis, but that analysis is inappropriate given the low number of cases. This is also an issue for a test of multicollinearity. Therefore, face valid intuitive definitions for likely variable groupings will be constructed. This provides an opportunity to go beyond the assessment of the general concepts of "health system outputs" and "population health". Within each set of nine measures, three more specific concepts can be addressed. Table 5 shows the nine measures of population health broken down into three measurable concepts, and table 6 shows the same for health system output measures.

Table 5: Population Health Concepts

Measure	Concept measured
Under-5 Mortality Rate	Child Health
Infant Mortality Rate	
Low Birth Weight Rate	
Life Expectancy at Birth	Adult Health
Adult Mortality Rate	
HIV incidence	Chronic and Infectious Diseases
Tuberculosis incidence	
PYLL to communicable diseases	
PYLL to diabetes	

Table 6: Health System Output Concepts

Measure	Concept measured
Public expenditure on health (% GDP)	Expenditure on health / cost of healthcare
Public expenditure on health (% of total public spending)	
Public expenditure on health (% of total health spending)	
Per capita total expenditure on health	
Physician density	Healthcare resources
Acute care bed density	
Acute care staff per acute care bed	
% of children immunized for measles	Coverage
% of population with public health coverage	

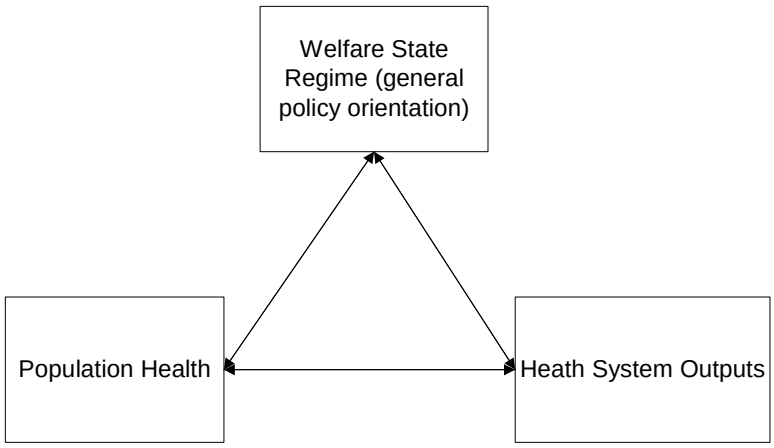
In summary, because of the fact that only a maximum of four variables can be entered into a cluster analysis with only 17 cases, it is important to establish subgroups of measures. This has the potential to enhance the ability of the analysis to be sensitive not only to the overall concepts of population health and health systems outputs, but also to various dimensions of each. The creation of such subgroups is often done using statistical data reduction methods such as factor analysis or correlational analyses. However, given again the low number of cases, these methods are inappropriate. Therefore, subgroups of measures as shown above, are based on intuition regarding the more specific concept embodied by each measure.

Chapter Three: General Analysis and Results

General Analysis

The analysis was done in three phases. For ease of reference, table 1, which outlines the main framework for this analysis, is given again here.

Figure 1: Basic Framework for Interpreting Findings



In the first phase, parallel cluster analyses have been performed – one for population health measures and the other for health system output measures. In order to accommodate the requirement that a maximum of four cases can be included in each cluster analysis, these analyses has included composite measures for each main concept. For example, the three measures of child health were combined with equal weight into a single measure of child health. The same was done with measures of adult health and chronic/infectious disease measures. The three resulting composite measures were entered into the cluster analysis in order to generate an overall result regarding the clustering pattern for population health. A second cluster analysis was then performed using composite measures of health system outputs (expenditure/cost of healthcare, health resources, and coverage). In each case the three composite measures were given equal weight, and this analysis generated an overall result regarding the clustering pattern for health system output measures. The purpose of this initial step is to allow for basic

conclusions to be drawn about the clustering patterns of population health and health system output measures relative to welfare state regime clusters (based on the framework presented in figure 1).

While the cluster analyses provide the detailed information that facilitates a full exploration of how population health and health system output measures relate to welfare state regime membership, eta^2 analysis was also performed in each case in order to summarize the general relationship between the measures entered into the analysis and welfare state regime groups. Eta^2 is a non-parametric, non-symmetrical measure of association. It is therefore appropriate for correlating interval-level measures (like the population health and health system output measures used throughout these analyses) with nominal-level ones (like welfare state regime groupings). The fact that eta^2 is non-symmetrical means that the result for the same two variables is different depending on which is entered as the independent. The correlation indicates the extent to which knowing the independent variable makes it easier to predict the value of the dependent variable. Here, a country's welfare state regime was entered as the independent variable. In other words, the analysis was used to identify the extent to which knowing a country's welfare state regime helps predict its value for each of the population health and health system output measures that are entered into the cluster analysis.

The actual figure given by eta^2 is a coefficient that shows the proportion by which prediction error is reduced relative to making a random prediction of the measure without knowing a country's welfare state regime. For example, an eta^2 coefficient of 0.3 indicates that knowing a country's welfare state regime type reduces error by 30% when attempting to predict the population health or health system output measure being

analyzed. In order to generate one eta^2 value for the series of variables entered into each cluster analysis (that is, one eta^2 value for each cluster analysis), the measures in the analysis were combined with equal weight into one variable and then correlated with the welfare state regime variable.

In the second phase, an attempt was made to break down the overarching concepts of population health and health system outputs. In this phase, cluster analyses were performed for each of the smaller underlying concepts. This involved performing six analyses:

1) using the three measures of child health
2) using the two measures of adult health
3) using the four measures of chronic/infectious disease
4) using the four measures of healthcare cost/expenditure
5) using the three measures of healthcare resources
6) using the two measures of health coverage

The purpose of these analyses is to identify the underlying concepts that may be shaping the conclusions drawn in phase one and to allow for a more detailed discussion of the various factors that do or do not appear to be tied to welfare state regime configurations. Eta^2 analyses were also performed for each of the six analyses.

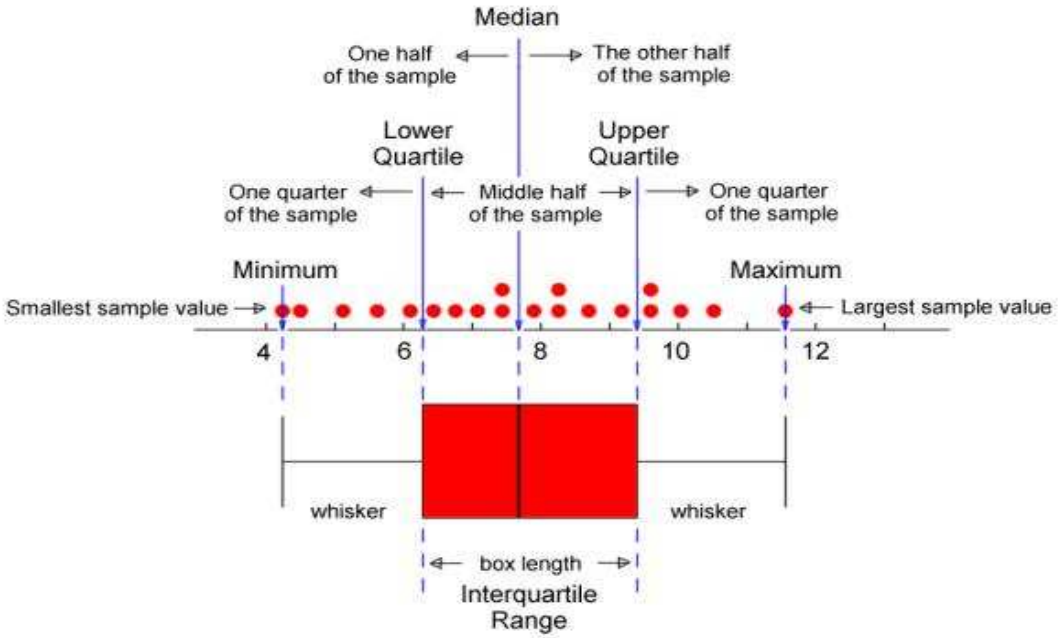
For both the first and second phases, results of cluster analyses are illustrated in three ways. First, a proximity matrix showing the distances, measured in standard units, between each variable at the beginning of the clustering process. Then, a two-dimensional Squared-Euclidean distance plot was created as a visual representation of the distance between the cases at the initial step of the clustering process. Third, a

dendrogram was produced in order to provide a full illustration of the cases as they cluster from stage to stage throughout the process. The dendrogram was the main tool for assessing results since it shows the clustering at every stage and does not require a predetermined number of clusters that are sought.

In the third phase, each individual measure was examined in relation to welfare state regimes. Analyses in this phase consisted of box plot illustrations showing each measure against welfare state regime groups as well as the eta^2 value to assess the extent to which the individual measures are correlated with welfare state regimes. This analysis fortifies the visual results of the box plots for each measure. The purpose of this analysis is to examine the underlying concepts that may be shaping the results of analyses in phases one and two.

Boxplots give a visual representation of the distribution of cases. Here, boxes are created for each welfare state regime in order to visually compare the values given to members of each group. As is illustrated in figure 2, a boxplot organizes data values by quartile. An additional note that should be made is that boxplot analyses identify extreme outliers in order to prevent them from affecting the length of the 'whiskers' and thus confusing the interpretation of distribution. Values that are 1.5 – 3 "box lengths" (the distribution range of the middle two quartiles) from either end of the box are denoted as outliers, while values more than 3 box lengths from either end of the box are identified as extreme values. This prevents the whiskers from being extremely long simply because of one or two cases.

Figure 2: Boxplot[7]



Here, while it is important to understand the above points, a detailed statistical distribution is not the main purpose of the boxplots, especially since there are very few cases in each welfare state regime (for example, the plot for the social democratic regime only contains four cases). However, when comparing the values held by countries of different regimes, it is useful to know how similar individual values are within each regime. With only four cases, for example, the median alone can be grossly misleading if two cases are extremely high and two are extremely low. Eta^2 values are provided along with boxplots. Boxplots and eta^2 values for each measure can be found in appendix 9.

[7] Illustrative figure taken from Murdoch University School of Chemical and Mathematical Sciences *Notes on Boxplots*, located at: http://www.cms.murdoch.edu.au/areas/maths/statsnotes/samplestats/boxplot.html

The results of each of these phases support a full discussion of the extent to which population health and health system outputs reflect welfare state regimes.

Summary of Analysis Phases

1. Cluster analyses using composite measures of population health and health system output measures.
    a. Squared-Euclidean distance measure, replicated with Euclidean distance to test reliability
    b. Z-score standardization
    c. Between-groups linkage (unweighted pair-group average) amalgamation method
    d. Two-dimensional squared-Euclidean distance plot and dendrogram output.
    e. Eta^2 analyses to help summarize the general level of fit.

2. Cluster analyses for each of the six underlying concepts (three underlying population health and three underlying health system outputs). Specifically, a cluster analysis was performed using the three measures of child health, another using the two measures of adult health, and another using the four measures of chronic and infectious diseases. Analyses were performed using the four measures of healthcare cost/expenditure, the three measures of healthcare resources, and the two measures of healthcare coverage. Tables 5 and 6 (shown earlier) outline these underlying concepts.
    a. Same methods as above

3. Box plots and eta^2 analyses for each of the individual measures of population health and health system outputs relative to welfare state regime groupings.

General Results

Figure 3 gives a summary table of the results for each phase of analysis on population health measures, and figure 4 gives the same for analyses on health policy output measures. In each box, eta^2 values are given to summarize the connection between each measure and welfare state regimes. Full analyses will examine in detail actual clustering in each analysis, but Eta^2 values are used here as summaries of each relationship. Values greater than .500 (prediction error reduced by 50% when knowing a country's welfare state regime) are highlighted.

Figure 3: Summary of Results for Population Health Measures

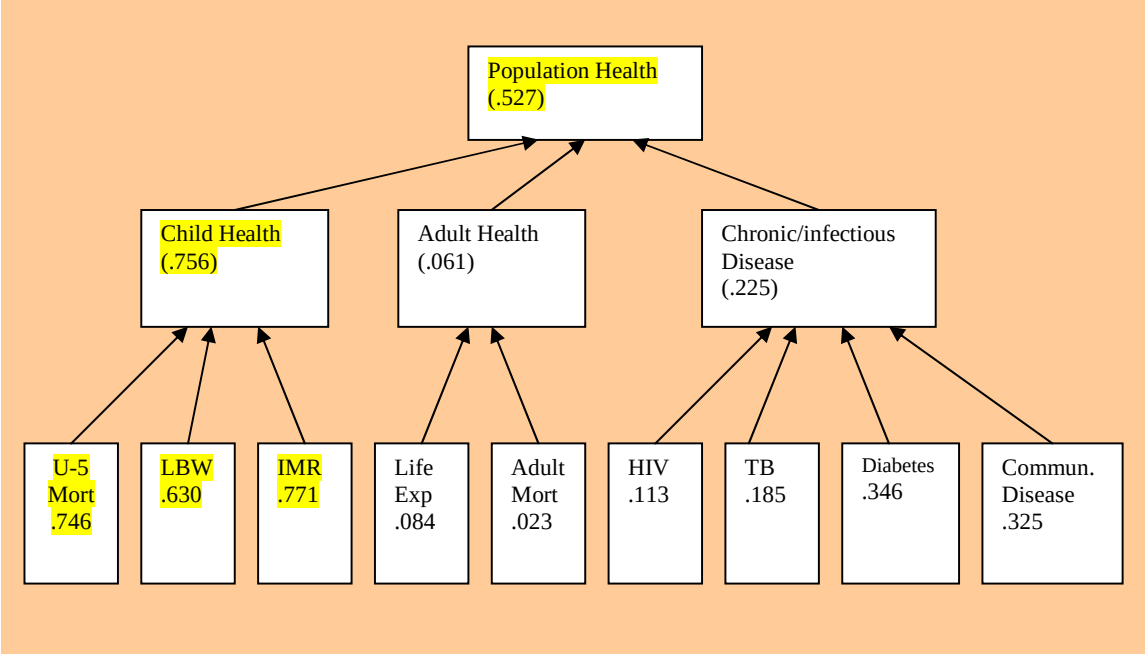
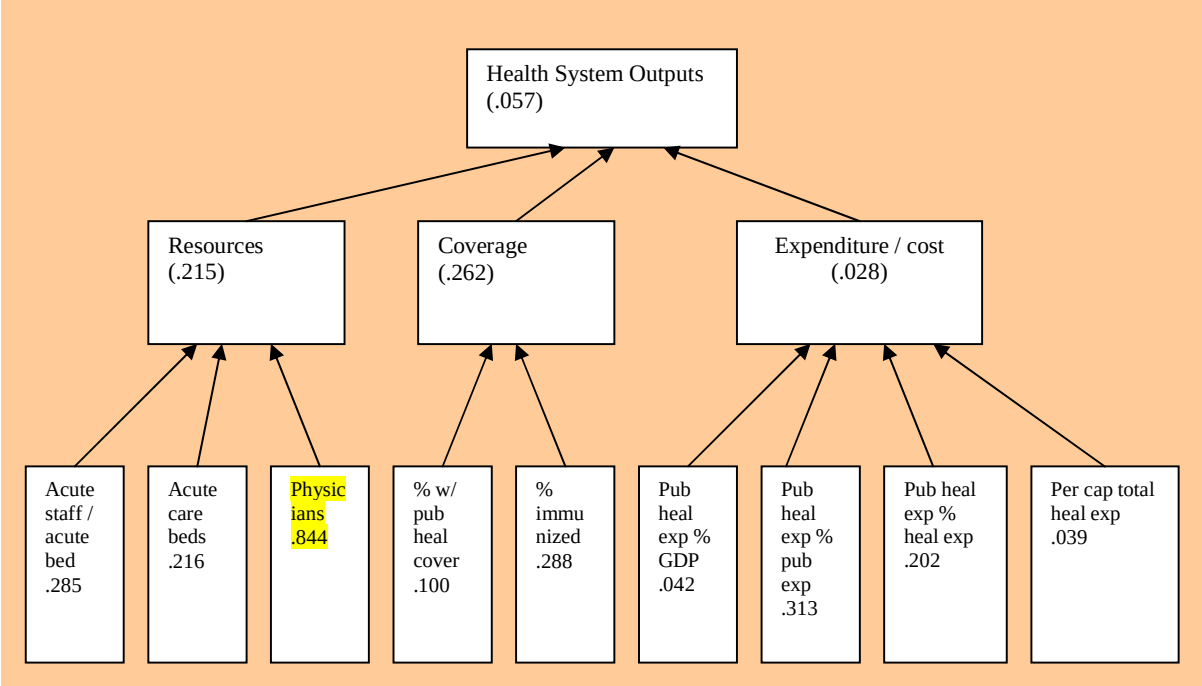


Figure 4: Summary of Results for Health System Output Measures



Looking at figures 3 and 4, it can be seen that overall (phase 1), population health relates more to welfare state regimes than health system outputs do. This was evident in the phase 1 cluster analyses of composite measures for each. Further, knowing a country's score on composite measures of population health reduces error in predicting a country's welfare state regime by about 53% ($eta^2 = .527$). On the other hand, knowing a country's score on composite measures of health system outputs only reduces prediction error by about 6% ($eta^2 = .057$).

Cluster analyses in phase 2 of the project found that child health measures produced clusters strongly resembling welfare state regimes, while measures of chronic/infectious disease showed mild parallels and measures of adult health showed virtually no clustering along regime lines. Therefore, it can be concluded that the observed parallel between welfare state regime types and the clusters that emerge when examining population health is driven almost entirely by child health measures. In phase

3, the independent examinations of each health measure allows for a further assessment of what drives the connection between child health and welfare state regimes. Independent analyses of each measure also allow for an examination of the measures that drive the lack of association between adult health and chronic/infectious disease. For example, diabetes and PYLL to communicable disease are more associated with welfare state regimes than incidence of tuberculosis and HIV.

Regarding health system output measures, phase 2 analyses showed that expenditure/cost measures have virtually no association with regimes while health resource and coverage measures had only minor associations. Cluster dendrograms revealed clusters that did not reflect welfare state regimes. Predictably, phase 3 analyses of each individual measure showed that almost all of them have either no association or a minor association with regime type. The exception is physician density, which shows a strong association with regime type, but does not make a distinction between social democratic and conservative states.

Overall, findings of the analyses performed here indicate:

1) Little connection between welfare state regime classifications and health policies
2) Little connection between health policies and population health
3) A moderate connection between welfare state regime classifications and overall population health, characterized by
    - Little connection between welfare state classifications and adult health
    - A strong connection between welfare state classifications and child health.
    - Moderate connection between welfare state classifications and communicable/infectious diseases

To address the basic framework for this analysis and answer the three main questions for this project (figure 1, shown again below), specific results regarding each of

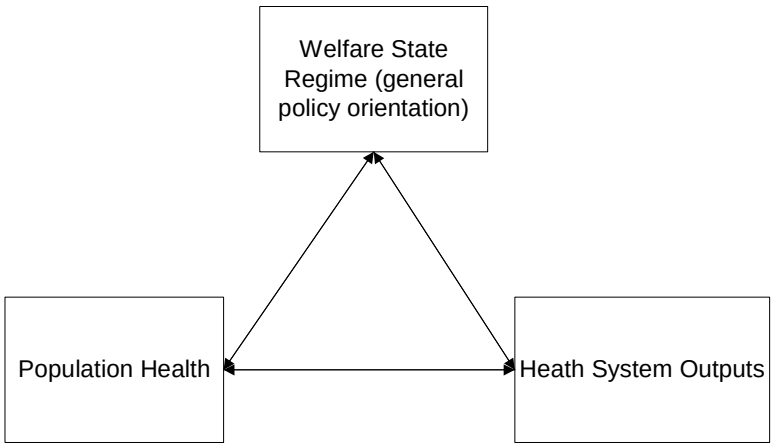
the hypothesized connections are examined in the following three sections. As such, the following three sections address:

1) Does population health cluster into groups resembling welfare state regime groups?

2) Do health policies cluster into groups resembling welfare state regime groups?

3) Do population health and health policies generate similar clusters?

The overall objective is to examine the above results in an effort to assess the extent to which welfare state regime typologies, as they are most commonly configured, are useful for the study of health. A model of civil society that uses the findings of this analysis to contextualize welfare state regimes relative to health policies and the health status of various segments of the population will then be advanced.



Chapter Four: Population Health and Welfare State Regimes: Does Population Health Cluster into Groups Resembling Welfare State Regimes?

As noted earlier, many authors have recently argued that welfare state regime typologies present reliable and well-tested descriptions of national policy orientations that can be used to help explain health outcomes (for examples, see Chung and Muntaner, 2006, 2007; Saint-Arnaud and Bernard, 2003; Navarro et al., 2006; Macinko, Shi and Starfield, 2004; Lundberg et al., 2008). If population health outcomes appear to trend along welfare state regime lines, it would suggest that particular national policy orientations lead to particular health outcomes.

There are two general areas of research suggesting that welfare state regime structures systematically impact population health. First, welfare state regime typologies were founded upon the analysis of labour market policies and inequality (Olsen, 2002; Korpi, 2000; Korpi and Palme, 1998). Given the literature supporting a connection between poverty, inequality and health (see for example Lynch et al, 2004; Wilkinson, 1996; Coburn, 2000; Daly et al., 1998; Lynch et al, 1998), it is rational to suggest that welfare state regime types may play a role in shaping population health by affecting social and economic inequality.

Second, recent research focusing directly on welfare state regimes and population health has suggested that population health does, to varying degrees, reflect welfare state regimes (for examples, see Chung and Muntaner 2006; 2007; Xu Ke Tom, 2006; Saint-Arnaud and Bernard 2003; Navarro et al., 2003; 2006; Macinko, Shi and Starfield, 2004; Macinko, Starfield and Shi, 2003; Muntaner et al., 2002; Conley and Springer, 2001). This research, however, has focused on a narrow range of population health outcome measures. Among the studies cited above, the only measures of population health used

are Life expectancy at birth, infant mortality rate, low birth weight rate, and under-5 mortality rate, and none of the studies use all of these measures.

The results of this analysis, which used a wider range of population health measures, indicates that the extensive reliance on child health measures as representative of population health may be misleading with regard to welfare state regimes.

This chapter will begin by examining the relevant results of the analysis, including the clustering relationship between welfare state regimes and the overall population health measure, child health measures, adult health measures, and finally measures of chronic and infectious diseases. Following this, the impact of the heavy reliance on child measures exhibited in existing research will be discussed. It will be emphasized that that over reliance on child health measures has led to conclusions that over emphasize the correlation between population health and welfare state regimes. Next, the connections between population health, welfare state regimes and inequality will be examined. Finally, the findings of this analysis will be applied to a larger model charting the ways in which welfare state policies are likely to affect population health.

Overall Population Health and Welfare State Regimes

The specific results of the analyses of population health and welfare state regimes performed in this dissertation are given in appendix 2. The initial hierarchical cluster analysis uses the three composite measures of health: Child health, adult health, and chronic and infectious diseases (as illustrated in table 5). Looking at the proximity matrix and the squared-Euclidean distance plot, welfare state regimes are not clearly apparent. However, while liberal and conservative welfare states are dispersed widely

across the spectrum, the social democratic states (cases 5, 6, 12 and 14) are relatively close to each other.[8]

The squared-Euclidean distance dendrogram reflects this, but does not indicate that welfare state regimes group together. At the first stage, a large cluster is formed that consists of liberal (Canada, New Zealand and Australia) and conservative (Germany, Switzerland, Austria and Belgium) countries. France, a conservative country, joins this grouping at the second stage. In this way, it can be seen that five of the conservative states group together early on. By the second stage, a cluster is formed that includes all four social democratic countries along with two conservative states (Italy and Netherlands). Spain and the UK are combined in the third stage, while the US is very distant from all of the other countries, remaining separate until the 25th stage.

The Euclidean distance replication dendrogram expands the calculated distance between cases within each of these groupings, and illustrates that there is, to a limited degree, congruence with welfare state regime types. By the fourth stage, Canada, Australia and New Zealand, all liberal states, are combined within a subgroup of the larger cluster observed in the Squared-Euclidean dendrogram. The US, also a liberal state, is well documented as being a distant outlier when it comes to health outcomes. As noted in the background section of this paper, the other liberal state, the UK, is often found to be a weak fit with liberal states. Therefore, while a liberal cluster is not apparent as a whole, the distinctions observed reflect the findings of some prior welfare state research.

[8] In the distance plot, the case plotted right at the top, which is not labeled, is case 7 (France). The proximity table on the previous page lists the case numbers for each country in the far left column. This is the case for all of the cluster analyses performed here.

It can also be seen in the Squared-Euclidean dendrogram that Norway, Sweden and Finland, all social democratic states, are combined in the first stage with Denmark (also social democratic) joining them in the second stage. Even though conservative states Italy and Netherlands are included in this cluster, it is clear that the social democratic states cluster together, as was indicated in the Euclidean distance plot. It is noteworthy, however, that in the Euclidean distance replication dendrogram Denmark remains separate from the other social democratic states until the 6^{th} stage.

When the composite measures of child health, adult health and chronic and infectious disease are combined with equal weight and then correlated with welfare state regime type, $Eta^2 = .527$. It is always a subjective decision regarding whether a particular correlation value is "high" or "low". However, in the case of Eta^2, this means that if a country's welfare state regime type is known, prediction error is reduced by 52.7% when predicting the value of the population health index measure. This is a substantial improvement in prediction accuracy. Moreover, looking at cluster analyses using health system output (health policy) measures, $Eta^2 = .057$ (which will be examined in detail later in this paper). Clearly, within the context of the main framework of this paper, overall population health does, to a considerable extent, reflect welfare state regime typologies. At this level, the connection is largely driven by the clustering of the social democratic states as well as a nucleus of conservative and liberal countries.

Zambon et al. (2006) examine self-reported health in the context of welfare state regimes, but in addition to the three central regimes they also include two regimes that have subsequently been proposed: post-communist and Mediterranean (also referred to in other research as the Latin Rim regime). The study performed here focuses on OECD

countries and the comparable data that comes with this, although it has included two countries often included in the Mediterranean regime: Spain and Italy. Although the analysis performed here focuses on the original and most commonly supported regimes, cluster analysis dendrograms allow for an assessment of how these two countries cluster. The Squred-Euclidean distance dendrogram for population health composite measures in appendix 2 shows that the two countries do not combine until the 6th stage, a point at which all countries other than the U.S. are grouped together. The same result is clear in the Euclidean distance replication. Going into further detail provides mixed results. The two countries group closely for child health measures and adult health measures but are very distant for chronic and infectious disease measures. With only two representatives of the proposed fourth regime, it is difficult to make conclusions. Moreover, Zambon et al. (2006) also found the Mediterranean regime to exhibit mixed results, with Italy and Spain as exceptions with regard to self reported health measures. At the same time, however, Zambon et al. found that social democratic and conservative regimes tended to mitigate the relationship between inequality and health more than other regime types.

Overall, then, when a wider range of population health measures are included in the analysis (as in the cluster analysis performed here as well as Zambon et al.'s use of adolescent self-report health measures), welfare state regime typologies are only moderately visible, which brings into question the relatively strong relationship that has been identified in recent research.

Child Health and Welfare State Regimes

. Research on welfare state regimes and population health have relied heavily upon measures of child health (as illustrated earlier, for examples see Chung and

Muntaner 2006; 2007; Saint-Arnaud and Bernard 2003; Navarro et al., 2006; Macinko, Shi and Starfield, 2004; Macinko, Starfield and Shi, 2003; Muntaner et al., 2002 and Conley and Springer, 2001).

There are a few exceptions, but they have not drawn on the array of available comparative population health measures. Eikemo et al. (2008) examined educational health inequalities in European countries using self-reported health and disability measures as representative of population health. They used data from two survey questions, one asking respondents to rate their overall health, and the other asking respondents whether their daily activities were inhibited by any long-standing physical or mental health illness or disability. They found, using ANOVA analysis, that self-reported health is related to welfare state regime type among European countries. Since these questions were asked of adult respondents, the study did not rely on measures of child health. However, Eikemo et al. admit that cultural and relative issues are associated with self-reported health measures, and their central analysis examined the magnitude of education-based health inequality rather than simply health status. This required the use of comparable data from the first and second wave of the European Social Survey rather than international adult mortality rates. Also, their analysis used European countries, which excludes key representatives of the liberal welfare state regime.

Lundberg et al. (2008) studied the impact of welfare state regime-based family and pension policies on population health. They analyzed the impact of family policies on infant mortality rates and the effect of public pensions on age-standardized adult mortality rate (using the extent to which mortality rates of those over 65 are greater than

those aged 30-59). In this way, Lundberg et al. do not examine welfare state regimes in general, targeting the impact of old-age security on mortality rates among older people.

Indeed, few studies have drawn on the wealth of available comparative population health data that can assess the impact of welfare state regime on population health overall, and yet recent reviews continue to assert that there is a strong association between welfare state regimes and health (see for example the literature review by Hurrelmann, Rathmann and Richter, 2010). Based on the analysis done here, the heavy reliance on child health measures has likely generated misleading conclusions about the connections between welfare state regime approaches and population health.

This cluster analysis used the three measures of child health (infant mortality rate, low birth weight rate, and under-5 mortality rate). Specific results of the analyses of the three child health measures are given in appendix 3. Looking at the proximity matrix and the squared-Euclidean distance plot, clustering by welfare state regime is strongly evident. This is illustrated in the squared-Euclidean dendrogram as well. By the second stage, the four social democratic states are grouped together, and four of the liberal countries (Australia, Canada, New Zealand and UK) also form a cluster. The liberal exception is the US, which has been well-documented as having extremely poor child health characteristics. For this reason, the US remains separate until the 25th stage.

By the second stage, all of the conservative states other than Netherlands have been clustered, and by the third stage Netherlands joins the conservative cluster. The Euclidean distance replication dendrogram also bears this out. This is especially the case regarding the clustering of the social democratic countries and the four liberal countries other than the US. The Euclidean distance dendrogram reveals some underlying

connections within the larger conservative cluster, however. For example, France, Germany and Switzerland are combined in the first stage. Austria and Spain are similarly connected in the first stage. In this analysis, Netherlands joins the conservative cluster only two stages before that cluster combines with the liberal cluster, indicating that Netherlands is relatively independent, but slightly closer to the other conservative states than to the liberal ones. This can be seen in the Euclidean distance plot as well. In general, the Euclidean distance dendrogram supports the findings of the squared-Euclidean analysis, namely that welfare state regime groupings are quite evident when measures of child health are examined.

When the three measures of child health are combined with equal weight into a single variable and correlated with welfare state regimes, $eta^2 = .756$. This is a strong correlation (error in predicting a country's child health status is reduced by 75.6% when welfare state regime type is known). It is evident that child health measures are the main driver of the association seen between welfare state regime type and population health in general.

Looking in appendix 9 at the box plots for the three child health measures, it is clear that each of the three associates with welfare state regime type. In other words, it is not the case that one or two of the three child health measures drive the overall link between child health and welfare state regimes. The plot for infant mortality rate shows that for all liberal countries other than the U.S., IMR is 5/1,000 live births, while the rate for the U.S. is the highest among all countries at 7/1,000. All four social democratic countries have an IMR of 3/1,000 live births, while seven of the eight conservative states have an IMR of 4/,1000. Italy is the lone exception, with an IMR of 3/1,000. For IMR,

eta^2 = .771, showing the strongest correlation with welfare state regime. A similar relationship can be seen in the box plot for under-5 mortality. Without exception, liberal states have the highest mortality rates, while social democratic countries have the lowest. Under-5 mortality is also strongly correlated with welfare state regime (eta^2 = .746). Finally, as with the other two measures of child health, low birth weight rate is strongly correlated with welfare state regime type (eta^2 = .63), although the box plot shows that liberal and conservative states have similar rates while social democratic states have distinctly lower rates.

It is clear, therefore, that each of the three child health measures is strongly associated with welfare state regime type. This supports the conclusions of recent research, which has found through various forms of analyses that child health measures reflect welfare state regime types.

Adult Health and Welfare State Regimes

The results of cluster analyses done in this project involving adult health measures bring into question the assumption that findings based on the analysis of child health measures can be generalized to make conclusions regarding welfare state regimes and population health overall.

This hierarchical cluster analysis included the two adult health measures (life expectancy at birth and adult mortality rate – as outlined in table 5). Results of this analysis can be found in appendix 4. While the US again remains separate until the 25th stage, virtually no evidence of welfare state regime clustering can be seen. This is illustrated in the proximity matrix and the squared-Euclidean distance plot as well as the dendrogram. Looking at the Squared-Euclidean dendrogram, by the first stage a hybrid

cluster is formed that includes members from each welfare state regime. This cluster includes three conservative states (Germany, Austria and Netherlands), one liberal state (New Zealand) and one social democratic state (Norway). Similarly, at the first stage Belgium (conservative), Denmark (social democratic) and UK (liberal) are grouped, with Finland (social democratic) joining the cluster at the second stage.

Several pairs are connected in the first stage as well, none of which are predicted by welfare state regime membership. Italy (conservative) is paired with Sweden (social democratic), Canada (liberal) is paired with Spain (conservative), and Australia (liberal) is paired with Switzerland (conservative). By the third stage, these six countries are combined to form another hybrid cluster.

The Euclidean distance replication dendrogram bears out these findings while showing some additional details underlying the formation of the groupings. For example, the cluster containing Netherlands, Germany, Austria, Norway and New Zealand can be seen to initialize in two groups. Namely, Netherlands is initially paired with Norway, while Austria, Germany and New Zealand group together before joining the two. Finally, these two adult health measures, when combined into one variable with equal weight, are not correlated with welfare state regime ($eta^2 = .061$).

Looking at each of the two measures individually, the box plots in appendix 9 show that neither life expectancy ($eta^2 = .084$) nor adult mortality ($eta^2 = .023$) correlates with welfare state regime. In the case of adult mortality, the boxplot shows that social democratic states are widely distributed relative to the other regime types. Although the US (case 17), with its high adult mortality rate, is an extreme positive outlier for this measure, the distribution of the other four liberal countries is small. Median values

across the regimes are nearly the same. All three regimes show relatively wide distribution of values for life expectancy, with a degree of overlap that limits prediction error reduction (driving the low eta^2 value).

The low correlation between welfare state regime and life expectancy is interesting, given that a few of the recent welfare state regime studies have used that measure along with common child health measures. Most of those studies, however, analyze life expectancy simultaneously with other policy and health measures, making it difficult to determine whether their analysis revealed a correlation between life expectancy in particular and welfare state regime policies (for an example of this issue, see Saint-Arnaud and Bernard, 2003). Navarro et al. (2006) found correlations between life expectancy at birth and public health expenditure, but life expectancy was not strongly correlated with public health care coverage. IMR was more strongly correlated with both public health expenditure and coverage. Further, Navarro et al. found that pro-redistributive government policies were strongly correlated with IMR (negative correlation) but not with life expectancy. The findings of the analysis performed here generally supports Navarro et al.'s finding that child health measures are more strongly related to welfare state regimes than life expectancy.

The additional fact that adult mortality rates do not reflect welfare state regimes may not mean that welfare state policies have little impact on adult health. Theorell and Vogel (2003) study self-rated health across welfare states and expand the analysis to include Eastern European countries. They argue that self-rated health is related to welfare state regimes, especially in the distinction between Nordic countries and other regimes. Populations in Eastern European countries are characterized by much lower

self-rated health as well as stress-related bodily changes. Although Eikemo et al. (2008) examined education-based health inequalities in European countries, a finding was that self-reported health among adults does reflect welfare state regimes. This may be partly because their study only examined European countries, and Eikemo et al. acknowledge that there are some limitations to using self-reported health (specifically, that the concept may be interpreted differently in different places). Further, Martikainen et al. (2004) analysed public employees in Britain, Finland and Japan and found that self-rated health did not clearly reflect welfare state regimes among men. Beckfield and Krieger (2009) argue therefore that future work should pay attention to the limitations of relying on self-assessed health as the main measure of health. However, self-reported health may be one of the best ways to assess aspects of health that may not be recorded in formal comparative data (like mortality and classified illness), and it has been argued that it is a reliable measure for comparative analysis (de Bruin et al., 1996). Eikemo et al.'s analysis, therefore, at the very least casts doubt on the suggestion that adult health in general is not impacted by welfare state regime policies. This indicates that focusing in detail on a wide range of adult health measures is likely to reveal a complex relationship with welfare state regimes that will require close examination and careful interpretation. This will also enhance the understanding of the relationships between welfare state regimes and population health overall.

The finding that the adult health measures used here do not cluster along welfare state regime lines may indicate the existence of historical cohort effects. In a review of recent research addressing the connections between political rule, welfare states and population health, Beckfield and Krieger (2009) note that there needs to be a greater

examination of birth cohort effects, life-course implications, timing of exposures, and possible period effects. They also argue that in the case of mortality measures, more attention to etiologic period is necessary, since they are likely not fully attributable to concurrent conditions. For example, Kunitz and Pesis-Katz (2005) examine the legacy of slavery and racism and its impact on the black-white health gap in the U.S., finding that such history shapes the health gap through institutions of the welfare state (in this case, national health insurance). However, few if any studies examine such effects in the context of welfare state regimes across a range of countries.

It is possible, therefore, that adult mortality rates reflect the fact that earlier generations' health was affected by different historical and policy realities over time. It is possible, for example, that those who die between the ages of 50 and 65 experienced historical events and policy structures that no longer affect those who have been born recently. In Canada, for example, during the hardships of the 1930s and WWII, health and social policy structures were vastly different – and importantly, public healthcare availability was minimal compared to current structures. Leading up to the 1930s in Canada, the shift toward urbanization and the fact that market mechanisms seemed unable to provide employment for all Canadians caused a shift in the responsibility for welfare from municipalities to provincial and federal governments, and policies like minimum wage and worker compensation began at different times in different regions (Rice and Prince, 2000). Many different pressures affected the policy reform timelines of different regions. The fact that different policy pressures led to different timelines from province-to-province may underscore Kasza's (2002) point that welfare state policies did not emerge systematically based on a uniform 'liberal' policy approach in Canada (a

point discussed in detail later). More to the point here, though, is that even within one country, particular cohorts were affected in very different ways by different policy structures, all of which could affect individual lifespan and health when measured at the national level.

Historical and policy factors that may be more directly relevant to the adult health and life of cohorts included in more recent adult health data may be the push from communities of reformers, intellectuals, and public administrators for a social security system in Canada, which intensified greatly after the Great Depression and WWII (Rice and Prince, 2000). Unemployment insurance, which affects inequality during periods of unequal employment, was developed through gradual amendments from 1946 to 1954 (Rice and Prince, 2000). Children born and raised during this time period would have been affected, and long-term health may have improved for them in relation to that of their parents. More recently, the development and implementation of the Canadian universal healthcare system and later the Canada Health Act are examples of policy scenarios that likely had an impact on the health of later generations.

In addition, it is not simply the case that welfare policies have developed over time, slowly improving overall adult health, but the opposite has also occurred. Many income security programs and social programs have been challenged in recent decades (Rice and Prince, 2000). The transformation of Canada's Unemployment Insurance program to Employment Insurance in 1996 was the culmination of a series of cuts to the level and duration of benefits that had occurred through the 1980s and 90s (Rice and Prince, 2000). Rice and Prince (2000) also point out that as of 1998 retirement and disability benefits were to be cut back for future retirees. Therefore, when interpreting

adult health data it is inappropriate to assume that health outcomes will steadily improve over time.

In this way, the impacts of both the historical events and the different policy structures of the time likely affected the long-term health of those who experienced them. For that reason, adult mortality rates may not reflect current welfare state regime structures. A number of studies have argued that child health measures are more sensitive to political and welfare state factors, and require only a short lag time (see Chung and Muntaner, 2006). This helps to explain the tendency to focus on child health measures. If that is the case, the finding that adult health measures do not cluster along welfare state regime lines emphasizes the importance of Beckfield and Krieger's (2009) argument that more work should consider the impact of historical and cohort impacts. Adult health measures remain disproportionately under-used in research on welfare state regimes and population health, and it would be helpful therefore to examine the impacts of historical and cohort factors while at the same time expanding the use of adult health measures in welfare state regimes and population health research. However, future dealings with this issue will require more than adding adult mortality measures to analyses. That is the starting point for the expansion of the operationalization of population health. The finding that a correlation with welfare state regimes is minimal illustrates the importance of this endeavour when further applying welfare state regime classifications to population health analysis.

Based on this analysis, a major reason for the lack of relationship between adult health measures and welfare state regimes is that for both measures used here (life expectancy at birth and adult mortality rate), values range greatly within each regime.

This presents a different implication for future research than it would if all of the regimes simply had very similar values. The wide range of values within regimes may help direct countries that can be compared. For example, why do the U.S., Finland and France, which are usually hallmarks of different regimes, have the three highest adult mortality rates? Or, why would Sweden (social democratic), Australia (liberal), Switzerland (conservative), and Italy (sometimes differentiated as belonging to a "Latin Rim" regime), all have low adult mortality rates? As will be discussed below, these findings also raise issues regarding the heavy reliance on child health measures within recent research on welfare state regimes and population health.

Chronic and Infectious Diseases and Welfare State Regimes

Few studies focus on the connections between welfare state regimes and chronic and/or infectious diseases. The fact that existing research focuses on a few general measures of population health contributes to this problem by not including measures that address the extent to which welfare state policies might affect those living with disabilities and/or chronic illness. The selection of measures reflecting morbidity and mortality later in life are likely to be more sensitive to state safety nets and welfare state policies than child health measures (except insofar as maternal health affects the health of infants born to them). Whiteneck and Fougeyrollas (1995) identified five environmental characteristics that have significant impact upon those with handicaps. While most are micro qualitative concepts, a key characteristic of their analysis pertained to the availability of supporting resources. For example, the provision of services like medical care, personal assistance, and income security are crucial to the quality of life experienced by disabled individuals. In a sense, labour must be decommodified to the

point where those unable to commit to full employment can nonetheless sustain an acceptable standard of living. This may suggest that chronic and infectious diseases are related to welfare state regimes, and that more work should therefore focus on this issue.

In contributing to the economics of communicable diseases literature, Mechoulan (2007) uses numerical simulations for various market and epidemiological contexts. In particular, the analysis examines the drug pricing strategies of private, competition-based monopoly on the one hand and social planners on the other. Mechoulan concludes that private monopolists set prices to achieve steady infection states, while social planners attempt to eradicate diseases (or subsidize treatment where eradication is impossible), and suggests that private competition alone may not be the best policy. Should eradication be cost effective, Mechoulan argues, public health policy makers should implement mandatory treatment programs for communicable diseases. Social security officials, by understanding the steady-infection-rate price a pharmaceutical firm is aiming for, should bargain over the drug price to be used. Although Mechoulan (2007) does not examine welfare state regimes, his analysis suggests that the total free-market approach to the treatment of communicable diseases is not the pathway to disease eradication. Given welfare state regime types differ with regard to the extent of market control and regulation, this hints at the possibility that different regimes may generate different outcomes regarding communicable diseases.

Galvin (2002) examines the impact of neoliberal welfare reform on the disabled, arguing that an ongoing trend of welfare reform in Australia has emphasized the importance of private responsibility for health, which in turn has detrimentally affected the treatment of those who are chronically disabled. Along these lines, Galvin argues that

being chronically ill or disabled, especially where one is unable to work, contradicts the prevailing belief in self-reliance.

Although the work focuses on Australia, Galvin (2002) argues that in Canada there has been a steady transition from the welfare state to "neoliberal rationalities" in the West since before the Lalonde Report release in 1974 (p.109). Galvin does not argue that the Lalonde Report was the origin of this trend, but that it provided an "incisive point of entry into the analysis of contemporary forms of behavioural culpability" by introducing the idea of health promotion (p. 109). The Lalonde Report (1974) noted that individual biology and the organization of the healthcare system are not the only factors that influence the health of Canadians, but that the social environment and individual lifestyles are also central concerns. This report suggested that prevention should become a greater focus in Canada's approach to health, and that public awareness about the impact of lifestyle choices should be a part of this. The report also suggested that chronic conditions could likely be reduced by encouraging people to make healthier lifestyle choices and by improving the social environment.

In examining the impact of welfare reform, Galvin (2002) discusses health promotion projects in Australia, and notes that those policies have been largely shaped by policies in Canada, the U.S. and Britain. Although Galvin does not explicitly state that she is analyzing a particular type of welfare state, her emphasis on the role of private responsibility for health leads her to a discussion of these particular countries. This is largely because her operational definition of "neoliberalism" coincides with the key characteristics of liberal welfare states, especially private (individual) responsibility for one's health, even though she refers to this as characteristic of "the West" in general. In

a way, this suggests that welfare reform policies in these four liberal welfare states reflect one another, and that they tend to have a common impact on those who are chronically ill or disabled.

Galvin (2002) overstates the impact of neoliberal-oriented welfare reform by suggesting that there has been a "collapse or, at the very least, shrinking of the welfare state…in contemporary Western culture" (p.117). This indicates that Galvin is not making a conceptual distinction between the four liberal states she refers to on the one hand and other Western nations on the other (since what she sees as "Western" includes Europe and North America, not all of which are liberal welfare states). However, the fact that her efforts to focus on the emergence of private responsibility for health lead her to a discussion of four liberal welfare states suggest a welfare state regime connection when analyzing chronic illness. It is also questionable whether Galvin is correct to link the recommendations of the Lalonde Report to a growing notion of "individual culpability" that she says is tearing down the welfare state.

Galvin (2002) does not examine the impact of neoliberal health promotion policies on population health outcomes, focusing instead on their impact on those who are chronically ill or disabled. She suggests that, due to the aggressive promotion of "healthy behaviours" and the accompanying sentiment that people are responsible for their own health, there has been a growing belief that people do not deserve a right to medical care (or general social support) if they cannot demonstrate that they did everything in their power to be healthy and reduce risk of illness (p. 119). This, she argues, is integral to the development (or lack) of policies that support people who are chronically ill or disabled and therefore cannot work, especially for health conditions that

are perceived to be an individual's own fault. In this way, in Galvin's view, neoliberal health promotion policies and an emphasis on individual responsibility may have a detrimental effect on the supports received by those with chronic illness and/or disability in liberal states.

It may not be the case, however, that this issue is exclusive to liberal welfare states. Michailakis and Schirmer (2010) argue that there has been a shift toward individual responsibility for health in Sweden, which has been tied to increasing expectations for individuals to live healthy lifestyles and avoid hazardous habits. In the long run, such a trend may reduce the importance of welfare state regime classifications when examining the impact of social policies on those with chronic illness and disability as regime distinctions narrow. At the same time, however, the extent of welfare state retrenchment is heavily debated and different regimes tend to handle economic and social pressures in different ways. In their analysis of health and disability, Eikemo et al. (2008) found that the prevalence of self-reported limiting long-standing illness clusters along welfare state regime lines. They argue that future research should not only enhance methods that have been used in cross-national comparisons, but also apply the welfare state regimes approach. The cluster analysis performed here contributes to this effort.

Padamsee (2008) demonstrated that similar welfare states (U.S. and U.K.) have responded in very different ways to the challenges posed by HIV/AIDS, suggesting that factors other than traditional welfare state regime underpinnings may shape chronic disease outcomes. This is especially the case since the U.S. and U.K. have vastly different HIV incidence rates, which can, to some extent, be seen as an outcome of divergent policy approaches demonstrated by Padamsee (2008). Although the U.K. tends

to be a weak fit with the liberal regime (and the National Health Service is clearly unique), Padamsee's work indicates that the connections between regime-specific policy approaches and the burden of disease are likely to be complex, and that within-regime policy distinctions are important considerations.

Results of cluster analyses performed here using the four measures of chronic and infectious disease (as outlined in table 5) show only a moderate relationship with welfare state regimes. Specific results of this analysis can be found in appendix 5. Looking at the proximity matrix and Squared-Euclidean distance plot, the US (case 17) is extremely distant from all of the other countries. Spain (case 13) and UK (case 16) are fairly distant from the rest of the countries, which are not apparently clustered along welfare state regime lines. The Squared-Euclidean distance dendrogram bears this out. As is indicated in the distance plot, Spain and the US are relatively distant from the other countries and therefore neither of them clusters with any countries until the 14th and 25th stage respectively. As can also be seen in the plot, the UK is fairly distant and does not cluster with any other countries until the 19th stage. In the first stage, a large hybrid cluster is formed that includes seven countries, three of which are conservative, three are social democratic, and one is liberal. Canada (liberal) and Netherlands (conservative) join this cluster in the second stage. Denmark (social democratic) and New Zealand (liberal) are paired in the first stage.

The Euclidean distance replication dendrogram also shows little clustering along regime lines. Germany (conservative) is paired with Norway (social democratic) in the first stage and Australia (liberal) joins them in the second. In the third stage, Sweden and Finland (both social democratic) join the group while conservative countries Italy and

Switzerland join in the fourth. This large cluster, then, does not seem to develop based on regime distinctions, and this remains the case throughout the 25 stages in the clustering process. For chronic and infectious diseases, $eta^2 = .225$. This indicates a somewhat weak correlation between welfare state regime type and the disease measures used here, in contrast to the virtually non-existent relationship between welfare state regimes and adult health measures (where, as discussed above, $eta^2 = .061$).

Further breakdown of the four measures of chronic and infectious disease gives some limited support to the above-noted suggestions that welfare state regimes may have particular impacts. Looking at individual boxplots in appendix 9, it can be seen that years-life-lost to communicable diseases is moderately related to welfare state regime type ($eta^2 = .325$). Social democratic regimes have the lowest rates, and, although there is overlap between conservative and liberal states, liberal states tend to have the highest scores. The distinction between liberal and conservative regimes is largely driven by the high values for the U.S. (PYLL = 10) and the U.K. (PYLL = 9) and the low value for Austria (PYLL = 3). Overall, however, the boxplot illustrates a moderate regime-based pattern.

Potential years of life lost to diabetes also shows a moderate relationship with welfare state regimes ($eta^2 = .346$). Looking at this boxplot in appendix 9, a different pattern is seen than was evident for PYLL due to communicable diseases. Here, conservative states are clearly the lowest while liberal and social democratic states tend to overlap. However, the mean line for social democratic states is much lower than for liberal states. The whiskers in the plot indicate that liberal countries are widely dispersed across the rankings while among social democratic states Denmark draws the average up.

AIDS and tuberculosis incidence show much weaker regime-based connections. For AIDS incidence ($eta^2 = .113$), the U.S. is an extreme outlier, but other than that liberal countries have rates only slightly higher than social democratic countries. Conservative countries have the highest rates. Incidence of tuberculosis also has a limited correlation with regime ($eta^2 = .185$). Once again, the conservative states have the highest rates while social democratic and liberal states are similar to each other. In this regard, Spain is an extreme outlier.

It is important to note that the two individual measures that show moderate correlations with welfare state regime classifications are measures of potential years of life lost (PYLL) (for diabetes and communicable diseases). The two measures that show little correlation with welfare state regimes are incidence measures. These findings suggest the possibility that different regimes provide different kinds of supports for those living with chronic illness or disease, which may alter the burden and impairment to healthy living. These findings also suggest that welfare state regime policies may not strongly impact contraction of infectious diseases.

In general, overall findings of this analysis support the suggestion that welfare state regime policies may impact chronic and infectious diseases, but in less consistent (or maybe more subtle) ways than for child health. These results are consistent with the research reviewed earlier suggesting that there are some underlying regime-based distinctions in chronic and infectious disease management but that important differences exist within regimes as well. At the same time, however, the analysis of population health and welfare states would benefit from more research using measures of somatic disease and health behaviour as well as mental health (Beckfield and Krieger, 2009).

The Reliance on Child Health Measures

The restricted range of health measures used in research pertaining to welfare states and population health remains an issue (Beckfield and Krieger, 2009). Given the fact that commonly used child health measures are strongly associated with welfare state regime classifications while adult health and disease measures are not, some of the conclusions drawn by recent research should be further examined. Besides generating potentially misleading conclusions about the congruence between welfare state regimes and population health, the emphasis on child health measures may also serve to overshadow the impact of adult health measures that have been used. For example, in analysis of infant mortality and life expectancy, Navarro et al. (2006) conclude that there is a "clear, robust, and significant negative correlation" between infant mortality rates and various political and welfare state measures (p.1035). Regarding life expectancy, they found that there was a correlation, but it was weaker than for infant mortality. In concluding the overall analysis, Navarro et al. conclude that the implementation of policies aimed at reducing social inequalities have a "salutary" effect on population health, and that this explains why measures such as infant mortality are better in countries with pro-redistributive policies (p.1037). In other words, the strong correlation found for infant mortality rate precludes further discussion of why life expectancy is only moderately related with welfare policies. In other words, a minor correlation for life expectancy may be seen as a supplement to a strong correlation with child health measures rather than discussed on its own. More focus is needed on the connections (or lack thereof) between welfare state policies and adult health measures in particular. When child health measures and adult health measures are indeed examined in the same

study (typically this has happened only with life expectancy), more focus should be placed on the reasons for why the welfare state correlation is strongest for child health measures.

Zambon et al. (2006) examined adolescent health in 33 countries using self-reported health measures. They found evidence that social democratic and conservative regimes mitigated the negative impact of inequality on health more than liberal regimes (although overall results for other regimes were mixed). This provides some evidence that the health of young people (not just infants and small children) may show regime-based characteristics. Therefore, efforts to expand upon the kinds of population health measures that have been used may benefit from a consideration of life-cycle effects and a relatively specific examination of historical cohort effects. In other words, studying adolescent health may provide a key "missing link" when working to identify why it is that child health measures relate so strongly to welfare state regime types while adult health measures may not. Moreover, adolescents can be seen as the future adult population, as argued by Zambon et al. (2006), and time-series analyses should consider that either the health of future adults will be better than the current generation, or that somehow, policy arrangements have different impacts on different age groups.

Zambon et al.'s (2006) work also highlights that although there are serious considerations when applying self-rated health (Beckfield and Krieger, 2009), it can be a useful addition to the types of measures used in an effort to get beyond the heavy reliance on traditional child health measures, and, as noted earlier, it has been argued that it is a reliable measure for comparative analysis (de Bruin et al., 1996). Eikemo et al.'s (2008) analysis suggests that welfare state regimes may be related to self-reported health among

adults. It is noteworthy, however, that there is likely an age cut-off below which self-reported health is seriously unreliable. In other words, it is unrealistic to expect 5-10 year-olds to accurately assess their overall long-term health. It remains the case, however, that the increased need for focus on adult health measures should be supplemented by self-report health data.

Overall, then, when a wider range of population health measures are included in the analysis (as in the analysis performed here as well as Zambon et al.'s use of adolescent self-report health measures), welfare state regime typologies are only moderately visible at best, bringing into question the relatively strong correlations that have been identified in recent research. Future research must begin from the standpoint that welfare state regimes may not generate specific population health outcomes despite existing conclusions. It seems likely that when a wider range of population health measures is used in examining welfare state regimes, child health is the exception.

Welfare State Regimes, Inequality, and Population Health

As noted earlier, it is important to emphasize that welfare state regime typologies were founded upon the analysis of labour market policies and inequality (Esping-Andersen, 1990; 1999; and for discussions see Olsen, 2002; Korpi, 2000; Korpi and Palme, 1998). Given the literature supporting a connection between poverty, inequality and health (see for example Lynch et al, 2004; 1998; Wilkinson, 1996; Coburn, 2000; Daly et al., 1998), it is rational to suggest that, by influencing inequality and wealth distribution in particular ways, welfare state regime types play a role in shaping population health.

Welfare State Policies and Inequality

Hurrelmann, Rathmann and Richter (2010) illustrate through a review of recent research that there is a relationship between welfare state regimes and various forms of inequality (see Dahl et al., 2006; Fritzell and Lundberg, 2005; Raphael, 2006, Navarro et al., 2006, Coburn, 2004).

Many studies have illustrated that welfare state policies affect health largely by shaping inequality. Navarro and Shi (2001) analyze inequality and population health across OECD countries. They use welfare state regimes as a framework for comparing national population health outcomes. Their framework adds a fourth regime ('ex-facist') to Esping-Andersen's framework. They conclude that full-employment policies (which address economic inequality) in social democratic states were more successful in improving the health of populations.

Olafsdottir (2007) points out that people in different countries experience similar negative life events like job loss, divorce and so on, and that the institutional context shapes the impact of such experiences. For example, examinations comparing several vastly different welfare states (like DiPrete, 2002, who studies the U.S., Germany and Sweden and Olsen, 2002, who studies the U.S., Canada and Sweden) demonstrate that American policy institutions do not mediate the consequences of negative life events to the extent that Sweden's do. Along these lines, Borrell et al (2009) argue that policymakers must go beyond the current paradigm, which holds that the health sector is the main (and in some cases the only) agent responsible for population health. They suggest that actors in all policy areas must become sensitive to their role in affecting health, since most policy areas play a role in shaping social stratification. In this way,

for example, Lundberg et al. (2008) conclude that family policies affect child health while pension rights and policies affect life expectancies. Although many studies use a limited range of welfare state regime measures, findings suggest that welfare state regimes affect health by influencing social and economic equality. This line of reasoning, though, depends on the idea that economic (in)equality has a systematic impact on population health.

Inequality and Population Health

Recent research has demonstrated that at the national level inequality is related to population health (Hurrelmann, Rathmann and Richter, 2010; Bambra, 2005; Coburn 2006; Navarro and Muntaner, 2004; Navarro and Shi, 2001; Ross et al., 2000). Lahelma et al. (2002) analysed the impact of the socioeconomic situations of single and partnered mothers in Finland and the U.K. on their overall health using self-reported health and illness measures. They found that although single mothers report poorer health than other women in both countries, the disadvantaged social position of women in the U.K. had a bigger impact on their poor health. To some extent, this suggests that in social democratic states like Finland, welfare policies may mediate the impact that inequality has on health.

There is some evidence about the impact of inequality on major determinants of health. Barnett, Pearce, and Moon (2005) examine the effects of inequality (in terms of socio-economic status) on smoking. This study looks at changing inequality levels between ethnic groups in New Zealand over time (1981 to 1996) and relates it to smoking rates. The authors conclude that as inequality between as well as within ethnic groups increased, smoking rates increased as well.

Navarro et al. (2006) argue that political factors (political parties in office, etc), shape both the labour market and the welfare state (though they measure the welfare state using only public health expenditure and public health coverage). They then argue that the labour market and welfare state shape economic inequality, which shapes health outcomes. Navarro et al's (2006) conclusion that policies aimed at reducing social inequalities have a positive impact on population health is supported by the cluster analyses performed here to the extent that Navarro et al. used child health measures. Lynch et al. (2004) suggest that there does seem to be some evidence that income inequality is associated with health outcomes for children. Although Lynch et al. (2001) found little association with life expectancy, self-rated health and age- and cause-specific mortality, there was some evidence of an association with infant mortality rates. Macinko, Shi and Starfield (2004) also found a correlation between income inequality and infant mortality rate. This finding that child health may be affected differently than adult health measures is reflected in the findings of this dissertation that child health measures are strongly related to welfare state regime types while adult health measures are not.

It is possible that when only wealthier countries are studied, it is more difficult to detect a cross-national correlation between inequality and health. Lynch et al. (2004) examined 161 countries by comparing GDP/capita to life expectancy. Their analysis suggests that higher GDP/capita is associated with better health, and that the association between the two variables decreases as countries' wealth increases. In other words, there is a 'threshold' above which the correlation weakens so that it is not as apparent when only 'richer' countries are analyzed (p.11). Since the wealthiest countries are

industrialized and because there are important structural reasons for why industrialized countries should be studied in isolation from other countries,[9] a lot of research has focused on the countries where the connection between inequality and poorer health is weakest. Wilkinson (1992) illustrated that the share of total after-tax income that goes to the poorer 70% of people in a country is strongly related to life expectancy at birth, and that yearly increases in income inequality slowed the increase of life expectancy over time. Ram (2006) makes cross-national comparisons between more than 100 countries to fully examine the connection between income inequality and population health, and also concludes that there is indeed a negative cross-country association.

Chung and Muntaner (2006) found no correlation between child health measures (low birthweight, infant mortality and under-5 mortality) and GINI index, and conclude that income inequality itself is not a cause of poor health in populations. But Navarro et al. (2006), using Theil Index to measure income inequality, come to the opposite conclusion. It is possible, therefore, that conclusions differ based on the measures of inequality that are used (for example, Theil Index, GINI Index and GDP per capita) with adult health or chronic disease measures. For this reason, the choice of equality measures, in addition to the choice of health measures, is an important consideration when generating and interpreting findings. The results of the cluster analysis performed here – for example that adult mortality rates as well as HIV and tuberculosis incidences show virtually no correlation with welfare state regime classifications while other illness measures such as PYLL to diabetes, PYLL to communicable diseases and child health do – contribute to the apparent complexity of this issue.

[9] For example, industrialized countries have important infrastructures in place, like controlled water access and cleaning, regulated food supply, and regulated healthcare services.

The lack of research using these types of health measures makes it more difficult to assess the full impact of social inequality on all aspects of population health. It will be important that future work examine various types of adult health measures in relation to each measure of inequality in a systematic way. In other words, if we know that welfare state regime types shape measures such as the Thiel index and the GINI index, research questions should go beyond "does inequality lead to poor health?" to "does the Theil index correlated with health status?" and "does the GINI index correlate with health status?"

Zambon et al. (2006) examined the extent to which stronger redistributive policies weaken the negative impact that socioeconomic status has on health. They do this by analysing self-reported adolescent health in 33 countries, applying an expanded form of Esping-Andersen's welfare state regime typology (as described earlier). By examining welfare state regimes, their goal is to assess the implications of broader social policies for health rather than just health care policies. While Navarro et al. (2006) and others have suggested that political factors (voter turnout, political parties in power, etc) shape both the welfare state and health outcomes, Zambon et al. argue that although the two are closely related, welfare state regimes are a key measure of "continuing social policies and bureaucracies that are resistant to electoral change" and therefore a more direct mechanism through which policies influence population health (2006, p.313).

In their analysis, Zambon et al. (2006) found evidence that social democratic and conservative regimes mitigated the negative impact of inequality on health more than liberal regimes. This provides some (albeit limited) evidence that the correlation between inequality and the health of young people (not just infants and small children) may be

mitigated by welfare state policies. It is important, though, that Zambon et al. did not find a stronger relationship, given the strong correlation between child health and welfare state regimes found in the analysis performed here. This suggests that analyzing different age groups (child, adolescent, adult), types of health measures (official health data and mortality rates, self-report health, etc) and various types of inequality (educational, economic, income) may influence findings regarding the relationship between population health and welfare state regimes. Future work should pay careful attention to such factors when choosing measures and interpreting results. Results of the analysis performed here highlight the importance of such considerations.

The findings of the cluster analyses performed here also raise questions about the ways in which welfare state policies may impact equality within various demographic cohorts, since child health measures are the ones that are strongly associated with welfare state regime classifications. In other words, if inequality shapes population health, do the findings presented here suggest that children, adults, and people with different conditions (diabetes, communicable diseases) are affected in different ways by the type of equality/inequality facilitated by the welfare state surrounding them? It is likely that the ways in which the welfare state's impact on equality affects various aspects of population health and demographics are very complex. This issue is likely compounded by the impact of historical factors that have affected different generations in different ways, as discussed earlier. It is important to focus more directly on the less-used measures of population health (insofar as they focus on a wider range of age groups and demographic characteristics) to weed through this issue.

Hurrelmann, Rathmann and Richter (2010) review existing research on the relationship between welfare state regimes and health inequality within national populations. They found that while welfare state regimes associate with various degrees of social and economic inequality as well as overall population health status, they do not seem to associate with levels of health inequality (a finding echoed by Mackenbach et al., 1997; Dahl et al., 2006; and Lehelma and Lundberg, 2009). Specifically, the divide between the health status of the richest and the poorest is widest in liberal states, moderate in social democratic countries and the smallest in conservative ones (Bambra, 2007; Eikemo et al., 2008; Espelt et al., 2008; Mackenbach et al. 2002). Hurrelmann, Rathmann and Richter (2010) argue based on this that an equal distribution of wealth resulting in a decommodified labour force does not guarantee health equity. This may partly be because, as Hurrelmann, Rathman and Richter (2010) suggest, once wealthy countries fulfil the most basic needs of general populations (for example, housing, water, nutrition, etc), the quality of health may reach a point of diminishing returns. At the same time, however, Hurrelmann, Rathmann and Richter (2010) suggest that as a country's wealth increases, it is mostly those who are already wealthy that have access to additional resources.

This explanation, however, does not consider that social democratic welfare states have the greatest levels of economic equality. This means that when countries get wealthier, such states may be more likely to reduce the size of the population that will have limited access to increasing national resources. That is, while increasing national wealth may not reduce health disparities, different welfare state regimes distribute increased economic resources differently within their populations. It remains important

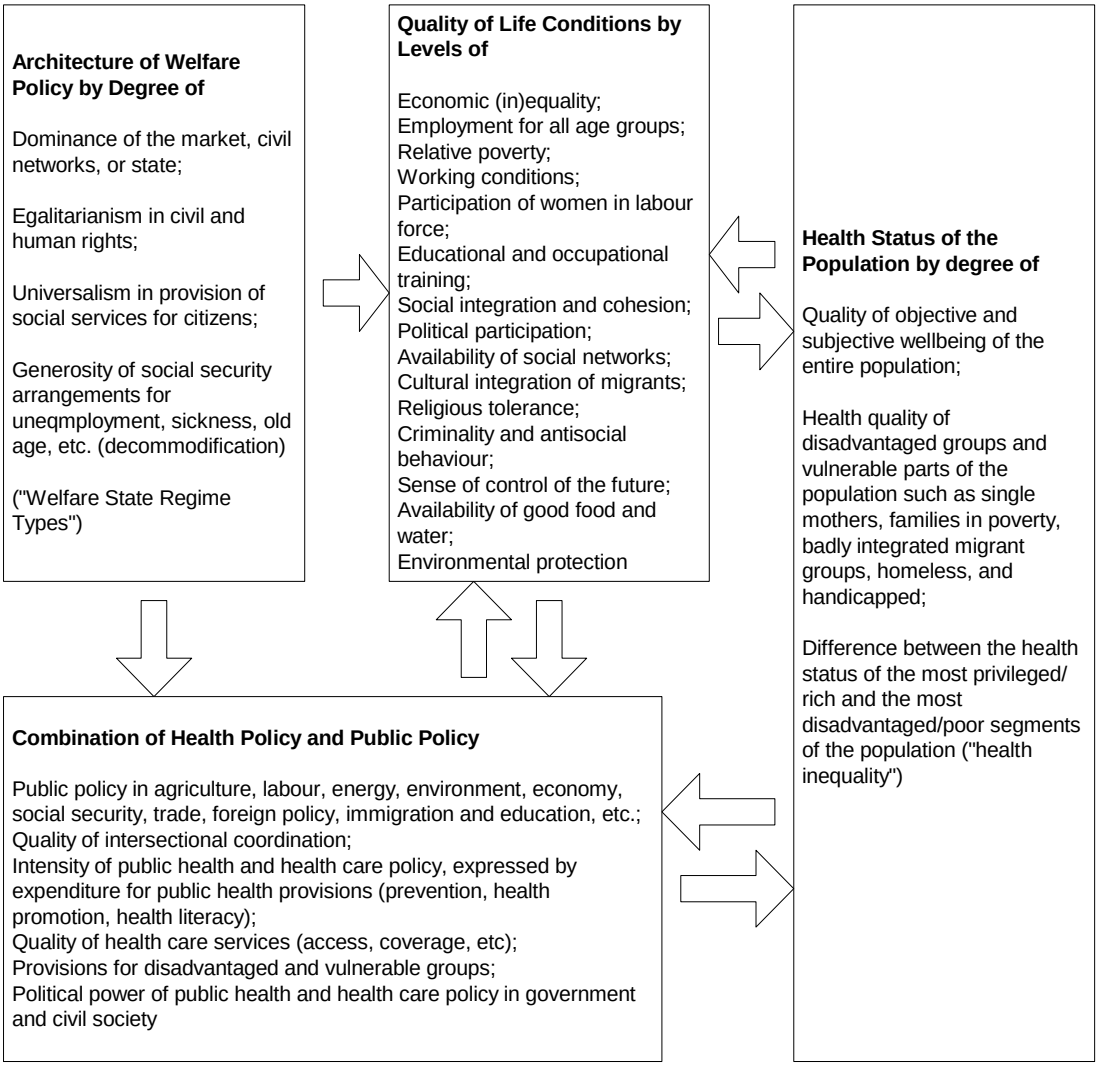
that future work pay attention to why policies that generate greater social and economic equality (i.e. that reduce the size of the population that has little access to additional resources) do not necessarily reduce health disparity across socio-economic groups.

Welfare State Regimes, Quality of Life Conditions and Population Health

Hurrelmann, Rathmann and Richter (2010) present the most comprehensive effort to address the range of mechanisms through which various aspects of welfare state regime policies affect population health, shown below.

This model suggests that welfare state policies affect population health by shaping quality of life and by generating particular health and social policies, which then impact population health. Whether welfare state regimes actually generate parallel health policy structures is discussed in the *Welfare State Regimes and Health Policy* chapter of this dissertation. Here, the issue is regarding the extent to which welfare state regimes correlate with population health – whether that impact occurs directly or not – as this model suggests.

Structural and Political Factors Influencing the Health Status of the Population (Hurrelmann, Rathmann and Richter, 2010).



Although Hurrelmann, Rathmann and Richter's (2010) model is intended to chart out the ways in which welfare state policies affect population health, it is important to note that the "architecture of welfare policy" is not depicted as a dynamic component. In other words, there is no indication that either living conditions or health/public policy might impact upon welfare state policies. Certainly, as Kasza (2002) has pointed out, specific pressures and policy decisions made in specific fields of social policies may in fact drive the nature of the resulting welfare state structure. In other words, such a robust

model can essentially be seen as a model of civil society, and it cannot be assumed that welfare state structures are not shaped by the other components. Following this shortcoming a step further, it is possible that the specific pressures on particular policy areas may affect quality of life conditions by impacting welfare state structure. This is something that cannot be addressed unless the model acknowledges that the architecture of welfare states is not only a cause but also a consequence. To make a more specific example looking at the model, policies making provisions for disadvantaged and vulnerable groups likely affect the dominance of the market and *thereby* the level of economic inequality those groups experience.

As outlined earlier, the findings of the analysis performed in this dissertation indicate that child health seems closely related to welfare state regimes while adult health does not. The analysis of chronic and infectious diseases suggests that there may be a connection with regime type, although it is not nearly as strong as that for child health. If child health (to a great extent) and chronic and infectious diseases (to a lesser extent) correlate with welfare state regime types, there are implications for Hurrelmann, Rathmann and Richter's model.

As discussed in the *Welfare State Regimes and Health Policy* chapter, welfare state regimes do not tend to generate parallel health policy systems. While that aspect of Hurrelmann, Rathmann and Richter's (2010) model is not supported by the analysis in this dissertation, the other main pathway through which Hurrelmann, Rathmann and Richter suggest welfare state regimes shape population health is through quality of life conditions. Their model lists 15 aspects of quality of life through which welfare state regimes may affect population health. The analysis performed in this dissertation allows

for a more specific assessment of the particular aspects of population health that may be impacted by these quality of life facets. In particular, since child health and (to a lesser extent) chronic and infectious diseases reflect welfare state regimes, it is important to assess the extent to which the aspects of quality of life given in the model are indeed likely to be the conduits through which this connection occurs.

Conditions of Living and Population Health

The suggestion in Hurrelmann, Rathmann and Richter's (2010) model that a wide range of life conditions shape health outcomes in general is supported by existing research. Two of the main factors that are often connected with health outcomes are the quality of the social environment and level of social status (Marmot and Wilkinson, 1999). There is good evidence that inequality leads to lower levels of trust, increased violence, and lower social capital (Wilkinson and Pickett, 2005; Wilkinson 2005), and that chronic stress is a major component of lowered health (Brunner and Marmot, 1999; Wilkinson and Pickett, 2005). Low social status has been found to be stressful because it reduces people's control over their lives and work (Marmot, 2004). Wilkinson (2005) argued that it is related to a feeling of being looked down upon by others, which Wilkinson says causes feelings of inferiority that increase stress. It has also been argued to make people feel humiliated and put down, which has been linked to increased violence (Wilkinson, 2004; Gilligan, 1996), a point that connects with criminality and antisocial behaviour, which are listed in Hurrelmann, Rathmann and Richter's model. In fact, a lot of the strongest evidence of an association between inequality and health are studies that examine violence and homicide (Lynch et al, 2004).

Hurrelmann, Rathmann and Richter's model also lists the availability of social networks as important for health. Kawachi (1999) examines the notion of *social capital* and its impact on health status. Social capital is defined and measured as levels of interpersonal trust and norms of reciprocity. In a preliminary analysis, Kawachi concludes that higher 'stocks' of social capital (higher levels of trust and reciprocity) seem to be associated with higher health achievements. Kawachi concludes that increasing social capital within communities can help to reduce health disparities.

Equating neo-liberalism with liberal welfare state approaches, Coburn (2000) argues that neo-liberal (market oriented) social structures affect income inequality and therefore social cohesion, another life condition listed in the model. Coburn suggests that part of the reason for the negative effects of neo-liberalism on health is that it undermines the welfare state, lowering social cohesion and thereby negatively affecting health. Coburn (2000) argues that rather than income inequality producing lowered social cohesion, leading to lowered health status, neo-liberalist welfare state structures produce *both* lowered social cohesion and greater income inequality. Wilkinson (1996) describes the effect of labour market policies on social cohesion through the concept of a 'cash and keys' society. That is, people need cash in order to participate in social transactions and to secure a standard of living, while at the same time we need keys to protect our private possessions from others. Wilkinson (1996) argues that in this context, people become rivals, competitors for jobs, houses, space, and all the way to taken-for-granted daily actions like getting a seat on the bus or parking spaces for our cars. Based on this, Coburn (2000) makes the proposition that the more market-oriented the society, the higher the social fragmentation and the lower the social cohesion. This would seem to

support Hurrelmann, Rathmann and Richter's model in the sense that welfare state policies may affect social cohesion and integration, which in turn may affect health outcomes.

Hurrelmann, Rathmann and Richter's model also gives political participation as a possible factor affecting population health. J. Sundquist, Johansson, Yang, and K. Sundquist (2006) develop a concept of 'linking social capital' and study its relationship with coronary heart disease. 'Neighbourhood linking social capital' was defined to be the proportion of individuals voting in local government elections at the neighbourhood level. This project studied 1,358,932 men and 1,446,747 women in Sweden. The authors concluded that even though Sweden is a 'relatively egalitarian society', individual health is affected by differences in neighbourhoods regarding voter turnout. Neighbourhoods with lower voting turnouts were associated with higher incidence of coronary heart disease. Direct causation was not examined in detail; the focus of this study was on the existence of a connection.

As noted above, however, based on the results of the analyses performed in this dissertation Hurrelmann, Rathmann and Richter's (2010) model can only be supported if the aspects listed for quality of life conditions seem to affect child health and chronic/infectious diseases, since those are the two aspects of population health that cluster in ways that reflect welfare state regimes.

Child Health and Quality of Life

The finding in this dissertation that adult health clusters do not resemble welfare state regime groups casts doubt on the suggestion in Hurrelmann, Rathmann and Richter's (2010) model that welfare state regime types affect overall population health

through their impact on quality of life. However, the fact that child health clusters strongly resemble welfare state regime types indicates that quality of life may have a more direct effect on the health of children than health in general.

In developing an approach to social work, Hernandez, Montana and Clarke (2010) argue that poverty, neighbourhood living conditions, racial and class inequality, and limited access to health care greatly affect the health of children. This supports that idea that some of Hurrelmann, Rathmann and Richter's aspects of quality of life may indeed be conduits through which welfare state regimes shape child health. The aspects of quality of life in the model that seem most directly illustrated in Hernandez, Montana and Clarke's (2010) analysis are economic inequality, employment, relative poverty, working conditions and availability of good food and water.

Olson et al. (2010) examined the correlation between income/inequality and infant health in the U.S. Among their measures were low birth weight and infant mortality rate, both of which were analyzed in this dissertation. Olsen et al. measured income using median family income and proportion of federal poverty levels, and income inequality using GINI coefficients. They found that median family income was negatively correlated with low birth weight ($r = -.295$) and infant mortality rates ($r = -.432$) as well as preterm births ($r = -.481$) and very low birth weight ($r = -.133$), lending support to the suggestion that higher income (an aspect of quality of life) affects child health. Olson et al's analysis using the GINI coefficient found that greater levels of inequality was positively correlated with each child health measure (for low birth weight, $r = .398$; for infant mortality rate, $r = .114$; for very low birth weight, $r = .460$; and for preterm births, $r = .339$). These findings indicate that the connection between welfare

state regime types and child health measures found in this dissertation are indeed likely to occur through the living conditions of the population especially given that welfare state regimes tend to have an important role in generating levels of wealth and inequality (Olsen, 2002).

Participation of women in the labour force, another aspect of living conditions in Hurrelmann, Rathmann and Richter's (2010) model, may also affect child health. As noted above, household income affects child health. For this reason, any social condition that negatively impacts on the employment or income of women (especially those in female-centred single-parent households) is likely to detrimentally affect the well being of children. It has also been argued that gender (in)equality can impact women's mental health (Sianko, 2011), which is likely to impact on the health of their children. Research that directly examines the impact of gender equality on the health of children is scarce. In addition, international research and policy attempting to improve maternal and child health has tended to ignore the role of gender inequality (Horton, 2010; Shaw, 2006).

One of the mechanisms through which welfare state regime structures may affect quality of life conditions for children is through family policies, which are often cast as policies that uniquely affect female labour force participation. Moreover, different welfare state regime types may generate parallel family policy structures (for example, maternity and parental leaves, public childcare and so on) in terms of their impact on gender equality (Korpi, 2000) and class stratification (Pankratz, 2009). Engster and Olofsdotter-Stensota (2011) examine the extent to which "family policy regimes" impact upon child well being. Drawing on Korpi's (2000) typology based on the impact of family-related policies on gender equality, Engster and Olofsdotter-Stensota argue that

family policy systems that provide significant public support to parents, besides reducing gender inequality, improve the welfare of children.

Unlike the case of health policies, family policy structures tend to reflect welfare state regime types. Korpi's (2000) typology of family policy systems is composed of three types: Market-Oriented support, General Family support, and Dual-Earner support. Since Korpi's measures centre largely on the extent to which public support is provided to parents, it is not surprising that these three systems correspond with welfare state regime types – liberal, conservative and social democratic respectively (Pankratz, 2009).

Engster and Olofsdotter-Stensota (2011) examine the connections between these family policy regimes and child welfare (child poverty rate, child under-5 mortality, and educational attainment and achievement). They conclude that child welfare is highest in dual-earner family policy regimes, which provide high levels of paid parenting leaves as well as public daycare. Since these characteristics fall within the traditional public-responsibility underpinnings of social democratic states, Engster and Olofsdotter-Stensota's finding suggests that social democratic welfare states are likely to reduce child under-5 mortality, a finding that is supported by the analysis performed in this dissertation. Engster and Olofsdotter-Stensota suggest that Dual-Earner Support family policy systems (which, it should be emphasized, occur in social democratic countries) sustain children's well being in part by supporting the labour force participation of women. In an indirect way, then, their analysis suggests that different welfare state regimes may contain particular policy structures (like family policies) that affect female labour force participation, thereby impacting the health of children. More work is needed focusing on the direct impact of female labour force participation on child health, but it is

clearly conceivable that this is an important condition of living to consider when evaluating Hurrelmann, Rathmann and Richter's (2010) model.

The availability of good food and water is a key factor underlying child health. Hendrie, Coveney and Cox (2011) show that in addition to physical activity, the food environment created by a child's caregivers may be instrumental to childhood obesity. In a review of 375 relevant quantitative studies, Cislak et al. (2011) conclude that when good food and water are available, family behaviours surrounding children significantly influences their eating habits. In other words, it may not simply be that the availability of good food and water to a population as a whole affect child health, but also the extent to which good food is made available to individual children by their households and caregivers. As is suggested in Hurrelmann, Rathmann and Richter's (2010) model, welfare state policies may influence the availability of good nutrition to children. For example, Bartfeld and Ahn (2011) demonstrate the importance of public school breakfast programs for elementary school children to fortify the food security of low-income households. In addition, low-income households in Canada are less likely to access dietary supplements to address nutritional shortfalls (Vatanparast, Adolphe and Whiting (2010). In complex ways, then, the availability of good food and water (not surprisingly) is an important condition of life that affects the health of children.

Other aspects of quality of life conditions listed in Hurrelmann, Rathmann and Richter's (2010) model are also potentially linked with child health. For example, the cultural integration of migrants can play a very direct role in the delivery of health services to children who are ill. Gulati et al. (2011) illustrate how language and other

communication barriers often exist between Asian parents with sick children and healthcare providers in Canada.

It is important to note that the connection between welfare state policies and child health may be a dynamic relationship. Within the countries examined in the analysis performed here, there tends to be a greater acceptance of social policies that directly control children's lives as opposed to policies that control adults. Legal drinking, smoking, and voting ages are good examples of this. Child and family welfare programs as well as legal systems are often designed to protect children, who are seen as a vulnerable population. For this reason, health trends among children may spur policy changes. In Canada, the national AUTO21 project is aiming to generate legislation requiring the use of booster seats for children up to the age of 9 in Manitoba, a policy effort that is responding to the number of children sustaining serious injuries in auto crashes that are avoidable.[10]

Given the finding in this dissertation that child health outcomes reflect welfare state regime membership and the evidence that many of Hurrelmann, Rathmann and Richter's (2010) indicators of life conditions impact child health, it is likely that welfare state policies do indeed shape child health by influencing the conditions of life for their populations, and that child health may also affect welfare state policies.

Chronic and Infectious Diseases and Quality of Life

The finding in this analysis that chronic and infectious disease cluster do, albeit to a slightly limited degree, reflect welfare state regime groupings suggests that, according to Hurrelmann, Rathmann and Richter's (2010) model, such diseases may be connected

[10] This is a project with which I am involved. Published results are forthcoming and policy implications are yet to take shape.

with quality of life. An emerging field of "life course epidemiology" is an example of research that has validated and illustrated many ways in which social integration, interaction, cohesion and networks affect chronic and infectious diseases (Kuh, Ben-Shlomo and Susser, 2004). For example, Elford and Ben-Shlomo (2004) suggest that geographic migration can affect the probability of cardiovascular disease when people move from more relaxed social settings to other kinds of societies (low- to high-blood-pressure communities).

Economic (in)equality, which is listed as an important life condition in Hurrelmann, Rathmann and Richter's (2010) model, may also play a role in chronic diseases. For example, it has been suggested that diabetes may be partly due to nutritional deficiencies in young children (Forouhi, Hall, and McKeigue, 2004), something that may be associated with poverty.

A key aspect of quality of life conditions given in Hurrelmann, Rathmann and Richter's model is the availability of good food and water, which can also have an impact on illness and disease. The availability of good food and water in wealthier countries (as those analyzed in this dissertation) is not based directly on a lack of developed infrastructure to deliver. Rather, social class and other economic arrangements may affect access to nutrition. For example, in Canada poverty is associated with obesity largely because of the easy availability of relatively cheap fatty foods and lack of guidance (Alvaro et al., 2011). The connection between poverty and obesity has also been demonstrated in comparative analyses of industrialized countries (for example, Phipps et al., 2006). On the one hand, obesity is a health outcome insofar as it affects how an individual feels physically, mentally and emotionally. However, obesity also

increases the risk of the development of other chronic illnesses, such as diabetes, hypertension and cardiovascular disease (Mikirova et al., 2011). Mikirova et al. (2011) found that a low-fat diet with nutritional supplementation greatly reduced not only unhealthy body weight but also many of the known physiological mechanisms through which chronic diseases occur (for example, the level of lipoproteins that increase cardiovascular risk factors).

Communicable diseases are also likely connected with some of Hurrelmann, Rathmann and Richter's (2010) conditions of living. For example, deviant and anti-social behaviour can lead to incarceration, which has a considerable effect on the spread of STI, STDs and HIV among inmates (Khan et al., 2011; Peate, 2011). In addition, this may be related to welfare state regime type since liberal welfare states tend to have higher incarceration rates. Diseases like HIV are also spread through social networks among drug users (Gwizdala, 2011), and within networks associated with alcohol-serving establishments (Kalichman, 2010). Gender inequality, another condition of living in the model, can also influence the contraction of HIV and other STIs depending on the distribution of power within relationships (Bermudez et al., 2010). Finally, poverty and low-quality and/or unstable housing increase the risk among children and adults of HIV and tuberculosis (Kerker et al., 2011).

The finding of the analysis performed in this dissertation that potential years of life lost due to diabetes and communicable diseases do show some connection with welfare state regime types, along with the evidence that some of Hurrelmann, Rathmann and Richter's (2010) aspects of life conditions may affect disease, provide support for the model's suggestion that welfare state policies may affect health by influencing the

conditions of life of their populations. At the same time, however, it will be important to further examine the reasons for why incidence rates (like those for HIV and tuberculosis) do not seem to associate with welfare state regime types while potential years of life lost do. As noted earlier, this could be because welfare state policies have an impact on the long-term outcomes of disease more than on the extent to which the diseases spread in the first place.

Conclusion: Welfare State Regimes and Population Health

The findings of the cluster analyses performed here using population health measures suggest that the connections between welfare state policy approaches and population health outcomes become much more complex when additional aspects of population health are examined. The examination of the role of inequality as a mediating factor should include specific analyses of the relationship between various types of inequality and specific aspects of population health. For example, in what ways does inequality shape the impact of diabetes at the national level? Existing research has examined this within countries, but to further the line of research taken in this paper, specific analyses should be conducted using Theil index, GINI index and PYLL as well as chronic impacts of diabetes so that welfare state regimes can be compared. This kind of work should be conducted for each measure used in this analysis as well as other health measures such as self-report adolescent and adult health. In the long run, this will provide a much better picture of the complex connections between welfare state policies and overall population health.

The model presented by Hurrelmann, Rathmann and Richter (2010) provides a clear framework to guide the specific aspects of social life and policy that should be

further explored. The findings of this dissertation make some important steps in that direction.

Chapter Five: Health Policy and Welfare State Regimes: Do Health Policies Cluster into Groups Resembling Welfare State Regimes?

While many studies suggest that it may be policies and factors other than just health-specific policies that shape population health outcomes (for example, Navarro et al., 2006; Chung and Muntaner, 2006; 2007; Saint-Arnaud and Bernard, 2003, Judge et al., 1998), there is a shortage of studies that focus specifically on the connections between health-specific policies and welfare state regime types. Individual studies have not examined a full range of health policy measures in isolation from measures of other policy areas and/or have used a very limited number of health policy measures (for example, Judge et al., 1998; Muntaner et al., 2002; Conley and Springer, 2001; Saint-Arnaud and Bernard, 2003; Macinko, Shi and Starfield, 2004; Bambra, 2005; Navarro et al., 2006; Navarro et al., 2003; Chung and Muntaner, 2006). Historically, the under representation of health-specific policy measures in welfare state regimes discourse is due to the fact that health policies constitute a service-heavy policy field while much welfare state regime work has addressed more quantitative measures, especially cash benefits (Olsen, 2002; Bambra, 2005).

Kangas examined several aspects of health insurance schemes (1994) and sickness allowance schemes (2004) and illustrated that Esping-Andersen's (1990) regimes typology is important for understanding national variation in these policies, although these aspects of health policies are limited and difficult to generalize as constituting a health policy approach. Regardless of the limitations, Kangas (1994; 2004) present findings suggesting that health policies reflect welfare state regime configurations.

Hurrelmann, Rathmann and Richter (2010) argue that the type of welfare state sets the stage for aspects of public as well as health policies. They develop a model that suggests overall policy structures affect health in two ways: indirectly by influencing living conditions and, secondly, directly by shaping the institutions and organizations that are responsible for the health of the population. This aspect of their model is based largely on the intuitive connection between health policies and welfare state regimes, and they call for future work that attempts to verify such connections.

Padamsee (2008) argues that despite the range of health-related outcomes associated with the welfare state, welfare state theories have not fully demonstrated an ability to account for health policy structures. Padamsee uses data collected through interviews with policy makers and advocates, policy documents, and media reports about policy developments to compare the policy responses to the challenges posed by HIV/AIDS in the United States and United Kingdom. Acknowledging that the U.S. and U.K. are both liberal welfare states, Padamsee attempts to explain why the two countries have responded to HIV/AIDS in much different ways. In this way, Padamsee identifies four factors that shape policy responses to HIV/AIDS. Each of the four suggests potential reasons for why health-specific policies may not be associated with specific welfare state types. For example, Padamsee points to the impact of public discourse about HIV/AIDS, the people who are affected by it, and perceptions of the structure and purpose of the national health care system. In this sense, public perception and social ideology may play an important part in the development of health policies.

The other three policy-shaping factors identified by Padamsee (2008) are more directly a part of the policy development system. The first is that policies are developed

within distinct health-related institutions. Although the policies these institutions generate become a part of a country's overall welfare state structure, specific pressures and demands at the institutional level may drive particular responses independently of policies created by institutions in other policy areas. The second more direct policy-making influence comes from the political mobilization of interest groups, stakeholders and groups affected by HIV/AIDS. The degree of power possessed by various groups may differ based on many micro-level social factors in particular times and places. The final policy-making influence identified by Padamsee is the interaction and relationships between political actors and policy makers. This final point seems to highlight the face-to-face interactions that underlie policy decisions, something that can be affected by factors other than overall welfare state regime directions.

It is noteworthy, however, that Padamsee (2008) compared policy responses to HIV/AIDS in the U.S. and the U.K. Although both of these countries are often classified as liberal welfare states, the U.K. is usually demonstrated to be unique among liberal countries, and its National Health Service is clearly very distinct from the U.S.'s health system. Therefore, it is likely that the different policy responses to HIV/AIDS in the two countries are also influenced by each country's overall welfare state orientation. Finally, given the often-noted exceptional case of U.S. welfare state policies, an examination using other liberal states like Canada and Australia would be useful to further assess Padamsee's conclusions, as would examination of health-specific policies other than those directly responding to HIV/AIDS.

Xu Ke Tom (2006) uses five measures of health policy (physicians/1000 pop; hospital beds/1000 population; % people without health insurance; per capita medical

expenditure; public health expenditure as % of GDP) along with survey-based health achievement measures in an examination of state-level variations in health service delivery within the U.S. Based on the significant state-state variations in health service delivery, Xu Ke Tom's analysis suggests that welfare state regimes may not constitute cohesive health policy systems across within-country geographic and political regions. This finding brings into question the assumption that welfare state regimes are cohesive, overall systems containing health policies that are singularly reflective of a country's regime type. This is an issue for Canada as well, where much healthcare delivery and policy is controlled at the provincial level. Future work should examine specifically how provincial variation affects the extent to which Canada's health care system is consistent with an overall regime approach.

Kasza (2002) argues that welfare state policies tend to develop in different fields (for example, labour market policies, family policies and health policies), and that different factors and pressures exist relating to each. This idea is consistent with conclusions drawn in social policy work before Esping-Andersen's regimes typology was published in 1990 (for example, the idea that the Canadian welfare state developed in a fragmented and incremental way, as found by Cairns and Williams, 1985). Because of this, Kasza argues, few welfare states actually exhibit the degree of internal consistency insinuated by welfare state regimes classifications. For this reason, Kasza suggests that the welfare state regimes concept may not be a useful tool for comparative analysis. It would be more useful, Kasza suggests, to study individual policy areas in relative isolation. This would help identify potentially more meaningful typologies based on individual policy areas – for example, health policy regimes or family policy regimes.

Although welfare state regime proponents suggest that there is no pure case of any one regime, there remains nevertheless the idea that in general, there is a consistency across major policy areas. Kasza (2002) further questions the idea that welfare state policies within each regime are driven by a general set of principles or values, whether political, religious or secular. Regimes may therefore be identified based on what "makes sense" (Kasza, 2002, p. 272). It is indeed possible, as Kasza seems to suggest, that regime identification is based on prior assumptions about the characteristics that should be found in particular regime types. For example, we may examine a service structure observed in a social democratic state from the standpoint that the structure somehow emerged from within an overall social democratic ideology. In other words, the question may be "how did this structure develop within a social democratic state?" rather than "how did this structure develop?" Overall welfare state structure may be useful for such work, but Kasza argues that the tendency to rely on one policy's structure in order to understand another policy area has become too great.

Kasza (2002) argues that what we should actually expect from such expansive welfare states is a more contradictory and disjointed set of policies that do not constitute a coherent totality that necessarily makes sense. Kasza discusses several main reasons for this argument.

First, welfare policymaking is cumulative in nature. That is, policies in various fields are built in response to current historical contexts and issues. Rather than abandoning existing policies, the policies are amended and transformed to respond to current concerns. This is evident in recent challenges to existing healthcare policies in the U.S. Recently proposed changes, which respond to the health concerns of an aging

population and a growing inability of individuals to afford private insurance, do not attempt to abandon the current private insurance-based system. Rather, they modify rules to increase individuals' access to existing private coverage. Although this instance is very recent and long-term results are difficult to predict (this issue will be discussed later in this dissertation), it can be used to illustrate Kasza's point. Namely, this more "public responsibility" approach[11], even if successful, will not result in a policy that is likely to be identified by existing welfare state regime methodology as social democratic. Rather, the emerging structure will be one that actually expands access to an existing system, in this case growing the reliance on private provision. In this instance, then, a public-responsibility policy orientation may lead to a policy structure that is fundamentally incompatible with that mentality as measured within welfare state regimes research. Kasza (2002) illustrates this point by citing examples of the long-term development of pension policies in countries including Sweden, Norway, Germany, Nigeria and India. Because of this, the policies we see today (or at any point in time) are the cumulative result of successive amendments. Further, existing policy structures are based on periodic responses to particular past concerns, demands, and historical circumstances that may not parallel (or even resemble) current conditions.

Kasza (2002) points out that this cumulative development of policy structures is necessitated by the fact that governments cannot annul and existing policy to replace it with another without risking serious protest and eventual loss of power. Moreover, it is impractical to void major policies because of their widespread impact on many segments

[11] In debates leading up to the U.S. Presidential election, Barak Obama stated that his policy revisions were based on the idea that every American has the right to the same health coverage that he himself has as a government official. In this sense, proposed changes can be argued to be based on a sense of public responsibility for the health of a population.

of the population. In this way, Kasza actually suggests that welfare states, by nature, cannot develop in the ways insinuated by much of the regimes literature.

A second reason suggested by Kasza (2002) for why we should expect a more contradictory and disjointed set of policies from expansive welfare states is that welfare state policy areas are likely to have different histories. In other words, Kasza argues that governments don't make substantial modifications to every policy area (health, pensions, family, labour market, etc) at the same time. Kasza illustrates how, across a number of countries, the adoption of health, unemployment and pension insurance was separated by an average time span of almost 24 years. In that amount of time, Kasza argues, political motivation and interests can change considerably, suggesting that these policy areas could not have occurred within a specific social policy approach.

It is worth noting, however, that welfare state regime policy approaches may have a sort of "historical momentum". For example, policy changes made today may be influenced by the policies put in place decades ago. Existing policy conditions help to shape the range of solutions that seem possible to populations and political leaders. In a country that has had public pension insurance for several decades, for example, current concerns about health will spawn a set of legitimized potential responses that is likely to include the possibility of applying public insurance to healthcare. If there were no long-standing public pension policy, it might be more difficult to envision such a policy response, since the concept would have to be built from the ground up. For example, had there been a long-standing public daycare system in the U.S., more public-oriented healthcare solutions may have seemed legitimate and feasible.

Kasza (2002) also points out that policy actors vary by policy field. At the same time, pressure groups tend to aim at particular policy fields that they see as relevant to their objectives (for example, the CMA directs most of its efforts toward policy actors dealing with the health field). This means that different policy areas face different types (and strengths) of pressure, which may be pushing in different ideological directions. Additionally, human actors within each policy field are trained and commissioned to shape their specific policy area, often regardless of specific changes occurring in other fields. These ideas are also supported by work in the public policy field (for example, Pross, 1992; Howlett et al., 2009).

For Kasza, this suggests that welfare states are unlikely to develop in a coherent, universal manner. The existence of provincial and territorial governments also supports this notion. In Canada, much health policy is enacted at the provincial rather than federal level. For this reason, within-country variation in policy application weakens the argument that national welfare states are cohesive and based on a unified ideology. Family and health policies in Quebec are considerably different than those in Alberta.

It is important to note, however, that proponents of welfare state regimes typologies do not argue that there are no within-country differences. Canada's health insurance system is still ultimately legislated at the federal level. For example, provinces control specific administration and regulation, but must conform to general federal directives and legislation (most notably the Canada Health Act). Within this framework, provinces have some degree of flexibility (for example, they can set the extent of public prescription drug coverage), which has generated important variation within Canada. In

other words, not only is there within-country variation across different policy fields, but variation can exist within the health field in particular.

The issue of within-country variation can complicate the ways in which welfare state regime membership is measured. For example, Canada has a significant degree of publicly-funded healthcare, but considerably less access to substantial publicly-funded childcare. In other words, as Kasza (2002) suggests, different policy fields may exhibit characteristics of different welfare state approaches, and, according to Kasza, "range from generous to miserly" (2002, p.278).

Beyond the fact that individual actors differ across policy fields, different policy-making processes also exist. Kasza points to Campbell (1992), who outlined several general policymaking processes. In some areas, for example, policies may be based on bureaucratic experts, who identify and seek to solve problems through policy changes. Or, policy may be shaped by governments in response to competition between interest groups over social issues. Campbell (1992) also suggests that there may be periods of rapid policymaking that may occur during election run-up. It may not be the case, as Kasza (2002) argues, that specific policy fields have particular policy processes in the long run (for example, that the family policy field uses one process while the health field consistently uses another process). However, it is likely that the existence of various policy-making processes adds an element of randomness to the policy structures that result.

A final main concern raised by Kasza (2002) pertains to the impact of foreign policy models. Often, when larger-scale policy strategies are envisioned and developed, models employed in other countries may be consulted. Kasza argues that although a

country may develop policies based only on preconceived notions about what will work, the appeal of foreign models is precisely that they differ from local practice. In this way, Kasza suggests that a country may develop policies resembling those generated in a different place, based on different social factors and pressures.

Although Kasza acknowledges that policymakers may choose to learn from only foreign models that are congruent with their own notions about what is right, he seems to overstate the extent to which a country will look to policy models that are based on different social ideologies. In Canada, as other liberal welfare states, popular ideology in general prioritizes the importance of private responsibility for personal welfare. It is most common for members of the Canadian public to look inordinately toward the U.S. for policy ideas, especially where they feel that Canada's "public" approach to healthcare is lacking. A growing body of research examines healthcare systems across a wide range of countries. However, much of the research in the applied health field that compares only a handful of national healthcare systems (and thus examines each in greater detail) tends to study Canada's system along with those in other liberal countries (for examples, Cheng et al, 2011; Adams and Nelson, 2009; Cacace and Schmid, 2008). When such studies do examine social-democratic and/or conservative welfare states, liberal states are almost always included in the analysis as well (see, for examples, Clarfield et al, 2001; Chambers et al., 2009; Legler et al., 2007; Ham, 2008).

This is partly due to practical issues: the more similar systems are, the easier it is to apply imported ideas. Other reasons, however, may not be based solely on issues of practicality. It may not be that we look to other policy models because they are different, but because they are different *within a particular social policy ideology* – in this

example, private responsibility for welfare. Regardless of evidence surrounding the outcomes of social democratic healthcare systems, much of the American public and leadership would resist such policy structures as representing a 'slippery slope' toward communism.

At the same time, popular conceptions about the American healthcare system, which tend to de-emphasize its negative side, may affect public opinion in Canada. The popular belief that Canada has a robust public healthcare system in the first place may discourage looking at public healthcare systems for solutions. In other words, if we have a public system already, improvements must draw from the opposite: privatization. This is especially the case since the Canadian population in general tends to stress private responsibility for welfare, both ideologically as well as in other policy fields. In this way, the popular social ideology, which tends to differ across welfare state regime types (Olsen, 2002), may actually solidify regime-based policy differences in some ways.

Overall, however, Kasza's (2002) work rightly questions some of the basic assumptions within welfare state regime discourse. Kasza suggests that a good way to address these issues would be to place greater emphasis on the comparison of particular policy fields. This, according to Kasza, would reduce the number of factors at play, and could potentially lead to the development of more reliable typologies within particular policy areas (for example pension regimes, healthcare regimes, etc). The analysis performed in this dissertation helps to address this issue by focusing on policies and outcomes within the health field in particular.

The findings of this analysis cast doubt on the extent to which health policy structures can be predicted based on welfare state regimes. This analysis suggests that

welfare state regimes do not produce parallel, regime-based health policy structures. Specific results of the overall analysis of health policy measures are given in appendix 1. The proximity matrix (also known as a dissimilarity matrix) shows the squared-Euclidean distances between each of the cases as calculated for the cluster analysis. Since data in the analysis is standardized using Z-scores, the unit used in the matrix is the number of standard deviation units between cases across each of the three composite measures entered in the analysis. Higher values represent greater distances. A squared-Euclidean distance plot is given on the next page of the appendix. This plots the cases based on the distances represented in the proximity matrix. This plot is intended to give a visual representation of the initial distances between cases, and is therefore two-dimensional. A limitation of using only two dimensions, however, is that it restricts the locations at which cases can be plotted and therefore distances do not always perfectly represent the distances in the matrix. Adding more dimensions to the plot would facilitate greater accuracy, but would reduce the plot's effectiveness as a simple visual representation. In general, the squared-Euclidean distance plot allows for a visual assessment of the relative locations of members of each welfare state regime type. Cases in the plot are labelled by case number, and case numbers for each country can be seen in the left column of the proximity matrix table on the previous page.

Looking at the matrix and the distance plot, it can be seen that when the three composite measures of health system outputs are analysed, welfare state regime types do not cluster together. Liberal countries (cases 1, 4, 11, 16 and 17) are distributed across the plot. Social democratic countries (cases 5, 6, 12 and 14) are also distant from one another, as are the conservative countries.

The next page of appendix 1 shows the squared-Euclidean distance clustering dendrogram for this analysis. It is also evident here that welfare state regimes do not cluster together. Belgium, Italy and Austria, all conservative states, do cluster closely together, as they are combined in the first stage and remain a separate group until the 12th stage. Switzerland, the Netherlands and France, which are conservative, are grouped with the UK, New Zealand (liberal) and Denmark (social democratic) by the fifth stage. By the seventh stage, they are grouped with Sweden (social democratic), Canada and Australia (liberal). Germany (conservative) and Norway (social democratic) are combined in the first stage while Finland (social democratic) is combined with Spain (conservative) after only three stages.

The following page of appendix 1 shows the dendrogram replicated using Euclidean (rather than squared-Euclidean) distance. As discussed earlier, Euclidean distance requires a greater number of stages in order to separate cases into groups. It can be seen that this Euclidean distance replication confirms the fact that clusters do not resemble welfare state regime groupings. Finally, Eta^2, is used to summarize the relationship between health policy and welfare state regime is .057, a very weak correlation.

It is clear, then, that when the three composite measures of health system outputs created here (expenditure/cost of healthcare, healthcare resources, and coverage) are analyzed, welfare state regime groupings are not evident. The specific implications of this finding for existing theory are discussed later in this chapter.

Expenditure/Cost Measures

The assessment of healthcare costs and expenditure is extremely complex (see for examples Anderson et al., 2011; Pickard et al., 2007; Kapur et al., 2000; Caley and Sidhu, 2011; van Baal et al., 2011; and Levy et al., 2010), and the potential links between various aspects of health expenditures and welfare state regimes cannot be fully examined within this dissertation. Of central importance here is the extent to which overall measures of healthcare expenditures in particular generate clusters that resemble welfare state regimes.

An important consideration is that expenditure on healthcare is often cost-driven (Owens et al., 2011; Brown et al., 2010). This confounds the assumption that greater expenditure on health and healthcare is indicative of national priorities. For example, of the countries in this analysis, the U.S. spends the most on healthcare per capita, but this is not necessarily because the state places a priority on providing care to the population and improving population health. Rather, various economic factors and market pressures have driven costs upward (Kaufman, 2011; Creer, 2009).

In this way, expenditure on healthcare may not capture the *intent* of health policies. But even though expenditure levels may not indicate the intent of the healthcare policies that generate them, they are the result of particular ways of structuring health systems. In other words, different levels of expenditure still reflect the structure of health policies, either because of different policy priorities or because of the impact policy structure has on the cost of care – by either containing costs or facilitating cost escalation.

Full results of this analysis can be found in appendix 6. Looking at the proximity matrix and squared-Euclidean distance plot, it can again be seen that the US (case 17) is

distant from the other countries. Switzerland (case 15) and Germany (case 8) are also relatively distant from most countries. There is some minor degree of apparent clustering among the liberal states other than the US, as Canada (case 4), Australia (case 1), New Zealand (case 11) and the UK (case 16) are located relatively closely together between members of other regimes. Finland (case 6) is located a good distance from the other social democratic countries, and conservative states are distributed around the plot.

The squared-Euclidean distance dendrogram shows that the social democratic countries do not cluster together. Denmark and Norway combine in the second stage, while Sweden and Finland combine in the fourth. However, these two pairs do not combine until the seventh stage, the point at which all countries are clustered together other than the US. Conservative states are also distributed across the clusters. Among liberal countries other than the US, Australia and Canada pair up in the first stage but do not combine with New Zealand and the UK until the seventh stage. The Euclidean distance replication dendrogram confirms these results, with welfare state regime types remaining divided for most of the clustering process.

Looking at the box plots for each of the expenditure/cost measures in appendix 9, it can be seen that per capita total expenditure on health and public expenditure on health as a percent of GDP do not correlate with welfare state regime types. This is visually clear in each plot, and eta^2 correlations are also very low for both (eta^2 = .039 and .042 respectively). There are, however, mild correlations between welfare state regime type and public health expenditure as a percent of total health expenditure (eta^2 = .202) and as a percent of total public expenditure (eta^2 = .313). This presents some limited evidence suggesting that welfare state regime policy orientations may influence health spending

patterns. Public health expenditure as a proportion of total health expenditure, that is, the extent to which health spending is public, is highest among social democratic states. This is congruent with the general idea that these states emphasize public responsibility for social welfare. Public health expenditure as a proportion of total public expenditure is highest among liberal welfare states. This may be partly because these states have lower overall public expenditure. Overall, however, the analysis performed here does not support the argument that welfare state regime types systematically generate parallel healthcare costs and spending patterns.

Healthcare Coverage Measures

Specific results of these analyses can be found in appendix 7. Looking at the proximity matrix and squared-Euclidean distance plot, it can be seen that distances are plotted in a relatively linear way. Major exceptions are Netherlands (case 10) and Germany (case 8) and the United States (case 17), which is extremely distant from all of the other countries. The four social democratic countries do cluster, as they are all located within the crowded-looking group of cases in the upper end of the plot. A series of conservative countries (Belgium, Italy, Austria, Switzerland and France) are together in the bottom-left part of the plot. However, in general, conservative states are distributed across the plot. Liberal countries Australia (case 1) and Canada (case 4) are within the crowded group in the upper part of the plot, while the UK (case 16) and New Zealand (case 11) are located extremely close to France (case 7). This indicates that liberal countries are again divided.

The squared-Euclidean dendrogram illustrates that welfare state regimes do not tend to cluster together, although there are some indications of congruity. In the first

stage, the relatively large "crowded" points on the distance plot are combined. This cluster includes representatives of each welfare state regime. Of the eight countries in this cluster, there are two liberal countries (Canada and Australia) and two conservative countries (Spain and Germany). Another conservative country, Netherlands, joins this cluster in the third stage. Notable, however, is that all four social democratic countries are within the group. This suggests that based on healthcare coverage measures, social democratic countries do cluster together. Liberal and conservative countries, on the other hand, are distributed across the clustering process. There is, however, a 'sub-cluster' of conservative states that also emerges at the first stage, including Belgium, Italy, Austria and Switzerland. Another conservative country, France, joins the group at the second stage (along with liberal countries UK and New Zealand). Overall, however, conservative countries are divided across the emerging clusters.

The Euclidean distance replication dendrogram allows for slightly more insight into the composition of the large eight-country cluster. Within this group, Finland (social democratic) and Spain (conservative) remain as a separate pair until the second stage, while Germany (conservative) remains autonomous until the fifth stage. Germany and Netherlands (conservative), which remains separate until the ninth stage, may not be considered a part of this larger cluster. In the replication dendrogram, no conservative countries are included within this group in the first stage. This dendrogram supports the finding that conservative and liberal countries do not cluster together while social democratic ones do. Overall congruence with welfare state regime groupings, however, remains weak.

Looking at the specific box plots for the two coverage measures in Appendix 9, it can be seen that the proportion of the population with public healthcare coverage has little variation. The major exception is the U.S., where only 25% of the population is covered, and a lesser exception is Netherlands, where about 76% have public coverage. Looking at the box plot for immunization measures, conservative states have a wide range of immunization rates. Social democratic states all have high rates, while liberal states also show a degree of variation. That social democratic states have the highest immunization rates may reflect their focus on universal public health services and prevention. Conservative states, however, are varied with regard to popular thinking around immunization and they generally do not enforce it. There is a moderate correlation between immunization rates and regime type ($eta^2 = .288$), and there is a suggestion in the box plot that social democratic states somehow encourage immunization.

Overall, however, it is likely that at the ground level, health coverage works in conjunction with policies surrounding *access* to care, which may not correlate with welfare state regime types. This is an issue that will be discussed in more detail later in this dissertation.

Healthcare Resource Measures

Specific results of this analysis can be found in Appendix 8. Looking at the squared-Euclidean distance plot, it can be seen that the liberal countries (cases 1, 4, 11, 16 and 17), while not extremely close to one another, are each fairly separate from the main group of countries. Germany (case 8) is also distant from the other countries. The

four social democratic countries (cases 5, 6, 12, and 14) are relatively close together but are closely mixed with conservative countries.

The squared-Euclidean distance dendrogram shows that the social democratic countries, while they combine at the fifth stage, remain initially separate and connected with conservative states. Conservative states are distributed across the figure and do not apparently cluster together. Although they are not located extremely close together, four liberal countries (UK, US, Australia and Canada) do cluster together in the ninth stage and then remain an autonomous cluster until the 17th. New Zealand, however, remains separate from the other liberal countries until the 25th stage. This relatively mild grouping of liberal states is the only suggestion of regime clustering found in this analysis; clustering along welfare state regime lines is not apparent when measures of healthcare resources are analysed. The Euclidean distance replication dendrogram supports these conclusions.

When we look at the individual measures of healthcare resources (box plots in appendix 9) of healthcare resource measures, it can be seen that density of acute care beds and acute care staff per bed are mildly correlated with welfare state regime type (eta^2 = .216 and .285 respectively). For acute care staff per bed, there is a wide range among liberal states. Conservative states tend to have the lowest but there is a lot of overlap between regimes. The box plot for acute care bed density also shows little evidence of welfare state regime influence. Germany (conservative) and New Zealand (liberal) have unusually high bed densities, but liberal and conservative regimes overlap. Social democratic states have the lowest acute care bed densities and are mildly distinct from the other two regime types in this way.

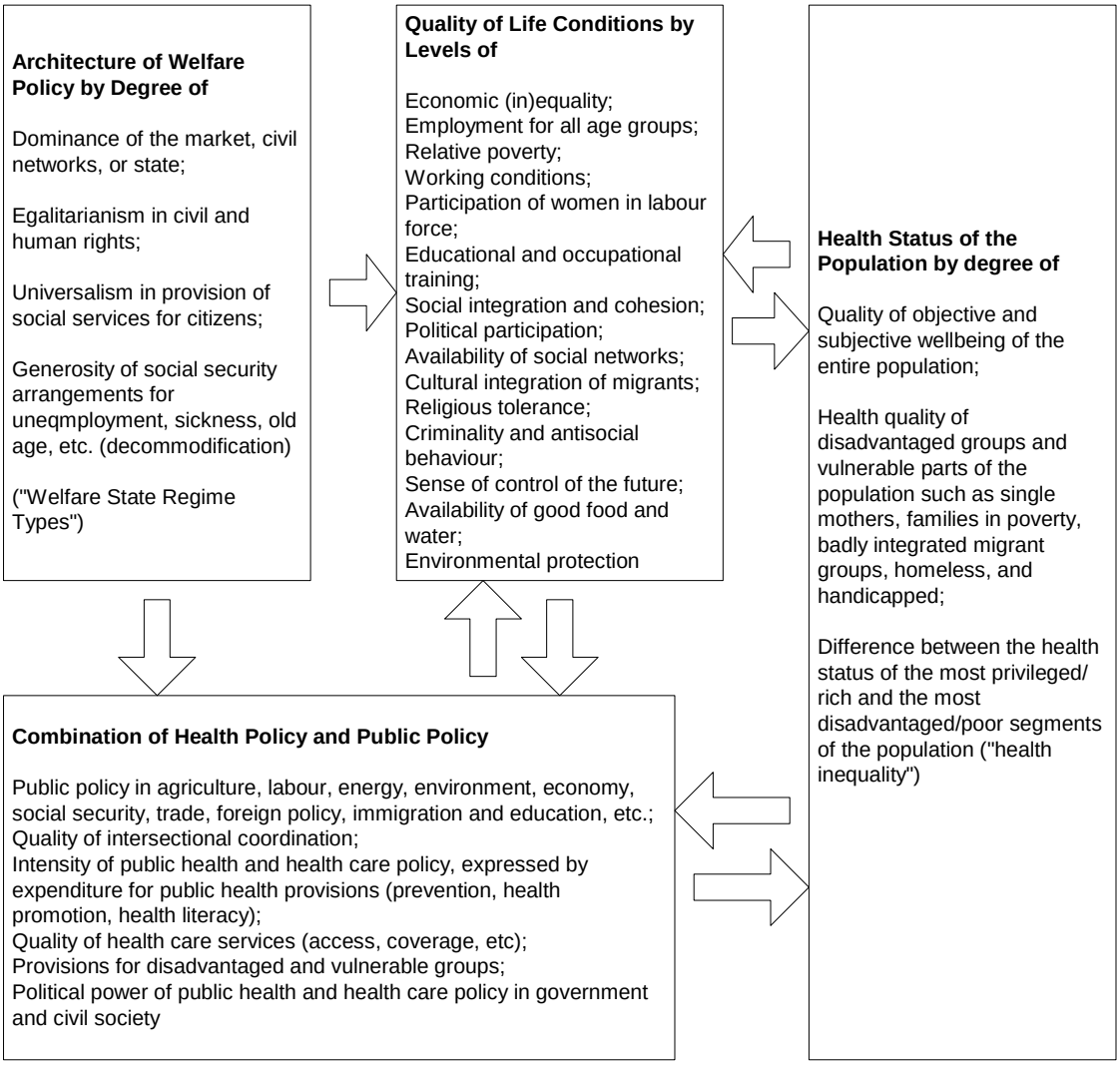
The biggest connection with welfare state regime types occurs with physician density ($eta^2 = .844$). However, this measure does not make an apparent distinction between social democratic and conservative states. Rather, the correlation is caused by the fact that liberal welfare states, without fail, have by far the lowest physician density rates. This raises the possibility that in order to fully study healthcare systems, the concept of "access" must be considered not only insofar as the population can access care, but also the extent to which individuals can be trained and licensed to practice under national regulations. In other words, physicians should be seen as individuals who have gained access to the healthcare system in their role. Some of the factors influencing access for physicians may be the amount and time required for training, policies governing the entrance and licensing of foreign-trained physicians and general licensing practices. A full analysis of this is beyond the scope of this dissertation, but it is important to note that the low physician density rates among liberal welfare states may be due to a range of factors, some of which could be impacted by welfare state regime characteristics.

Modeling Factors Affecting Population Health

These findings have implications for developing models of population health and welfare state policies. Hurrelmann, Rathmann and Richter's (2010) model of health and welfare state policies (shown below) assumes that welfare state structure sets the stage for specific features of health and public policy. Although Hurrelmann, Rathmann and Richter (2010) examine the connections between welfare state regimes and population health, their model does not isolate health-specific policies. Rather, their model locates the role of a "combination of health policy and public policy" as a single entity.

The insinuated connections between this and population health outcomes were discussed in greater detail in the *Welfare State Regimes and Population Health* chapter of this dissertation. Here, of central importance is the model's connection between welfare state regimes and health policy. Hurrelmann, Rathmann and Richter's (2010) model reflects their assertion that ideally, all social policies and programs have an impact on health and should therefore be seen as health policies. This suggests that all policy areas should be at least partly assessed based on their predictable or measured impact on population health. This is a point that fundamentally challenges the assumption in this dissertation that some policies are "health-specific" while others are not. Here, the rationale for focusing on certain policies is that they are the ones designed largely by professionals trained in the health field and with conscious attention to their impact on the health of affected individuals. Regardless of whether all policy areas should be evaluated for their impact on population health, it is worthwhile to, as research cited in this project has done, examine the extent to which those intentions have been realized. Hurrelmann, Rathmann and Richter acknowledge the relevance of this distinction by labelling that piece of their model as a "combination of health and public policy".

Structural and Political Factors Influencing the Health Status of the Population (Hurrelmann, Rathmann and Richter, 2010).



The usefulness of the combination of health and public policy as applied in Hurrelmann, Rathmann and Richter's (2010) model can be fully tested only by isolating specific underlying component indictors. The model contains three specific components that are relevant to the analysis performed in this dissertation:

1) "Intensity of public health and health care policy, expressed by expenditure for public health provisions (prevention, health promotion, health literacy)"
2) "Quality of health care services (access, coverage, etc)"
3) "Political power of public health and health care policy in government and civil society"

The third point is not directly connected to the specific indicators used in the current analysis. Hurrelmann, Rathmann and Richter are not clear with regard to how this might be measured but it is insinuated that this represents the extent to which population health and health policies are factors in political action. This may include, for example, whether health policies are directly and specifically an election campaign issue. Notwithstanding the issues that would surround the operationalization of this measure, the specific measures used here do not assess this factor.

However, points one and two relate to concepts that can be evaluated by the analysis performed in this dissertation. The first point addresses expenditure on public health. Since expenditure on public health provisions such as prevention, health promotion and health literacy (popular knowledge about health and health issues) comes largely from budgets set aside for health, the four overall measures of health expenditure analysed in this dissertation are appropriate measures for these concepts. As outlined earlier, when the four measures of healthcare expenditure are combined, there is little evidence of welfare state regime-based clustering (see Appendix 6). All of the clusters that emerge after eight stages include representatives of at least two welfare state regime types. In addition, eta^2 correlation between welfare state regime type and the summary measure of the four expenditure indicators is .028, indicating that there is virtually no association.

Looking at each of the four measures independently (appendix 9) shows that two of the measures, public expenditure on health (% GDP) and per capita total expenditure on health are not associated with welfare state regime. Public health expenditure as a percent of total health expenditure shows a very minor association ($eta^2 = .202$). Looking at the box plot, however, it is difficult to see any clear distinction, other than that social democratic states show much less variation and tend to have slightly more public expenditure than the other regime types. Finally, there is some evidence of a correlation between welfare state regime and public heath expenditure as a percent of total public expenditure ($eta^2 = .313$). Looking at the box plot, liberal welfare states have the least variation, and tend to direct a higher proportion of their public expenditure toward health. This may be because the cost of healthcare is higher in more privatized systems (especially the U.S.) rather than because of an intentional effort to fund healthcare for the full population. Because of that, the proportion of public spending that is directed at health may support Hurrelmann, Rathmann and Richter's (2010) model insofar as the welfare state "sets the stage" for health spending by the extent to which it allows or controls rising healthcare and administrative costs. Overall, however, results of the analysis performed in this dissertation do not support Hurrelmann, Rathmann and Richter's implication that welfare state regime type shapes public spending on health.

For Hurrelmann, Rathmann and Richter (2010), this point also includes the ideas of health prevention and promotion. One of the measures used in this dissertation as an indicator of coverage (% of children immunized for measles) can be applied as a measure of health promotion insofar as it assesses the effectiveness of public health efforts to expand the size of the population covered by existing health resources (in this case, by

convincing people to immunize their children). Looking again at appendix 9, it can be seen that the percentage of children who have been immunized for measles is only mildly associated with welfare state regime type ($eta^2 = .288$). The box plot indicates that social democratic countries have the highest immunization rates. The variation among conservative welfare states is considerable, ranging from an immunization rate of 96% (Spain and Netherlands) to 75% (Belgium). All liberal welfare states fall within the upper portion of that range. This measure lends mild support for Hurrelmann, Rathmann and Richter's model insofar as social democratic welfare states encourage widespread immunization of children. Given the variation within other welfare state types (most notably among conservative states), however, support is modest.

Hurrelmann, Rathmann and Richter's (2010) second point addresses the quality of care as well as access to healthcare and coverage. The other measure of healthcare coverage used in this dissertation (% of the population with public health coverage) indicates healthcare coverage. In addition, access to healthcare can be addressed by the three measures used in this dissertation as indicating the level of healthcare resources. It can also be argued that the numbers of physicians, beds and acute care staff measure quality of care, in the sense that more healthcare workers can work together to provide more attentive care. It should be noted, however, that physician density, acute care bed density and acute care staff per bed are not necessarily complete indicators of access, since the number of physicians, staff and beds are of little consequence to people who can not afford to access them.[12] Nevertheless these measures from the current analysis can help to assess this part of Hurrelmann, Rathmann and Richter's model. For the "quality"

[12] This is why this dissertation uses these density measures to indicate healthcare resources rather than coverage and access. But the measures can still be partly relevant to an assessment of Hurrelmann, Rathmann and Richter's (2010) concept of the *quality* of available care.

aspect of this point, it is worth noting that Alber (1988) used hospital bed and physician density as measures of healthcare quality in OECD countries. Therefore, the precedent for using these measures in relation to healthcare quality precedes welfare state regimes theory.

Looking at the proportion of the population with public health coverage, the correlation with welfare state regime is virtually nonexistent ($eta^2 = .100$). This is largely due to a lack of variation within the measure. Almost all of the countries used in this analysis provide public health coverage for all or very nearly all of their population, with exceptions being Germany (90.9%), Netherlands (75.7%), and the U.S. (25.3%). For this reason, it is difficult to assess this aspect of the model other than to say that all four social democratic states provide public health coverage for 100% of their population.

The three measures of healthcare resources (physician density, acute care bed density and acute care staff per bed) from this analysis provide some mild support for Hurrelmann, Rathmann and Richter's (2010) model. Appendix 8 gives the results of the analysis of these three measures together. When these measures are combined, there is only a minor correlation with welfare state regime type ($eta^2 = .215$). Looking at the cluster analysis dendrogram, by the fifth stage one large cluster has formed that includes all four social democratic states as well as five of the conservative ones. At the same time, however, four of the liberal states (Canada, Australia, the U.S. and U.K.) group together. This suggests that in some way, liberal welfare states have similarities based on these measures, even if there is not a clear distinction between conservative and social democratic states.

There is a minor correlation evident between welfare state regime type and acute care bed density ($eta^2 = .216$) as well as acute care staff per bed ($eta^2 = .285$). However, there is a strong association between regime type and physician density ($eta^2 = .844$), and the box plot for this measure in appendix 9 shows that liberal welfare states without fail have the lowest number of physicians per capita. This provides some support for Hurrelmann, Rathmann and Richter's model, indicating that there is likely a systematic connection between welfare state regime type and the number of physicians available to the population. However, the strong correlation is driven not by distinctions between the three main welfare state regime types. Rather, it is based on the fact that one of the regimes (liberal) has by far the lowest physician density. There is no indication that physician density differs between conservative and social democratic states. Therefore, support for Hurrelmann, Rathmann and Richter's (2010) model is modest. Future work should apply other measures of healthcare quality to better assess this part of the model.

In general, then, the model's assertion, as well as Hurrelmann, Rathmann and Richter's suggestion that welfare state structure sets the stage for health and public policy receives only a limited degree of support from the analysis performed here. This aspect of their model is based on the oft-made assumption that health policies must go hand-in-hand with other welfare state policies, an assumption that requires further examination and confirmation. It is possible, for example, that there are other intervening factors that moderate how welfare state regime structures affect health policies. Partly, their model addresses this by indicating that welfare state regimes systematically affect the quality of life conditions for the population, and that these conditions interact with health and public policy development. At the very least, results of the analysis performed here suggest that

Hurrelmann, Rathmann and Richter's model may need to separate the concept of "health policy" from that of "public policy" when locating the two within the network of factors that shape population health. There are also theoretical implications for another possibility indicated by analysis results: that health policy may develop somewhat independently of an overall, coherent national welfare state regime orientation.

Divergent Development of Different Policy Areas & Health Policy Regimes

As discussed earlier, Kasza (2002) illustrated that different policy areas develop at different times under different social pressures and with different individual policy makers in each field. This directly challenges Hurrelmann, Rathmann and Richter's (2010) assertion that "welfare and health policies follow historical traditions, fixed power structures, and strong path dependencies". The findings of the analysis performed in this dissertation seem to support Kasza's claim, which may help explain why health-specific policies do not appear to reflect welfare state regime types. It is for this reason that Kasza (2002) suggested that different policy areas should be studied separately and that there may be, for example, pension regimes or health-policy regimes. One of the key tasks in assessing the results of the analysis performed here, then, is to consider the possibility that there may be a systematic underpinning to the clusters that do emerge with health policies, whether those clusters resemble general welfare state regime clusters or not.

Wendt (2009) uses cluster analysis to identify typologies of healthcare systems among 15 European countries (11 of which are included in the analysis of this dissertation). He argues that the indicators commonly used in comparative analyses at the macro level, which focus on broad organizational and financial characteristics, are

insufficient. Building upon healthcare typologies developed by Moran (1999; 2000), Wendt uses measures that address the actual modes of healthcare provision and regulation of access along with some common measures that he argues should nonetheless not be ignored.

Wendt (2009) develops seven indicators addressing health expenditure, financing, provision, method of determining entitlement, method of paying physicians, and regulations governing access to general physicians and specialists. The three expenditure and financing measures used by Wendt are similar to expenditure measures used in the analysis performed in this dissertation. In this regard, Wendt uses health expenditure per capita (including public and private expenditure), the percentage of total health expenditure that is public, and the percentage of total health expenditure that is private out-of-pocket. Although these measures are very similar to expenditure/cost measures used in this dissertation's analysis, Wendt only analyses all of the indicators together rather than independently. Unfortunately this makes it impossible to directly compare Wendt's results with those of this dissertation's analyses of these measures. It is presumable that, given the fact that Wendt also uses cluster analysis, similar clustering would emerge. This is important to note because if Wendt's identified clusters are different, it can be assumed that it is due to the alternative measures he analyzes. This would indicate the complexity of measuring healthcare systems and delivery.

Wendt's (2009) fourth measure is designed to measure the level of healthcare provision, incorporating in-patient and outpatient care. An index is created to indicate whether healthcare systems emphasize primary care (like general physicians and

pharmacists) or care by specialists (like neurologists or hospital nurses). This is done by measuring employment in these areas.

Wendt's (2009) fifth and sixth indicators assess institutional regulatory characteristics. First, Wendt measures the "mode of entitlement". This identifies how a country determines eligibility for care. Possibilities are access based on citizenship, social insurance contributions, private insurance contributions or proven need (which relates to the concept of means-tested access as applied in traditional welfare state regimes analysis). Second, Wendt measures remuneration method for physicians. This is not based on the amount earned, but rather on the way in which remuneration is determined. Possibilities for this measure are fee-for-service, per case, the number of patients on a physician's list, or salary. For Wendt, this indicates the level of control the state has over healthcare costs. For example, salary-based remuneration allows more control while fee-for-service offers the least (as suggested earlier by Groenewegen et al., 2002). Therefore, for Wendt, this measure indicates the degree of autonomy physicians have from state control. It is noteworthy, though, that the state can apply caps to fee-for-service systems (as is the case in most of Canada), something not fully addressed by Wendt's measure.

Wendt's (2009) seventh and final measure assesses the regulations by which the population has access to physicians and specialists (that is, the ways in which access might be restricted by policies). There are several possibilities for this measure. First, individuals can have free access to specialists. Second, access to specialists – for example, a referral from a general practitioner may be required. Third, people may be allowed to bypass the referral system to accessing specialists by making additional

payments. Based on these principles, Wendt develops an index that ranges from free access and choice to a "gatekeeping" system where individuals may have to sign on a particular physician's list and require referrals in order to access specialists.

Wendt (2009) then performs cluster analyses using all of the above measures together. Based on this, three types of healthcare systems are identified. The three types are labelled "health service provision-oriented", "universal coverage – controlled access type" and "low budget – restricted access type". *Health service provision-oriented* states are characterized by high levels and unquestioned emphasis on service provision, especially in the outpatient (primary care) sector. The number of health service providers is high, only limited amounts of out-of-pocket expenditure is required, individuals have free choice of physicians and doctors are remunerated on a fee-for-service basis, encouraging more doctor-patient contact. Finally, among these countries the mode of entitlement tends to be social insurance contributions. For that reason, it is not surprising that this cluster is made up primarily of core conservative welfare states (Austria, Belgium, France and Germany along with Luxembourg).

The other two healthcare system types identified by Wendt (2009), however, do not reflect welfare state regime groupings. *Universal coverage – controlled access* states include Denmark, the UK (referred to by Wendt as Great Britain), Italy and Ireland. Although Wendt does not identify Sweden as part of this group, it is the next country to join this cluster as the analysis progresses. Sweden is not included as a strong case of any of Wendt's healthcare system types. This suggests the fact that Wendt's unique measures address characteristics not often considered in welfare state research, since Sweden usually is classified as a strong case of a universal access kind of system. States in this

group emphasize universal coverage, but access to physicians is strictly regulated (which is likely the reason for why Sweden is not a strong fit). There is a low density of outpatient providers, and people are often required to sign onto a physician's list for a longer period of time. However, in these states the total population is covered and private out-of-pocket payments are low.

Wendt's (2009) third healthcare system time, *low budget – restricted access* systems, also do not reflect traditional welfare state regimes groups. The strongest representatives of this group in Wendt's analysis are Portugal, Spain and Finland. Per capita health spending is lower in these states than in the other types. High private out-of-pocket payments restrict access to care, and patients must remain with a particular physician for an extended period of time. In-patient service provider density is very low. Physicians are paid by salary, and as such for Wendt have less autonomy from state control.

One of the key omissions in Wendt's (2009) analysis is the fact that traditional liberal welfare states are not included. Due to the nature of cluster analysis, adding these countries does not just involve determining where they fit within the clustering Wendt has identified. Rather, adding several potentially unique states to the mix may fundamentally alter the way other countries group together because relative distances between cases and clusters may change. Wendt suggests that this is the case, but does not refer directly to the fact that liberal states in particular have been omitted, suggesting only that "adding further nations such as the United States, Switzerland or Central and Eastern European countries could reveal different and presumably more than three system types" (p. 442).

For purposes of this dissertation, there are two main questions regarding Wendt's typology. First, the ways in which liberal welfare states, based on their overall social policy orientations, are likely to fit into Wendt's work. The answer to this question will help to discern the extent to which Wendt's measures may further distance health policy systems from the often assumed connection with welfare state regime type. Second, the extent to which Wendt's typology reflects the clusters identified within this dissertation's analysis. This will help to determine the extent to which diversity is found even when Kasza's (2002) advice is taken to focus on only specific policy areas.

The United Kingdom, as discussed earlier, is often classified as a weak liberal welfare state. This is especially the case with healthcare, due to its National Health Service structure. Wendt (2009) includes the UK (he calls it Great Britain) in his analysis since it is a European state. The analysis performed in this dissertation, however includes three other core liberal welfare states: Canada, Australia and the United States, the latter of which is typically identified as the purest example of liberal policy characteristics. On the surface, looking at Wendt's healthcare system types, it seems logical that these countries are most likely to resonate with *low budget-restricted access* systems.

Looking in greater detail at Wendt's measures, however, it is unlikely that the fit would be clear. One characteristic of Wendt's *low budget-restricted access* model is that it has the lowest per capita health expenditure. A key omission in Wendt's analysis is that the four countries that spend the most on health per capita, the U.S, Norway, Switzerland and Canada, are not included. Including these countries would therefore likely reshape Wendt's findings in important ways, especially since the typology relies partly on per capita health spending. Most relevant to the current point is that within this

high-spending group are Canada and the U.S. It is therefore less likely that these two liberal countries would cluster with the low budget-restricted access type, especially the U.S., which spends by far the most per capita on health. This may also highlight a potential problem with Wendt's suggestion that spending more on health indicates that a country has a "high budget" for healthcare, especially since health spending in the U.S. is cost-driven rather than budget-driven. In addition, Wendt's *low budget – controlled access* states pay physicians by salary, which is not the case in Canada or the U.S.

At the same time, however, some of the characteristics of this healthcare system type do reflect characteristics of Canadian and U.S. health systems. Most notably, high out-of-pocket payment requirements restrict access to healthcare, especially for lower-wealth groups. This is strongly reflective of the U.S. system, and it resembles certain aspects of the Canadian system as well (with regard to things like ambulance, dental and vision care, for example).

As is apparent in the analysis performed in this dissertation, by far the lowest physician densities exist in liberal welfare states. In Wendt's typology, however, the lowest physician ("outpatient care provider") densities occur in *Universal coverage – controlled access systems*, which are also characterized by a high amount of public funding (about 80% of total health expenditure is public).

Part of the reason for why Wendt's types do not match welfare state regime groupings is that his measures are not based on the key underpinnings of those approaches to welfare. For example, for Wendt, a high proportion of public funding does not indicate an intention to care for the population but rather the ability to control access, for better or worse. This is not a bad thing, and seems to address some of the concerns

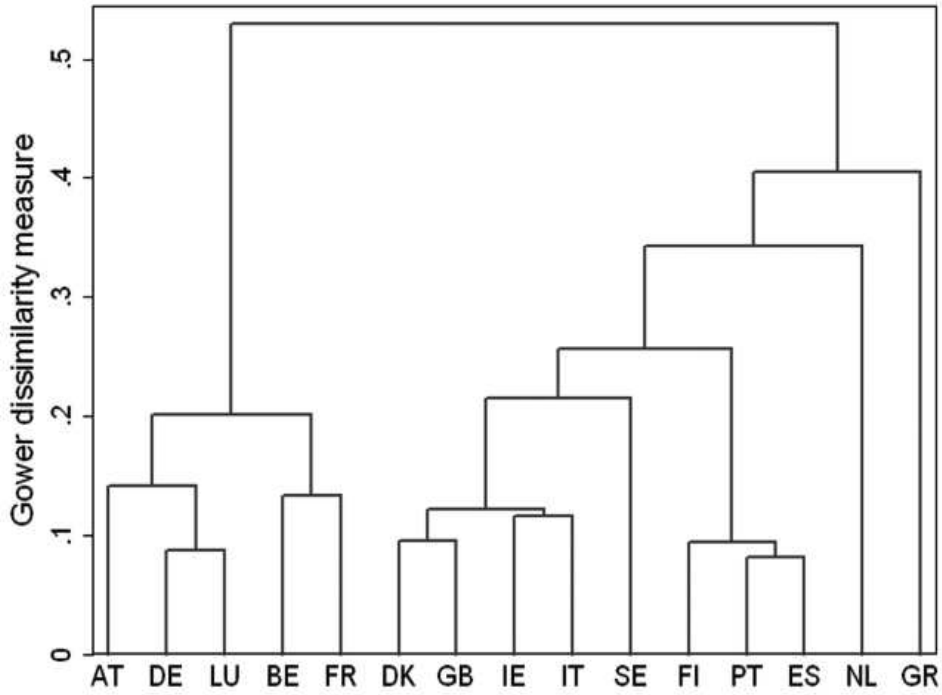
outlined by Kasza (2002) by focusing on one policy area and not working from the assumption that welfare state regimes and their ideological underpinning exist in the first place.

The second main implication of Wendt's health system typology is that even when analyses focus on one specific policy area as suggested by Kasza (2002) findings are complex. By considering different aspects of policy implications for populations (in Wendt's case, focusing on control over access), completely different groupings emerge, each with vastly different underlying motivations.

By the nature of cluster analysis, adding cases such as liberal states changes relative distances between clusters and may considerably alter overall groupings. And liberal states are not the only omission from Wendt's analysis. As pointed out above, his analysis omits the four highest per-capita health spenders – which is crucial when one of the key indicators is per capita health spending. While Wendt omits several key countries included in this dissertation's analysis, he includes four countries that are not in the analysis performed here (Luxembourg, Ireland, Portugal and Greece). This is important to consider when comparing clustering results between the two projects.

The discussion above has suggested reasons for why Wendt's typology, because of the characteristics assigned to each health system type, is unlikely to reflect welfare state regimes even when liberal states are included. Notwithstanding the fact that different countries are included in his analysis, however, it is important to note that when Wendt's (2009) measures are applied, clustering patterns do not parallel the results of the analysis performed in this dissertation either. The figure below gives Wendt's (2009) cluster dendrogram.

Cluster Dendrogram for European Healthcare System Types (Wendt 2009)



Note: AT: Austria; DE: Germany; LU: Luxembourg; BE: Belgium; FR: France; DK: Denmark; GB: Great Britain; IE: Ireland; IT: Italy; SE: Sweden; FI: Finland; PT: Portugal; ES: Spain; NL: Netherlands; GR: Greece.

Comparing Wendt's dendrogram with that in appendix one, *the health service – provision oriented type* is not evident in the emerging clusters. As noted earlier, for Wendt (2009) this healthcare type exists in Austria, Germany, Luxembourg, Belgium and France. In appendix one, it can be seen that Belgium and Austria do cluster together immediately (with Italy). France and Germany, however, do not cluster with Austria and Belgium, or with each other.

Universal coverage – controlled access health systems (Denmark, U.K., Sweden, Italy and Ireland) also do not cluster together in the analysis performed in this dissertation. Again looking at appendix 1, it can be seen that Italy, Sweden, U.K. and Denmark are widely distributed across emerging clusters. Denmark and U.K. combine in the fifth stage, but by that point are clustered with France, New Zealand, Netherlands,

and Switzerland, suggesting that, using the measures in this analysis, these countries do not appear to share characteristics that distinguish them from the other types of healthcare systems.

Finally, *low budget – restricted access* health system types (Portugal, Spain and Finland), though consisting of only three countries, is potentially supported by the analysis performed here. Only two countries, Spain and Finland, are included in both this and Wendt's (2009) analysis. However, looking at Wendt's dendrogram and that in appendix 1, in both studies Finland and Spain cluster together early in the analysis. In the analysis performed in this dissertation (appendix 1), Finland and Spain combine early and then remain separate from all of the other countries until the final stage. One of the drivers of this similarity is likely the fact that per capita health spending is a key element of *low budget – restricted access* systems and it is also a central variable used in the analysis performed in this dissertation. Finland and Spain spend almost the same amount per capita on health, both spending very low amounts relative to the other countries.

A second main component of Wendt's *low budget – restricted access* type is a low level of inpatient providers. A similar measure used in the analysis performed here (acute care bed density) also reveals a similarity between Finland and Spain, which have two of the lowest acute care bed densities. In addition the two countries have identical physician density levels (33/10,000 population). To some extent, the commonalities between the underlying measures used by Wendt (2009) and this dissertation may drive the fact that Finland and Spain connect so clearly in both analyses.

However, these countries also have similarities that are not measured in both studies. For example, the analysis done in this dissertation found that Spain and Finland

have the two highest child immunization rates (tied with Netherlands at 96%). It is possible that characteristics of the *low budget – restricted access* system connect with high immunization rates. For example, low levels of per capita health expenditure might correlate with high immunization rates insofar as health expenditure is cost-driven and immunization is a cost-effective means of improving population health and reducing reliance on health services. *Low budget – restricted access* systems are also characterized by a requirement to remain under the care of an individual's first-contact physician for a longer period of time – something that might encourage a longer-term care plan that involves prevention like that offered by immunization.

Of course, conclusions cannot be drawn based on this basic comparison and with only two countries in common between two studies. But these findings suggest that efforts to identify healthcare system typologies will require a depth of analysis that includes the kinds of measures used by Wendt (2009) as well as the coverage, cost/expenditure and healthcare resources measures used in this dissertation. Such work must also include a wider range of countries, especially when there are clear potentially systematic omissions. For example, Wendt omits the four highest per-capita health-spending countries and yet uses that measure. Wendt also excludes the countries with the lowest physician densities while using that as a key measure of a commitment to outpatient care. In addition, there are theoretical shortcomings when one established welfare state regime type is almost completely omitted (as liberal states are in Wendt's analysis). As a result, the findings presented here suggest a hybrid response to the issues raised by Kasza (2002). Namely, that future work should focus on health systems in particular in order to achieve a greater depth of analysis while nevertheless paying

attention to the role of established welfare state regimes underpinnings. It is certain that the commonly made assumption that welfare state regime types generate parallel health policy structures is inadequate.

The Impact of Potential Changes in the United States

In most national-level comparative research in the welfare state regimes discourse, the U.S. has turned out to be a stark outlier. This is also apparent in the analyses performed in this dissertation. The U.S. is most likely to remain independent in the clustering process dendrograms, and many of the box plot illustrations in appendix 9 show the U.S. as an exceptional case (case #17). The promises of healthcare reform made under the Obama Administration and the public momentum this appeared to have at the outset raises questions about the extent to which the U.S., a consistent outlier and extreme liberal case, may transform its position relative to that of other welfare states. This is important because it directs attention toward an assessment of factors that facilitate or resist efforts to change large-scale social policy structures that are central to welfare state regimes definitions.

Based on the original and central definition of liberal states as those that emphasize private responsibility for welfare and means-tested access to support, the U.S. is actually an outlier in the sense that it so radically embodies these principles. For example, the proportion of the U.S. population that has public health coverage (about 25%) is radically lower than the other liberal states.[13] Outcomes like infant mortality rate are exceptionally and uniquely poor in the U.S. compared to the other OECD countries as well. The extreme adherence to the principles of the liberal welfare state type is largely

[13] In fact, in all of the other liberal states in this analysis, 100% of the population has public health coverage.

because in the U.S., staunch and widespread support for the principles of a free and unimpeded market prevails. Some forms of regulation have been placed upon particular aspects of the market – for example, anti-trust legislation, various controls on industrial products and rules for environmental protection (Freddi, 2009). This has, however, not been the case in the health sector. Throughout history, the U.S. population has not supported the idea of a comprehensive government role in financing healthcare (Skocpol, 1996; Quadagno, 2005; Gordon, 2005; Hacker, 1996). And according to past precedent, Obama's plan faces serious challenges. Freddi (2009) points out that over the last century many bills have been submitted that proposed some form of compulsory national health coverage, each of which have been systematically rejected. These include proposed bills under a range of influential past presidents including Roosevelt, Truman, Johnson and Clinton (Freddi, 2009). This is why public health coverage that does exist in the U.S. remains largely driven by means-testing and is aimed only at two segments of the population that can be seen as economic liabilities - the poor and the elderly (Freddi, 2009).

The American political system is based largely on the interaction of competing lobby groups. Creer (2009) argues that in the health sector, healthcare products, pharmaceutical and insurance industries have developed especially strong lobbies, with lobbyists outnumbering Congress members by fifty-to-one. Federal healthcare lobbying from these three industries has surpassed spending in all other sectors, totalling about 15% of all expenditures from 1998 to 2006 (Creer, 2009). Creer argues that despite widespread dissatisfaction about the healthcare system among the U.S. population, the prospect of acquiring the costs associated with making such a change may generate fear

among a population affected not only by a perception of national debt, but most of who are personally financially indebted. Within a financially strained population, it is relatively easy to generate public scrutiny toward any kind of additional expenditure. For this reason, Creer argues that meaningful healthcare reform in the U.S. will only occur in response to a major war, depression and/or large-scale civil unrest. He then suggests that these conditions may be approaching, as the U.S. is involved in several financially straining wars, an economic recession, and increasing restlessness within the population.

There are other possibilities, however. Freddi (2009) suggests that the healthcare system in the U.S. is actually a network of sub-systems that range from a full reliance on private insurance to publicly funded. This points to one of the key concerns for welfare state regime typologies – that within-country variation cannot be ignored. In this regard, making a single regime classification for a country that so heavily relies on individual state-level (and even county-level) policies is problematic in the first place. The relevance to this point, however, is that a fragmented and diverse system is much more difficult to transform in a uniform, coordinated direction. Canada's healthcare system is largely administered at the provincial level, but there is less fragmentation and fear of federal control. In addition, many people in Canada see healthcare as a Federal issue in the first place, seeing the province as an administrative device that may or may not efficiently achieve Federal directives. In that sense, there would likely be less resistance to the *idea* of unified Federal policy changes (even if there is disagreement with the specific direction itself). This indicates that major changes that can affect the U.S. in such a way that it will impact upon welfare state regimes analyses are unlikely, at least in the very near future.

A major reason for this involves the kinds of arguments that have been presented by private American healthcare providers and industries (Freddi, 2009). The American Medical Association (AMA) has been a strong supporter of private providers. Freddi (2009) argues that the AMA and its allies have, since about 1920, have released strong ideological statements against social insurance ideology. Much current rhetoric against Obama's plan is familiar to statements made in a 1949 petition to the U.S. Congress containing the argument that state-sponsored medical care would lead to a socialistic state that would contravene the principles of the American Constitution (Freddi, 2009). This is also the case for statements made by the AMA against the Johnson Administration stating that state-sponsored healthcare, even for the elderly, presents a slippery slope toward a totalitarian government where the state makes decisions about things as fundamental as one's health (Freddi, 2009).

Further, a fragmented form of health insurance delivery has its roots in the post-WWII labour situation. During this time, large employers began offering more robust health coverage for their workers (Freddi, 2009). This established a wide range of divergent policies and coverage schemes that has made the practical introduction of a unified system difficult. This difficulty is reflected in Obama's effort to insure the public not by fundamentally streamlining a universal insurance system, but to increase the ability of the uninsured to access the existing mix of existing private provider contracts.

More recently, the profit-driven health provider and insurance system has led to radical cost increases, which in turn have increased the amount of public money that is required to purchase even the basic coverage for the poor and elderly. This is evident in the analysis performed in this dissertation – public health expenditure in the U.S. exceeds

that of every country other than Norway. In Norway, however, the high level of public spending covers about 83% of total health spending and supports a universal access sytem. In the U.S., this high level of public spending makes up only about 46% of total health expenditure and covers a small portion of the population.

Like Creer (2009), then, Freddi (2009) suggests that a transition to a more equitable public healthcare system in the U.S. "does not stand much of a chance" (p. 341). Freddi, however, points to several emerging trends that might that may open a door to change. First, Freddi argues that health care is becoming a more visible political issue than it has been in the recent past. This can be seen in the 2008 election campaign led by Obama, which forced public debate and response from Republican candidate McCain. Second, more an more people forced out of the American healthcare system by prohibitive costs are going to places like Asia and Latin America for complex procedures at a much lower cost (Freddi, 2009). Third, Freddi suggests that as costs increase and more and more people face economic obstacles to care, it is starting to impact upon middle and even upper-middle class segments of the population – who, unlike the other affected groups, tend to vote. At the same time, however, Freddi cautions that the fragmented delivery system in the U.S. continues to make shared beliefs and feelings difficult to transform into a mobilisable movement.

In order to affect welfare state-level measurement, health care reform in the U.S. would have to significantly reduce the prevalence of private insurers and greatly decrease the prevalence of means-testing when determining access to support. To a large extent, as noted above, Obama's proposals remain dependent upon means-testing for access to private coverage. But a more radical aspect of his plan involves the development of a

public insurance plan modeled after that offered to federal employees and politicians. The full implementation of such a plan, while it likely will not be implemented in such a form due to political opposition, would potentially impact upon the U.S. degree of separation from other welfare states using common policy measures. Freddi (2009) points out that the advent of economic and military issues after the election has taken steam away from such a process. Moreover, voter turnout in the 2008 election was roughly the same as that from the previous election, suggesting that the majority of the underinsured still do not tend to vote despite the increased centrality of this issue in political debate.

Overall, it is unlikely that change to the classification of the U.S. in comparative health policy analysis will come about quickly. In addition, national-level data about policy structure will lag behind any significant changes, and data for population health and other relevant outcomes will be even further behind.

Conclusion: Health Policy and Welfare State Regimes

This chapter has examined the relationship between health policies (using measures of "health system outputs") and established welfare state regime classifications. Three main conclusions can be drawn. First, clustering of health-specific policies does not resemble that of welfare state regime memberships. Second, there is emerging discussion about the potential existence of health policy regimes. The analysis performed here provides limited support for this possibility, but further analysis involving countries from each welfare state regime is required to ensure inclusion of a wider range of national policy and ideological characteristics. Third, welfare state regimes classifications remain useful for the study of health policy in several main ways. One,

that they demonstrate the importance of choosing a wide range of countries in analyses. Second, that they provide a basis for comparison – for example, we can examine why it is that countries with labour market policies resembling liberal traits do not necessarily generate parallel approaches to healthcare (Canada is a good example of this issue). Finally, welfare state regimes typologies demonstrate that the concept of categorizing policy structures can be useful for understanding policy development in the first place.

Chapter Six: Do Population Health and Health Policies Generate Similar Clusters?

In order to address completely the objective of this project – that is, to determine the extent to which welfare state regimes theories can help in understanding population health and health policy development – it is important to examine the connections between health policies and population health. One of the main things that can be gained from such an evaluation is a critical assessment of the common assumption that health policies must affect population health since they are focused on health-related objectives. At the outset, this assumption seems to make sense. In the research examined throughout this dissertation, studies have often assumed that health-specific policies would have direct impact on health outcomes, since that is their apparent focus. This is also apparent in Hurrelmann, Rathmann and Richter's (2010) model, which this dissertation seeks to enhance. This assumption has affected the kinds of measures that researchers have chosen to include in their analysis as well. For example, in an analysis of the impact of pension and family policies on health, Lundberg et al. (2008) actually make methodological adjustments, fearing that "increases in healthcare" may result in reductions in mortality (p. 1635).

It should be emphasized that the connections (or lack thereof) between health-specific policies and population health may be even more complex than national-level studies reveal, since within-country variation is important. Xu Ke Tom (2006) suggests that the U.S.'s high level of health inequality relative to other industrialized countries can be attributed at least partly to the design of the healthcare system, but that regional differences make the connection more complex. Within the U.S. in particular, health policies vary more from region-to-region than they do within most other countries. Xu Ke Tom's findings therefore indicate that internal consistency with a national health care

system has an important impact on health, partly because of unequal access to care. The analysis performed in this dissertation, like the work it builds upon, uses national data and therefore does not distinguish between within-country variations of healthcare delivery. Xu Ke Tom's (2006) analysis suggests that the connection (or lack thereof) between health policies and population health may be impacted not only by an overall welfare state policy approach, but by geographically distinct policy regions as well. Nevertheless, analyses of this connection are important at every level of state power since national policy structures either direct, set the parameters for, or in some other way influence regional powers.

Looking at analyses that have tested the connection between health policies and population health, many analyses have found a connection between health policies and population health. As discussed earlier in this dissertation, however, this work has used a relatively limited range of measures for both population health and health policies.

Navarro et al (2006) measured "welfare state" using only public health expenditure and health care coverage (which are both health policy measures). They correlated each of their population health measures (infant mortality and life expectancy) with each of these health policy measures. Strictly speaking, Navarro et al. were actually correlating health policy structures (rather than welfare state policies overall) with population health outcomes. In their analysis, the two policy measures were much more strongly related to infant mortality rate than to life expectancy, although life expectancy was correlated with public health expenditure. This suggests that there may be a connection between basic healthcare policy structures (in this case, just expenditure and coverage) and population health.

Chung and Muntaner (2006) note that their main indicator of health policy (public medical coverage, which they analyzed among general political factors) was the most significant predictor of mortality outcomes, a finding that also suggests that health-specific policy has a direct effect on population health.

In addition, some studies have suggested that health systems and their histories shape health inequities within a population. This has been demonstrated to occur within Canada (James et al., 2007), Australia (Korda et al., 2007), Spain (Borrell et al., 2006), and across developing countries (Houweling et al., 2006). These findings reflect the concerns raised by Kasza (2002) that different policy areas may develop in different ways because of different historical pressures and policy groups.

Galvin's (2002) analysis of policies affecting disability in Australia, U.K., U.S. and Canada, as discussed earlier, illustrates that health policies, insofar as they impact upon disability, affect disability-related illnesses. Such policies, however, go beyond what has typically been defined as "health" policies and may help explain the finding here that overall welfare state policies are somewhat reflective of chronic and infectious disease measures.

Some research has used the connection between health policies and population health to suggest that efforts to improve health should include further investment in health policies. Conley and Springer (2001) argued that increased investment in public health and state spending generally reduces infant mortality (Conley and Springer, 2001). However, their conclusion combines general "state" spending (spending on programs other than health-specific ones) with "health" spending. The idea that general state spending may reduce infant mortality is consistent with the finding in this analysis that

child health is related to overall welfare state regime. However Conley and Springer's finding that increases in public health spending also reduce infant mortality suggests that health-specific policies have an impact on population health as well. Macinko, Shi and Starfield (2004) suggest that improving aspects of the healthcare financing system can mediate the effects of inequality on population health.

At the same time, some recent research has suggested that the impact of health-specific policies on population health is not as great as the impact of social policies overall. Further examining the correlation between public medical coverage and mortality outcomes they had found (2006), Chung and Muntaner (2007) suggest that healthcare services have an impact upon infant mortality and low birth weight, but that "the impact of health care services might be relatively smaller than that of welfare state policies as a whole" (p.337). Zambon et al (2006) supports this finding, stating that medicine has a minor effect on population health compared to the larger impact of demographic and socio-economic factors.

Watson and McGrail (2009), after analysing 19 OECD countries, conclude that there is virtually no association between avoidable mortality on the one hand and the supply of physicians, general practitioners, specialists, nurses, or health expenditures per capita on the other. This hints at the importance of the measures that are used in analyses. It seems that different policy and health measures can lead to much different conclusions when analyzed. This points again to the importance of using a wider range of measures for both policy and health, a need that this dissertation has attempted to address.

Comparing the cluster dendrograms for the composite measures of health system outputs (appendix 1) and composite measures of population health outcomes (appendix 2), it is clear that there is little resemblance. Countries that cluster closely together based on population health (like, for example, Norway and Sweden) remain separate almost until the final clustering stage when health system outputs are analysed. Clustering patterns observed in analyses of health policies do not resemble those for child health, adult health, or disease measures. Similarly, clustering patterns for healthcare resources, coverage and expenditure/cost measures do not resemble those for child health, adult health, or chronic/infectious diseases. It is apparent, then, when a wider range of measures is used, there is little evidence that national health policy structures generate parallel population health outcomes. The incongruence between these findings and those of other recent research seems to confirm the importance of the specific measures chosen for each aspect of health and policy. Moreover, the inconsistency in findings across the literature suggests that policy-health connections are extremely complex.

The finding in the analyses performed in this dissertation that health-specific policies to not seem to generate parallel health outcomes also has implications for Hurrelmann, Rathmann and Richter's (2010) model. This finding re-emphasizes the need to mete out the impact of health-specific policies from the impact of other welfare state policy areas when examining population health. It was established earlier in this dissertation that health policies should be conceptualized as a separate entity within the model since national health policies do not appear to reflect welfare state regimes. The analysis of health policies and population health in this chapter suggests that health policies may affect population health in different ways than other policy areas do.

Therefore, separating health-specific policies within the model allows for the possibility that these policies have a different (or smaller) direct impact on health than economic, labour market, family and/or social security policies. This conceptual separation is even more important in the face of the common assumption that health-specific policies have the greatest effect on health because it encourages the separate analyses of these policies. In other words, if a model is intended to guide research and further understanding, this separation is crucial.

Chapter Seven: Improving the Application of Welfare State Regimes to the Study of Population Health

It has been recognized for some time now that the factors influencing the health status of a population are very complex. Judge et al. (1998**)** conclude that "…a nation's health is likely to be the product of a wide range of cultural, economic and social factors, many of which are not easily measured and most which might interact with each other" (578). However, the results of the analysis performed here further complicate the issue by finding that overall welfare state policies affect child health and chronic/infectious diseases but not adult health, while health-specific policies seem to have less of a connection with population health than overall welfare state policy structures. The findings of the analysis performed in this dissertation, which use a wider range of health measures, suggest that it is likely a variety of social policies, rather than just specific health policies, that shape the health of a population, but that this seems to apply only to *child* health, and to some degree chronic and infectious diseases.

Implications for the Main Framework of this Project

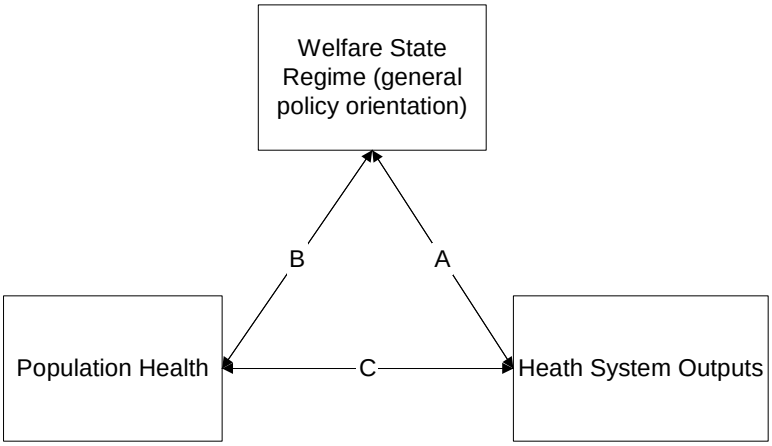
At the outset, the three questions investigated in this dissertation were:

1) Does population health cluster into groups resembling welfare state regime groups?

2) Do health policies cluster into groups resembling welfare state regime groups?

3) Do population health and health policies generate similar clusters?

Along these lines, the basic framework for this analysis is shown again below:



Each of these potential connections has been investigated in this dissertation, but findings do not allow for a clear, singular answer to each hypothesized association. Analyses of association "B" indicate that welfare state regime classifications connect considerably with child health measures, to a limited degree with measures of chronic and infectious diseases, and not at all with adult health. In response to these findings, this model would require that the concept of population health be divided into these three component parts. As illustrated, this also raises serious concerns regarding the extreme reliance on child health measures in recent research.

Analyses of association "A" suggest that welfare state regime types do not generate parallel health policy structures. The relative exception is that liberal welfare states have much lower physician densities than other countries in this analysis. But this measure did not generate a distinction between social democratic and conservative regime types. It is more likely that, as illustrated earlier, different policy areas develop in different ways at different times due to different social and historical pressures. This is also a crucial finding since it suggests that analyses using different policy measures may

challenge the common assumption that health policies, since they are part of the welfare state, but reflect regime types.

Finally, analyses of association "C" indicate that there is no clear connection between health-specific policies and population health outcomes. It seems, rather, that a wide range of social policies impact upon population health and that health-specific policies do not have a systematically larger impact. As noted in previous chapters, research that has found a correlation between health-specific policies and population health has used a very limited range of measures for both population health and health policy. Further research using a wider range of measures would help further detail this connection.

As has been highlighted throughout this dissertation, the model developed by Hurrelmann, Rathmann and Richter (2010) provides a solid basis upon which to map these complex connections between welfare state policies and population health.

Modeling the Factors that Impact Population Health

The usefulness of welfare state regimes typologies for understanding the society-wide impacts on population health is illustrated through the usefulness of Hurrelmann, Rathmann and Richter's (2010) model. The analysis performed in this dissertation has mandated several ways in which this model should be further developed. A revised version of Hurrelmann, Rathmann and Richter's model is given below. There are several key developments. First, the "welfare state regimes" concept is now described as dynamic. In other words, welfare state approaches do not simply influence quality of life conditions and social policies – they are influenced by those policies as well. To reflect this, arrows from the "Architecture of Welfare Policy" box now run both ways rather

than just outward. It was Hurrelmann, Rathmann and Richter's aim to further develop Navarro et al.'s (2006) model of how politics shape the labour market and the welfare state, which in turn affect equality and population health. In other words, Navarro et al.'s (2006) model was far more directional and linear.

Since Hurrelmann, Rathmann and Richter (2010) started out in an effort to advance that existing model, it seems natural to begin from the same premise. Namely, that general policy approaches are the initial causes of a sequence of complex interactions that affect health. However, at this point the model becomes more useful as a model of civil society, accounting for how various major conceptual aspects of social and political life interact. Population health is, in reality, not simply an outcome of a more or less linear progression, but rather one aspect of life that interplays with other parts of society. In other words, population health must be viewed as a dynamic aspect of society that both shapes and is shaped by other aspects of social life. From a practical approach, the 'arrows' between concepts in such a model should only initially be guided by predictions about logical and/or likely relationships. Eventually, the location and direction of causal flow should be dictated not by what seems likely but by how much we know about the interaction of two concepts represented in the model. At this point, however, it is important to add the initial suggestion that life conditions and social policies influence overall welfare state approaches, even if that connection was not a focus of the statistical analyses performed in this dissertation.

A challenge for the ongoing development of such a model, however, is deciding how far concepts should be broken down. For example, if "health policy" and "public policy" are to be separated, how does one know when the indicators within each need to

be separated as well? Eventually a model will become unusable as a heuristic overview. The results of the analyses performed here, however, suggest several adjustments that do not compromise the model's ability to summarize relationships between larger social concepts. Along these lines, the second adjustment made to the model here is to separate "health policy" from "public policy", which Hurrelmann, Rathmann and Richter have combined. Making this general division is productive for existing research directions because it is a separation that can help account for the fact that different policy areas develop in different ways and face different pressures. While separating all policy areas may compromise the heuristic value of the model, health-specific policies, because of existing assumptions about their role in shaping health, should be isolated while other policy areas remain in one concept (in the case of this model, as "public policy"). This will help to direct research toward further examining a connection that is often assumed.

Moreover, results of the analyses performed here mandate the isolation of health-specific policy within the model in two ways. First, the fact that health policies do not reflect welfare state regimes suggests that these policies may have systematic differences compared to other welfare state policies. Second, the fact that population health outcomes (especially for children) reflect welfare state regimes but not health policies also points to the possibility that health-specific policies are somehow unique.

The third development applied to the model based on the findings of this dissertation is that the concept of "health status of the population" be further broken down. Given the finding here, which uses a relatively wide range of measures, that child health is strongly reflective of welfare state regimes while adult health is not, it seems imperative to make this distinction. There may be systematic differences in the way

social policies affect adults and children. At the same time, based on these findings, an effective model must reflect the fact that using child health measures as summary measures for population health in general will lead to misleading conclusions about many of the relationships within the model.

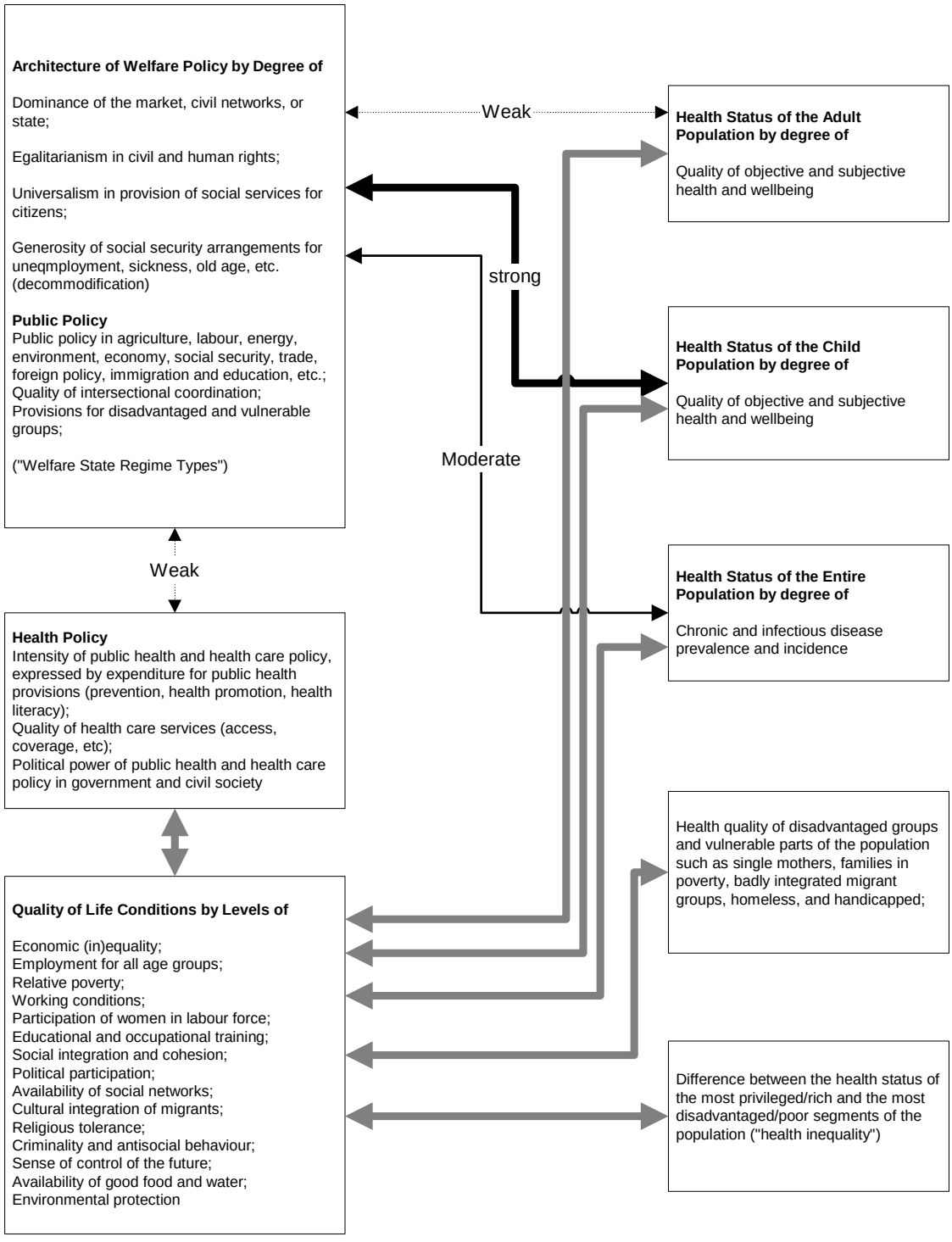
The fourth key alteration to the model addresses the fact that Hurrelmann, Rathmann and Richter's (2010) distinction between 'welfare state regime type' and 'health and public policy' is tenuous. For example, they give universalism in provision of social services and generosity of social security policies as measures of welfare state regime. In reality, however, those are specific policy characteristics themselves. A characteristic they give for health and public policy is access and coverage of health care services. These concepts overlap to the point where no distinction is necessary. For example, there is little point in saying that generosity of social security arrangements for unemployment, sickness and the elderly leads to greater social provision for vulnerable groups. It is the existence of the latter characteristic that indicates the generosity of social security arrangements in the first place. This does not mean that these are not important concepts – only that such characteristics of social policies are evidence of welfare state regime type, not outcomes of it. Therefore, in the model developed here, the concept 'welfare state regime types' is combined with 'public policy'. The concept of 'health policy', however, remains separate because of the finding that health policies do not reflect welfare state regime types.

Based on this, the model of welfare states, health policy and population health is given below. All arrows are two-way to reflect the dynamic nature of these social concepts. Grey arrows reflect the connections given by Hurrelmann, Rathmann and

Richter. These exist in connections where the current statistical analysis cannot verify or dispute the relationship.

Model of Welfare States, Health Policies and Population Health

The following model contextualizes the findings of this analysis among the concepts highlighted by Hurrelmann, Rathmann and Richter (2010). Arrows that are labelled “weak”, “moderate” or “strong” are connections that have been identified in the analyses performed here. The population health concept has been split into five different concepts, each of which should be investigated independently. This was mandated by the finding that welfare state regimes strongly reflect child health, and moderately reflect chronic and infectious disease measures, but do not seem connected with adult health measures. The health policy concept is separated from other public policies but is not further divided because the statistical analyses performed here did not identify differing levels of association for healthcare coverage, resources or cost/expenditure components. For example, it is not the case that healthcare coverage measures reflect welfare state regimes while healthcare resource measures do not. For population health, the contrast was stark – especially that child health strongly reflected welfare state regimes while adult health showed no connection at all.


Architecture of Welfare Policy by Degree of
Dominance of the market, civil networks, or state;
Egalitarianism in civil and human rights;
Universalism in provision of social services for citizens;
Generosity of social security arrangements for uneqmployment, sickness, old age, etc. (decommodification)
Public Policy
Public policy in agriculture, labour, energy, environment, economy, social security, trade, foreign policy, immigration and education, etc.;
Quality of intersectional coordination;
Provisions for disadvantaged and vulnerable groups;
("Welfare State Regime Types")
Weak
Health Policy
Intensity of public health and health care policy, expressed by expenditure for public health provisions (prevention, health promotion, health literacy);
Quality of health care services (access, coverage, etc);
Political power of public health and health care policy in government and civil society
Quality of Life Conditions by Levels of
Economic (in)equality;
Employment for all age groups;
Relative poverty;
Working conditions;
Participation of women in labour force;
Educational and occupational training;
Social integration and cohesion;
Political participation;
Availability of social networks;
Cultural integration of migrants;
Religious tolerance;
Criminality and antisocial behaviour;
Sense of control of the future;
Availability of good food and water;
Environmental protection
Weak
strong
Moderate
Health Status of the Adult Population by degree of
Quality of objective and subjective health and wellbeing
Health Status of the Child Population by degree of
Quality of objective and subjective health and wellbeing
Health Status of the Entire Population by degree of
Chronic and infectious disease prevalence and incidence
Health quality of disadvantaged groups and vulnerable parts of the population such as single mothers, families in poverty, badly integrated migrant groups, homeless, and handicapped;
Difference between the health status of the most privileged/rich and the most disadvantaged/poor segments of the population ("health inequality")

In this way, the findings of the analyses performed in this dissertation further complicate the cause and effect relationships between welfare state policies, health-specific policies and population health outcomes. It is also noteworthy that the aspects of health policies studied by Wendt (2009) would even further complicate the health policy concept since the aspects of health policies Wendt used (for example, rules regarding access to physicians and specialists, method of physician remuneration, and so on) generated different clustering patterns in an analysis of European countries. Wendt's findings may, for example, justify the further splitting of the health policy box into two boxes that may have different relationships with the other boxes in the model.

The concept of welfare state regimes typologies has been helpful as a building block for modeling population health. The regime groupings represent long-standing and copious bodies of research establishing them as effective summaries of overall approaches to social welfare, even as regime memberships are often being tweaked and classification methods continue to advance. Hurrelmann, Rathmann and Richter (2010), in advancing Navarro et al.'s (2006) model of the social and political causation of population health, use the regimes concept effectively as summaries of policy "values" dominantly held within national societies. These overall policy values shape and are shaped by the living conditions of the population, population health, and the application of government policies in every area. The analyses performed in this dissertation have fruitfully applied the welfare state regimes concept to further develop a useful model of the place of population health within civil society. Based on this, it is clear that emerging research in the population health field must apply the welfare state regimes concept

strategically. It cannot simply be assumed that states classified as “liberal” based on family or labour market policies will have characteristically “liberal” health policy structures or outcomes. The advanced model developed here builds on the agenda of developing a detailed strategy for applying the concept of welfare state regimes to the study of health.

APPENDICES

Appendix 1: Health System Outputs (Three Composite Measures)

Cluster Analysis: Squared Euclidean Distance

Proximity Matrix

Case	Squared Euclidean Distance																
	Australi	2:Austria	Belgium	Canad	Denmar	:Finland	:France	Germar	9:Italy	0:Nethe lands	11:New Zealand	2:Norwa	3:Spain	4:Swede	5:Switz rland	6:United Kingdom	7:United States
1:Australia	.000	12.171	11.521	2.881	9.835	9.113	8.456	27.262	10.352	3.775	2.665	24.661	5.340	1.256	12.902	9.046	24.919
2:Austria	12.171	.000	.726	19.733	12.893	19.934	15.378	23.402	.448	3.814	7.359	26.750	11.119	16.476	5.051	4.762	14.543
3:Belgium	11.521	.726	.000	19.811	16.654	17.743	16.078	28.851	.078	4.852	7.261	32.224	10.991	16.320	7.526	7.114	13.269
4:Canada	2.881	19.733	19.811	.000	7.006	21.630	3.708	19.429	18.300	6.477	3.351	15.769	15.435	.333	13.025	9.603	23.062
5:Denmark	9.835	12.893	16.654	7.006	.000	32.226	4.509	5.109	14.805	4.220	5.366	4.099	19.162	7.272	3.796	2.370	19.992
6:Finland	9.113	19.934	17.743	21.630	32.226	.000	34.116	61.482	16.859	16.934	18.522	58.952	2.208	16.742	33.483	27.585	51.229
7:France	8.456	15.378	16.078	3.708	4.509	34.116	.000	9.191	15.023	5.449	2.684	8.253	23.890	4.658	5.690	4.781	10.115
8:Germany	27.262	23.402	28.851	19.429	5.109	61.482	9.191	.000	27.032	14.925	15.938	.789	42.565	21.373	6.921	7.967	19.201
9:Italy	10.352	.448	.078	18.300	14.805	16.859	15.023	27.032	.000	3.884	6.432	30.070	9.828	14.923	6.654	6.054	13.795
10:Netherla	3.775	3.814	4.852	6.477	4.220	16.934	5.449	14.925	3.884	.000	1.093	15.175	8.441	4.883	3.015	1.386	14.339
11:New Zea	2.665	7.359	7.261	3.351	5.366	18.522	2.684	15.938	6.432	1.093	.000	15.426	11.235	2.458	4.817	3.054	11.920
12:Norway	24.661	26.750	32.224	15.769	4.099	58.952	8.253	.789	30.070	15.175	15.426	.000	40.975	18.080	9.121	9.176	23.482
13:Spain	5.340	11.119	10.991	15.435	19.162	2.208	23.890	42.565	9.828	8.441	11.235	40.975	.000	11.346	20.358	15.694	39.939
14:Sweden	1.256	16.476	16.320	.333	7.272	16.742	4.658	21.373	14.923	4.883	2.458	18.080	11.346	.000	12.286	8.722	23.025
15:Switzerla	12.902	5.051	7.526	13.025	3.796	33.483	5.690	6.921	6.654	3.015	4.817	9.121	20.358	12.286	.000	.431	9.007
16:United K	9.046	4.762	7.114	9.603	2.370	27.585	4.781	7.967	6.054	1.386	3.054	9.176	15.694	8.722	.431	.000	11.534
17:United S	24.919	14.543	13.269	23.062	19.992	51.229	10.115	19.201	13.795	14.339	11.920	23.482	39.939	23.025	9.007	11.534	.000

This is a dissimilarity matrix

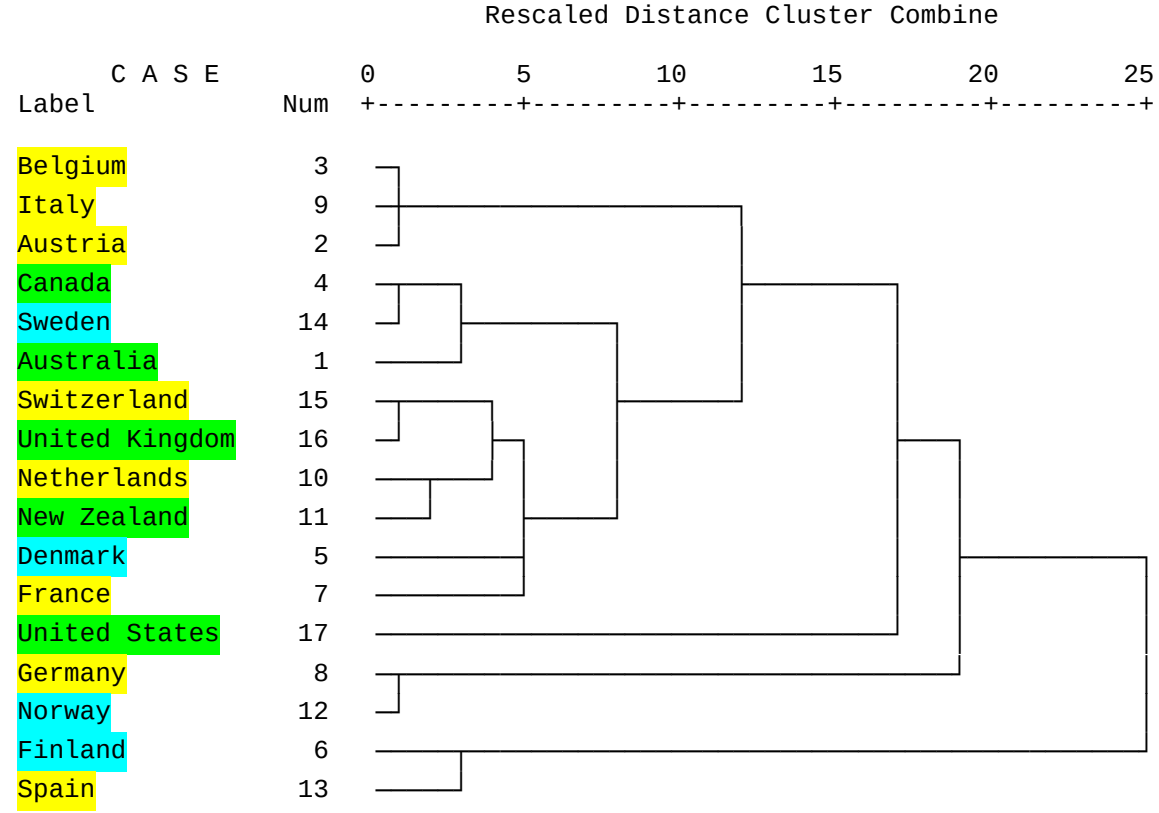
Derived Stimulus Configuration

Euclidean distance model

Case Numbers:

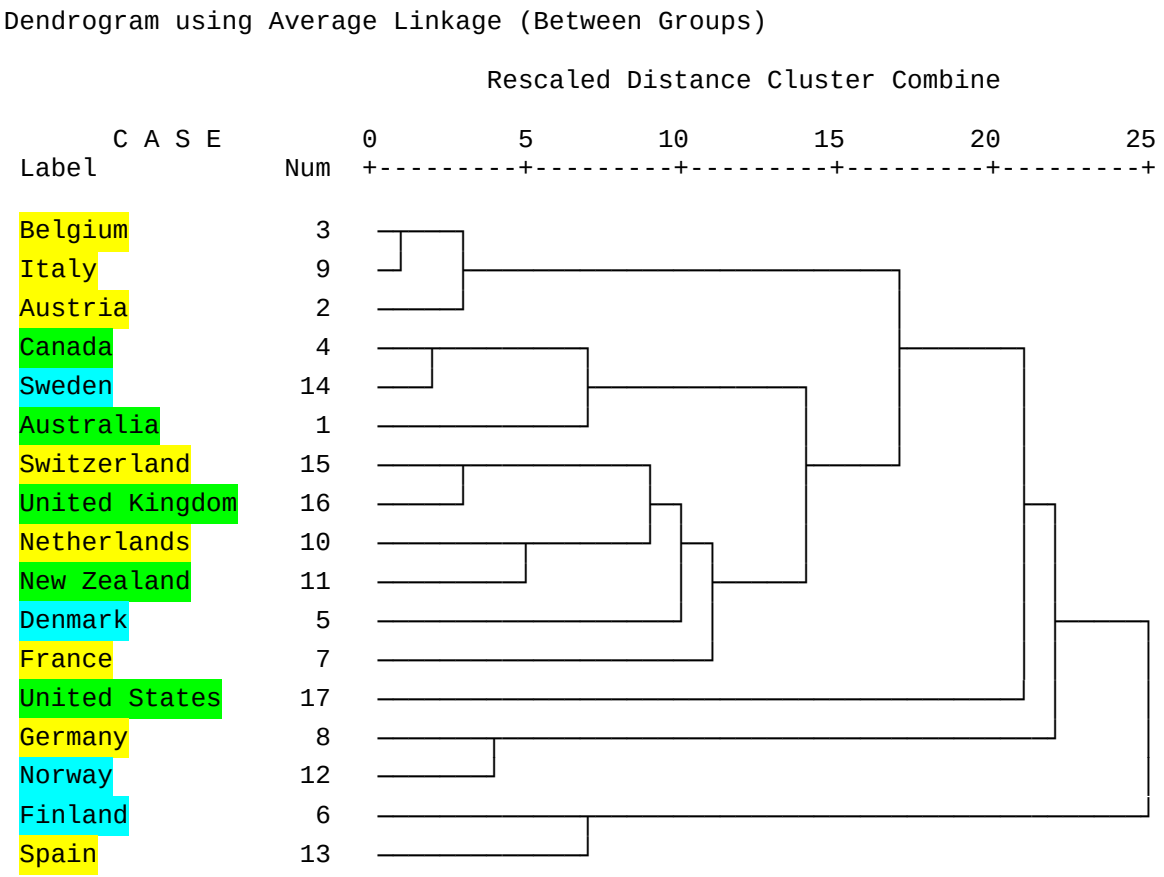
Australia	1	France	7	Spain	13
Austria	2	Germany	8	Sweden	14
Belgium	3	Italy	9	Switzerland	15
Canada	4	Netherlands	10	United Kingdom	16
Denmark	5	New Zealand	11	United States	17
Finland	6	Norway	12		

Dendrogram using Average Linkage (Between Groups)



$Eta^2 = .057$

Cluster Dendrogram: Euclidean Distance Replication



Appendix 2: Population Health (Three Composite Measures)

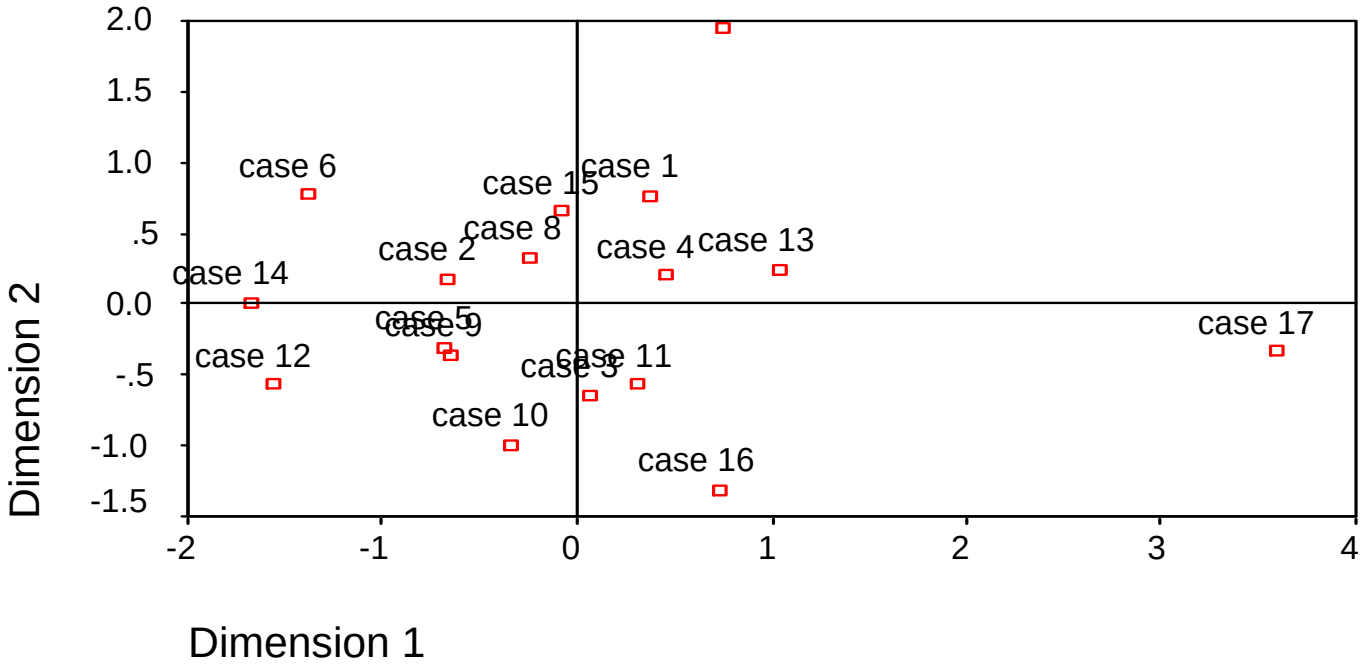
Proximity Matrix

Case	Squared Euclidean Distance																
	:Australi	2:Austria	:Belgium	:Canada	:Denmar	6:Finland	7:France	:German	9:Italy	0:Nethe lands	11:New Zealand	2:Norwa	13:Spain	4:Swede	5:Switze rland	16:United Kingdom	17:United States
1:Australia	.000	5.367	1.759	1.189	23.211	38.455	6.425	2.478	11.515	11.547	3.581	25.567	27.688	31.586	2.386	16.498	98.644
2:Austria	5.367	.000	4.553	6.512	11.906	18.241	10.667	.658	3.308	7.397	8.354	8.746	34.007	11.820	1.068	30.059	140.067
3:Belgium	1.759	4.553	.000	.630	16.084	32.631	6.607	1.969	7.006	5.350	.815	19.362	20.762	26.260	2.234	11.622	95.445
4:Canada	1.189	6.512	.630	.000	17.863	35.514	4.004	3.053	9.034	6.795	.756	23.317	17.902	30.369	2.743	10.056	86.567
5:Denmark	23.211	11.906	16.084	17.863	.000	5.813	13.472	12.891	2.768	3.802	15.983	3.932	18.840	7.018	12.034	34.022	142.590
6:Finland	38.455	18.241	32.631	35.514	5.813	.000	27.951	22.736	9.665	17.126	35.645	3.228	43.345	1.874	21.794	65.816	202.484
7:France	6.425	10.667	6.607	4.004	13.472	27.951	.000	7.192	9.400	7.845	5.483	22.587	11.788	27.986	5.326	16.008	90.443
8:Germany	2.478	.658	1.969	3.053	12.891	22.736	7.192	.000	4.000	6.201	4.692	12.347	28.048	16.632	.175	22.617	121.986
9:Italy	11.515	3.308	7.006	9.034	2.768	9.665	9.400	4.000	.000	2.013	8.612	3.481	22.413	6.937	3.873	27.590	135.800
10:Netherlan	11.547	7.397	5.350	6.795	3.802	17.126	7.845	6.201	2.013	.000	4.684	9.079	12.682	15.033	5.971	16.380	108.912
11:New Zeala	3.581	8.354	.815	.756	15.983	35.645	5.483	4.692	8.612	4.684	.000	22.718	14.088	30.759	4.590	6.744	81.161
12:Norway	25.567	8.746	19.362	23.317	3.932	3.228	22.587	12.347	3.481	9.079	22.718	.000	38.167	.881	12.572	49.270	180.386
13:Spain	27.688	34.007	20.762	17.902	18.840	43.345	11.788	28.048	22.413	12.682	14.088	38.167	.000	47.764	25.709	11.129	62.738
14:Sweden	31.586	11.820	26.260	30.369	7.018	1.874	27.986	16.632	6.937	15.033	30.759	.881	47.764	.000	16.701	61.907	202.693
15:Switzerlar	2.386	1.068	2.234	2.743	12.034	21.794	5.326	.175	3.873	5.971	4.590	12.572	25.709	16.701	.000	22.223	119.364
16:United Kir	16.498	30.059	11.622	10.056	34.022	65.816	16.008	22.617	27.590	16.380	6.744	49.270	11.129	61.907	22.223	.000	43.361
17:United Sta	98.644	40.067	95.445	86.567	142.590	02.484	90.443	121.986	35.800	08.912	81.161	.80.386	62.738	202.693	19.364	43.361	.000

This is a dissimilarity matrix

Derived Stimulus Configuration

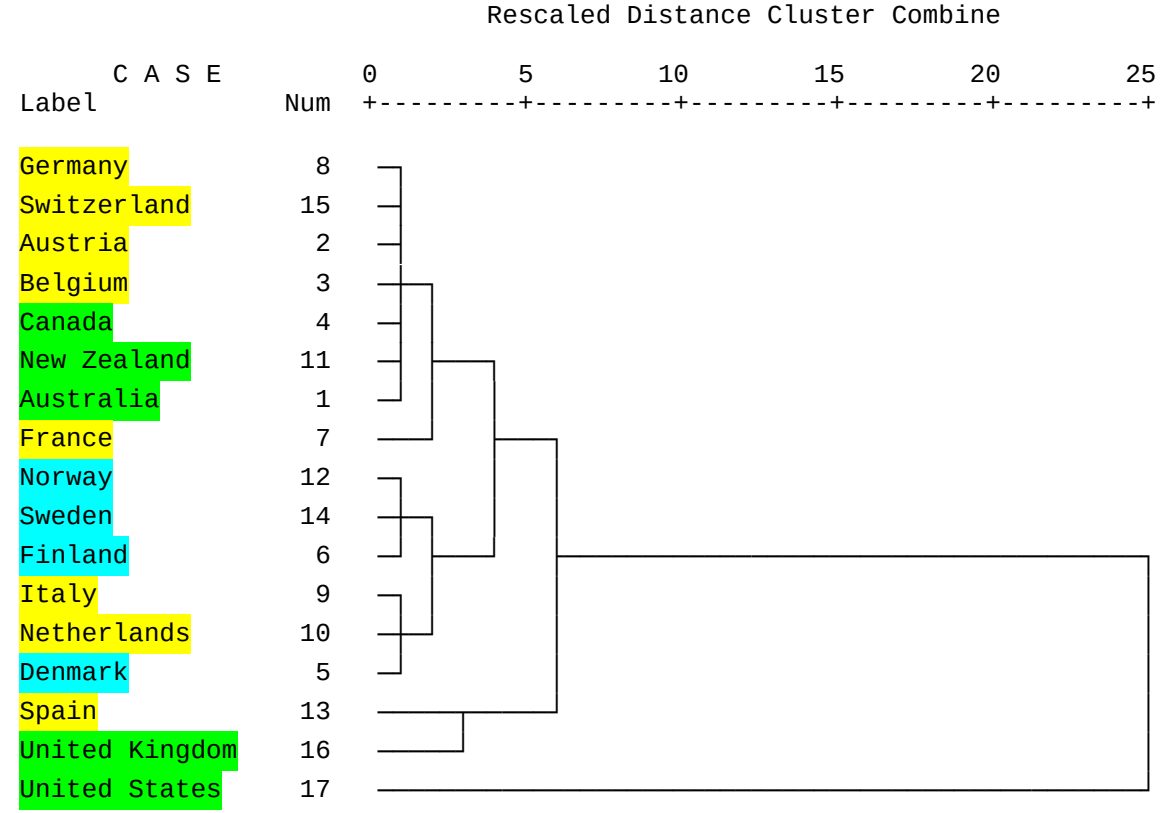
Euclidean distance model



Case Numbers:

Australia	1	France	7	Spain	13
Austria	2	Germany	8	Sweden	14
Belgium	3	Italy	9	Switzerland	15
Canada	4	Netherlands	10	United Kingdom	16
Denmark	5	New Zealand	11	United States	17
Finland	6	Norway	12		

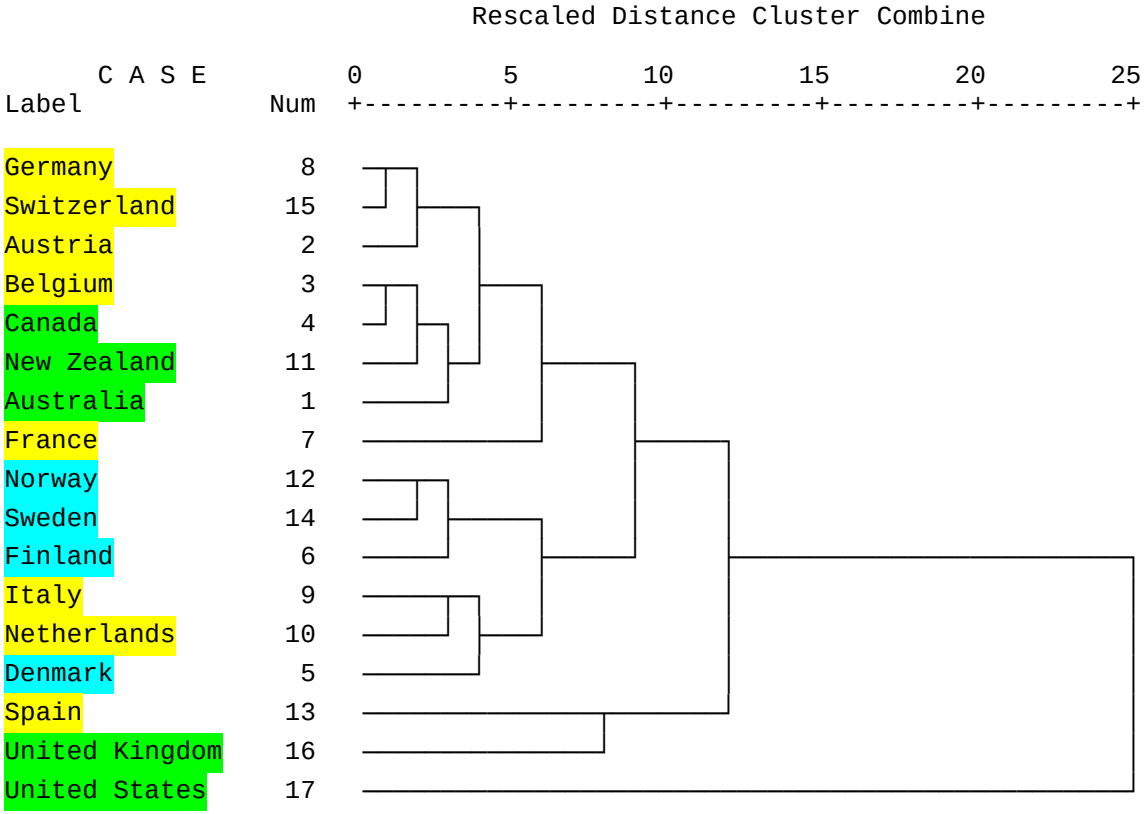
Dendrogram using Average Linkage (Between Groups)



$Eta^2 = .527$

Cluster Dendrogram: Euclidean Distance Replication

Dendrogram using Average Linkage (Between Groups)

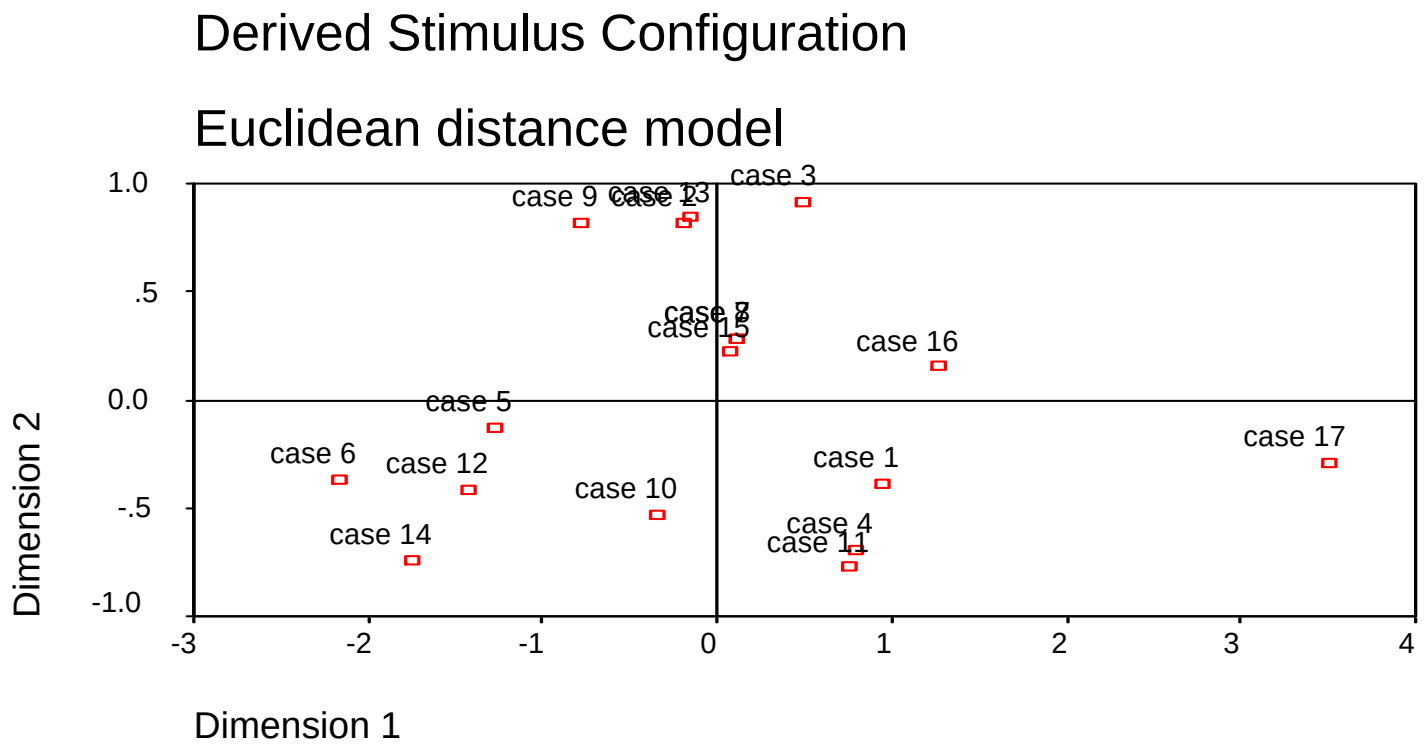


Appendix 3: Child Health

Proximity Matrix

Case	Squared Euclidean Distance																
	:Australi	2:Austria	:Belgiun	:Canada	:Denmar	6:Finland	7:France	:German	9:Italy	0:Nethe lands	11:New Zealand	2:Norwa	13:Spain	4:Swede	5:Switze rland	16:United Kingdom	17:United States
1:Australia	.000	4.047	3.026	.117	7.274	13.093	1.715	1.715	6.509	2.327	.262	8.032	4.157	9.919	1.664	.729	8.753
2:Austria	4.047	.000	1.054	4.572	3.261	7.310	.763	.763	.966	2.803	4.922	4.427	.007	7.028	.814	3.756	20.147
3:Belgium	3.026	1.054	.000	3.959	6.152	12.616	.729	.729	2.327	4.197	4.512	7.726	.960	11.041	.882	1.715	14.499
4:Canada	.117	4.572	3.959	.000	6.749	11.985	2.064	2.064	6.859	1.860	.029	7.274	4.740	8.753	1.955	1.428	9.919
5:Denmark	7.274	3.261	6.152	6.749	.000	1.426	3.237	3.237	1.639	1.605	6.575	.117	3.531	.882	3.026	9.606	31.697
6:Finland	13.093	7.310	12.616	11.985	1.426	.000	8.244	8.244	5.251	4.572	11.519	.960	7.726	.705	7.887	16.881	42.928
7:France	1.715	.763	.729	2.064	3.237	8.244	.000	.000	1.598	1.428	2.327	4.228	.814	6.523	.007	1.860	15.811
8:Germany	1.715	.763	.729	2.064	3.237	8.244	.000	.000	1.598	1.428	2.327	4.228	.814	6.523	.007	1.860	15.811
9:Italy	6.509	.966	2.327	6.859	1.639	5.251	1.598	1.598	.000	3.026	7.121	2.630	1.017	4.925	1.605	6.655	26.998
10:Netherlan	2.327	2.803	4.197	1.860	1.605	4.572	1.428	1.428	3.026	.000	1.715	1.780	3.058	2.647	1.231	4.512	20.095
11:New Zeal	.262	4.922	4.512	.029	6.575	11.519	2.327	2.327	7.121	1.715	.000	6.983	5.118	8.258	2.188	1.865	10.589
12:Norway	8.032	4.427	7.726	7.274	.117	.960	4.228	4.228	2.630	1.780	6.983	.000	4.755	.357	3.959	10.946	33.504
13:Spain	4.157	.007	.960	4.740	3.531	7.726	.814	.814	1.017	3.058	5.118	4.755	.000	7.458	.880	3.720	19.994
14:Sweden	9.919	7.028	11.041	8.753	.882	.705	6.523	6.523	4.925	2.647	8.258	.357	7.458	.000	6.152	13.853	37.227
15:Switzerlar	1.664	.814	.882	1.955	3.026	7.887	.007	.007	1.605	1.231	2.188	3.959	.880	6.152	.000	1.955	16.022
16:United Kir	.729	3.756	1.715	1.428	9.606	16.881	1.860	1.860	6.655	4.512	1.865	10.946	3.720	13.853	1.955	.000	6.859
17:United Sta	8.753	20.147	14.499	9.919	31.697	42.928	15.811	15.811	26.998	20.095	10.589	33.504	19.994	37.227	16.022	6.859	.000

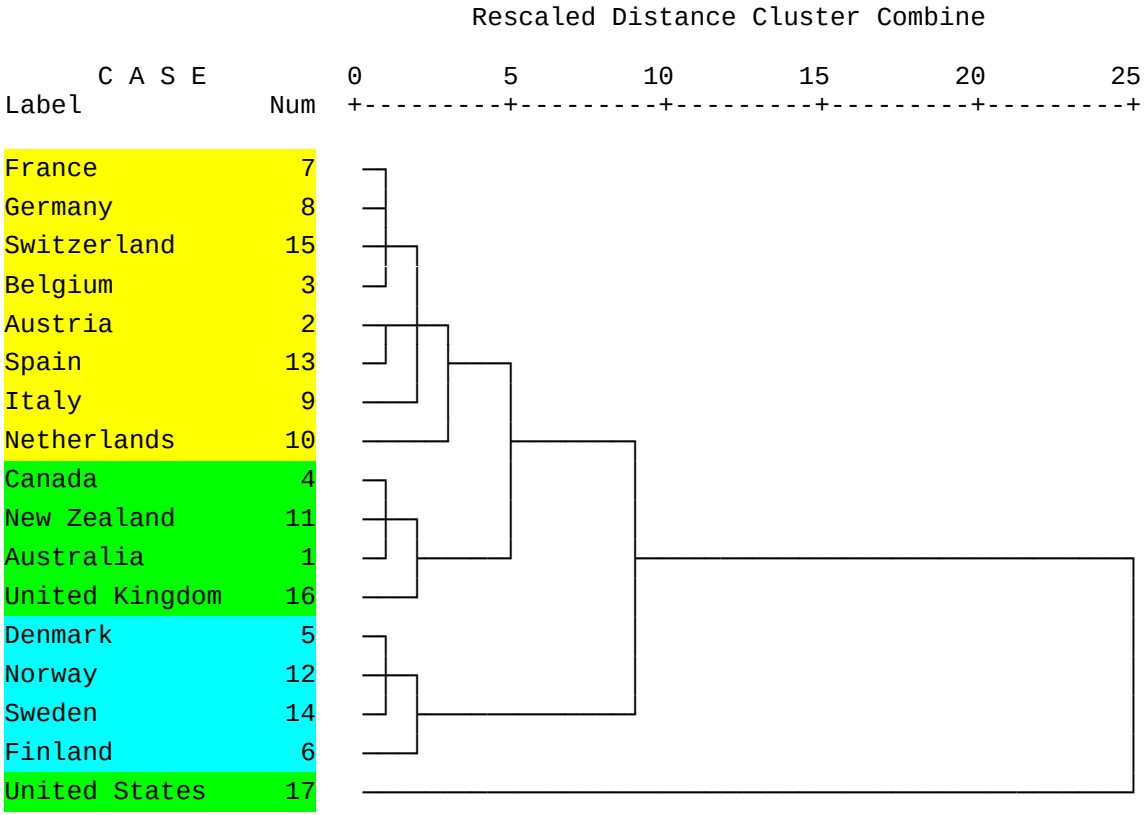
This is a dissimilarity matrix



Case Numbers:

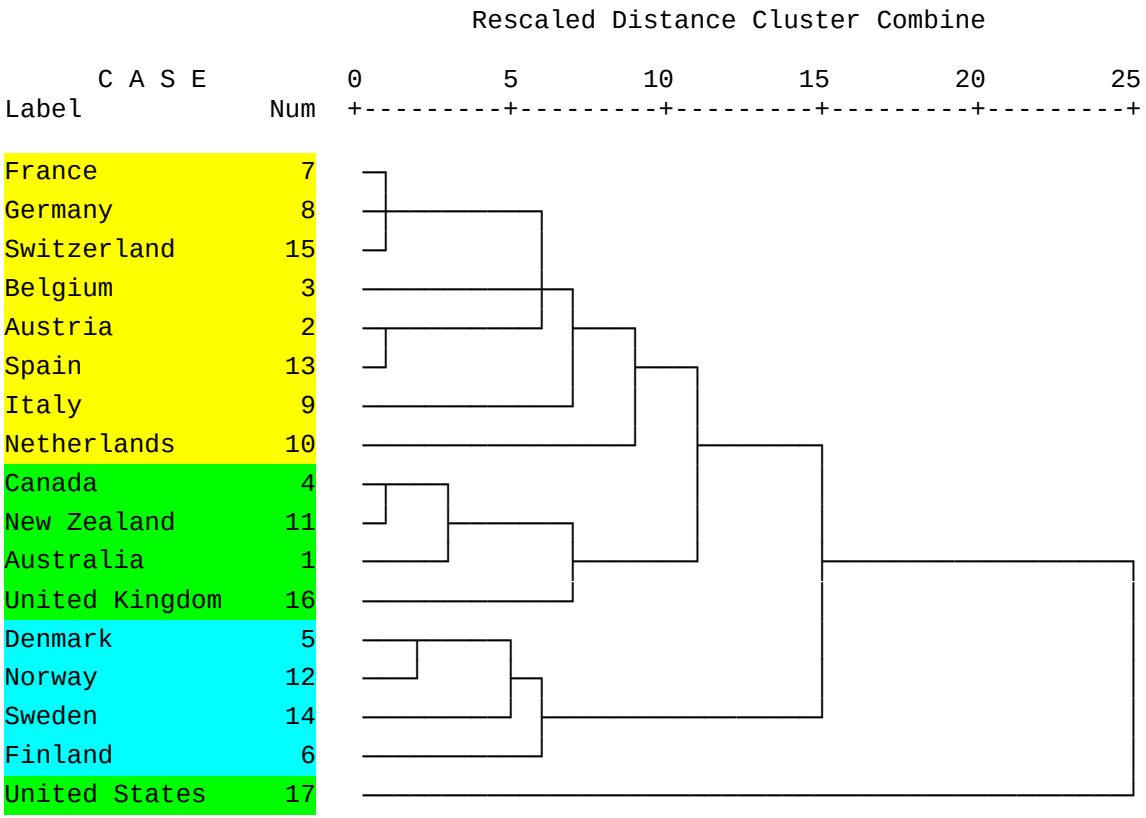
Australia	1	France	7	Spain	13
Austria	2	Germany	8	Sweden	14
Belgium	3	Italy	9	Switzerland	15
Canada	4	Netherlands	10	United Kingdom	16
Denmark	5	New Zealand	11	United States	17
Finland	6	Norway	12		

Dendrogram using Average Linkage (Between Groups)



Eta^2 = .756

Cluster Dendrogram: Euclidean Distance Replication


Rescaled Distance Cluster Combine
C A S E
Label Num
0 5 10 15 20 25
France 7
Germany 8
Switzerland 15
Belgium 3
Austria 2
Spain 13
Italy 9
Netherlands 10
Canada 4
New Zealand 11
Australia 1
United Kingdom 16
Denmark 5
Norway 12
Sweden 14
Finland 6
United States 17

Appendix 4: Adult Health

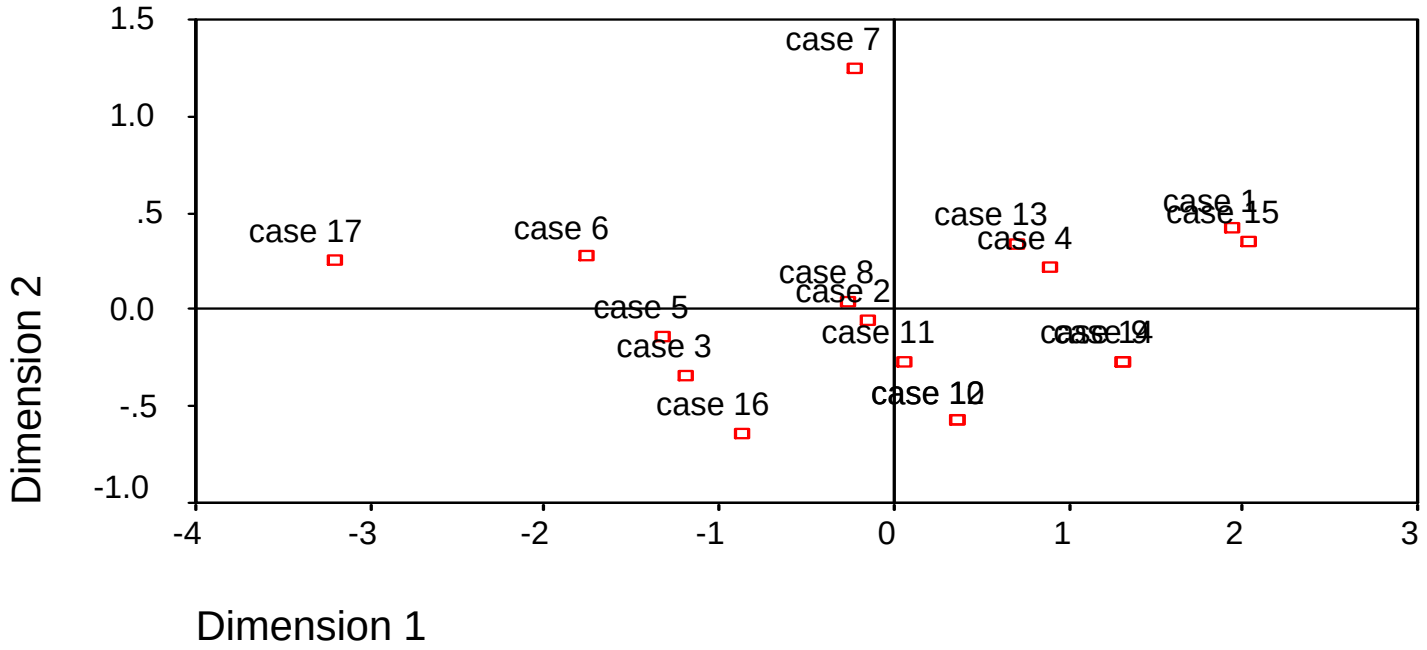
Proximity Matrix

Case	Squared Euclidean Distance															
	Australi	2:Austria	Belgium	Canad	Denmar	6:Finlan	7:France	Germar	9:Italy	10:Nethe lands	11:New Zealand	12:Norwa	13:Spain	14:Swede	15:Switz rland	16:United Kingdom	17:United States
1:Australia	.000	4.333	9.749	1.083	10.290	12.949	4.942	4.702	.788	3.280	3.742	3.280	1.397	.788	.025	8.419	24.421
2:Austria	4.333	.000	1.083	1.083	1.280	2.560	1.668	.025	2.166	.499	.098	.499	.880	2.166	4.702	.788	8.665
3:Belgium	9.749	1.083	.000	4.333	.025	.615	3.280	.935	6.105	2.357	1.526	2.357	3.871	6.105	10.290	.222	4.037
4:Canada	1.083	1.083	4.333	.000	4.702	6.671	2.222	1.280	.394	.806	.837	.806	.055	.394	1.280	3.520	15.460
5:Denmark	10.290	1.280	.025	4.702	.000	.394	3.182	1.083	6.671	2.776	1.822	2.776	4.167	6.671	10.881	.394	3.496
6:Finland	12.949	2.560	.615	6.671	.394	.000	3.280	2.166	9.429	4.942	3.496	4.942	5.841	9.429	13.737	1.576	1.822
7:France	4.942	1.668	3.280	2.222	3.182	3.280	.000	1.397	4.487	3.496	2.357	3.496	1.576	4.487	5.607	3.871	9.029
8:Germany	4.702	.025	.935	1.280	1.083	2.166	1.397	.000	2.560	.745	.222	.745	1.003	2.560	5.120	.788	7.951
9:Italy	.788	2.166	6.105	.394	6.671	9.429	4.487	2.560	.000	1.003	1.526	1.003	.745	.000	.788	4.702	19.497
10:Netherla	3.280	.499	2.357	.806	2.776	4.942	3.496	.745	1.003	.000	.154	.000	.935	1.003	3.428	1.397	12.487
11:New Zea	3.742	.098	1.526	.837	1.822	3.496	2.357	.222	1.526	.154	.000	.154	.782	1.526	4.013	.935	10.241
12:Norway	3.280	.499	2.357	.806	2.776	4.942	3.496	.745	1.003	.000	.154	.000	.935	1.003	3.428	1.397	12.487
13:Spain	1.397	.880	3.871	.055	4.167	5.841	1.576	1.003	.745	.935	.782	.935	.000	.745	1.668	3.280	14.149
14:Sweden	.788	2.166	6.105	.394	6.671	9.429	4.487	2.560	.000	1.003	1.526	1.003	.745	.000	.788	4.702	19.497
15:Switzerla	.025	4.702	10.290	1.280	10.881	13.737	5.607	5.120	.788	3.428	4.013	3.428	1.668	.788	.000	8.813	25.528
16:United K	8.419	.788	.222	3.520	.394	1.576	3.871	.788	4.702	1.397	.935	1.397	3.280	4.702	8.813	.000	5.957
17:United S	24.421	8.665	4.037	15.460	3.496	1.822	9.029	7.951	19.497	12.487	10.241	12.487	14.149	19.497	25.528	5.957	.000

This is a dissimilarity matrix

Derived Stimulus Configuration

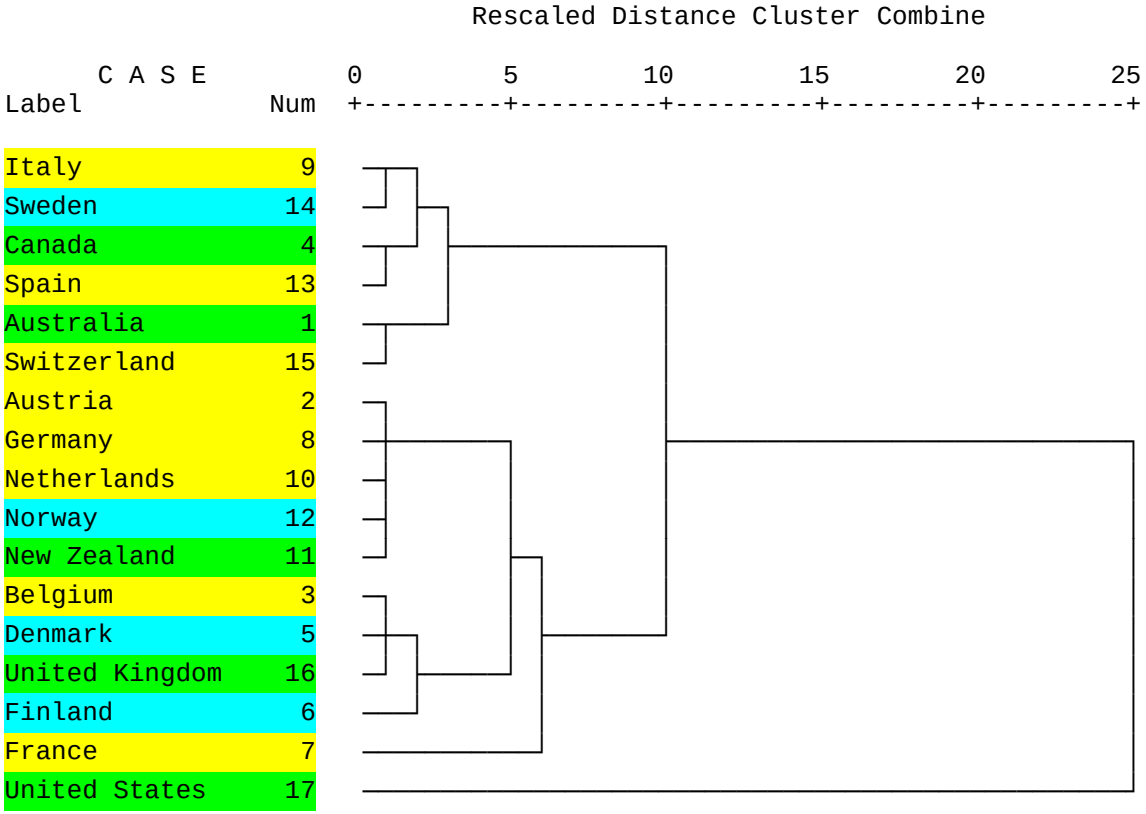
Euclidean distance model



Case Numbers:

Australia	1	France	7	Spain	13
Austria	2	Germany	8	Sweden	14
Belgium	3	Italy	9	Switzerland	15
Canada	4	Netherlands	10	United Kingdom	16
Denmark	5	New Zealand	11	United States	17
Finland	6	Norway	12		

Dendrogram using Average Linkage (Between Groups)



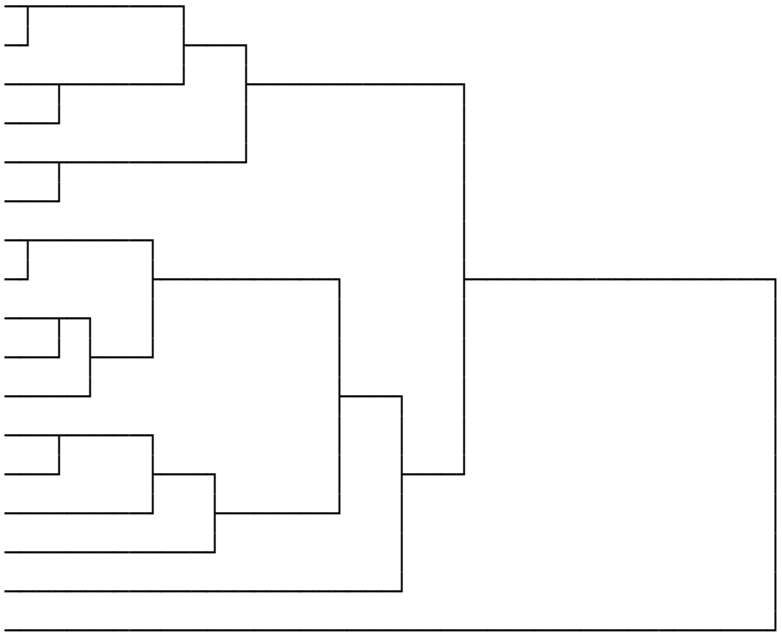
$Eta^2 = .061$

Cluster Dendrogram: Euclidean Distance Replication

Dendrogram using Average Linkage (Between Groups)

Rescaled Distance Cluster Combine

C A S E Label	Num
Italy	9
Sweden	14
Canada	4
Spain	13
Australia	1
Switzerland	15
Netherlands	10
Norway	12
Austria	2
Germany	8
New Zealand	11
Belgium	3
Denmark	5
United Kingdom	16
Finland	6
France	7
United States	17



Appendix 5: Chronic and Infectious Disease

Proximity Matrix

Case	Squared Euclidean Distance																
	Australi	:Austria	Belgium	:Canad	Denmar	:Finland	:France	German	9:Italy	0:Nethe lands	11:New Zealand	2:Norwa	3:Spain	4:Swede	5:Switz rland	6:United Kingdom	7:United States
1:Australia	.000	3.118	1.657	.829	4.013	.176	2.726	.074	.336	1.469	1.995	.085	17.325	.424	.715	10.824	27.482
2:Austria	3.118	.000	1.427	6.580	7.784	3.993	3.522	2.804	2.895	6.812	5.870	2.804	12.463	1.808	2.544	16.435	41.619
3:Belgium	1.657	1.427	.000	3.726	7.379	2.630	.531	1.464	1.185	2.668	4.305	1.487	9.053	1.831	.986	8.427	32.037
4:Canada	.829	6.580	3.726	.000	3.021	.503	4.341	1.202	1.658	.803	1.151	1.204	20.120	2.204	2.670	9.711	22.837
5:Denmark	4.013	7.784	7.379	3.021	.000	3.118	9.319	4.962	5.312	5.874	.704	4.961	23.076	4.629	7.486	19.819	25.503
6:Finland	.176	3.993	2.630	.503	3.118	.000	3.990	.326	.962	1.622	1.436	.317	19.874	.647	1.571	11.873	28.012
7:France	2.726	3.522	.531	4.341	9.319	3.990	.000	2.611	1.766	2.343	5.555	2.668	7.073	3.691	1.600	5.609	27.607
8:Germany	.074	2.804	1.464	1.202	4.962	.326	2.611	.000	.416	1.631	2.638	.002	17.327	.336	.538	10.582	29.796
9:Italy	.336	2.895	1.185	1.658	5.312	.962	1.766	.416	.000	1.820	3.060	.468	14.725	.824	.243	10.327	25.319
10:Netherla	1.469	6.812	2.668	.803	5.874	1.622	2.343	1.631	1.820	.000	2.644	1.640	15.413	3.308	2.382	4.995	22.982
11:New Zea	1.995	5.870	4.305	1.151	.704	1.436	5.555	2.638	3.060	2.644	.000	2.630	18.480	2.959	4.654	13.244	24.767
12:Norway	.085	2.804	1.487	1.204	4.961	.317	2.668	.002	.468	1.640	2.630	.000	17.444	.333	.582	10.597	30.119
13:Spain	17.325	12.463	9.053	20.120	23.076	19.874	7.073	17.327	14.725	15.413	18.480	17.444	.000	18.493	14.566	12.649	38.736
14:Sweden	.424	1.808	1.831	2.204	4.629	.647	3.691	.336	.824	3.308	2.959	.333	18.493	.000	.934	14.263	33.251
15:Switzerla	.715	2.544	.986	2.670	7.486	1.571	1.600	.538	.243	2.382	4.654	.582	14.566	.934	.000	10.061	29.026
16:United Ki	10.824	16.435	8.427	9.711	19.819	11.873	5.609	10.582	10.327	4.995	13.244	10.597	12.649	14.263	10.061	.000	29.139
17:United St	27.482	41.619	32.037	22.837	25.503	28.012	27.607	29.796	25.319	22.982	24.767	30.119	38.736	33.251	29.026	29.139	.000

This is a dissimilarity matrix

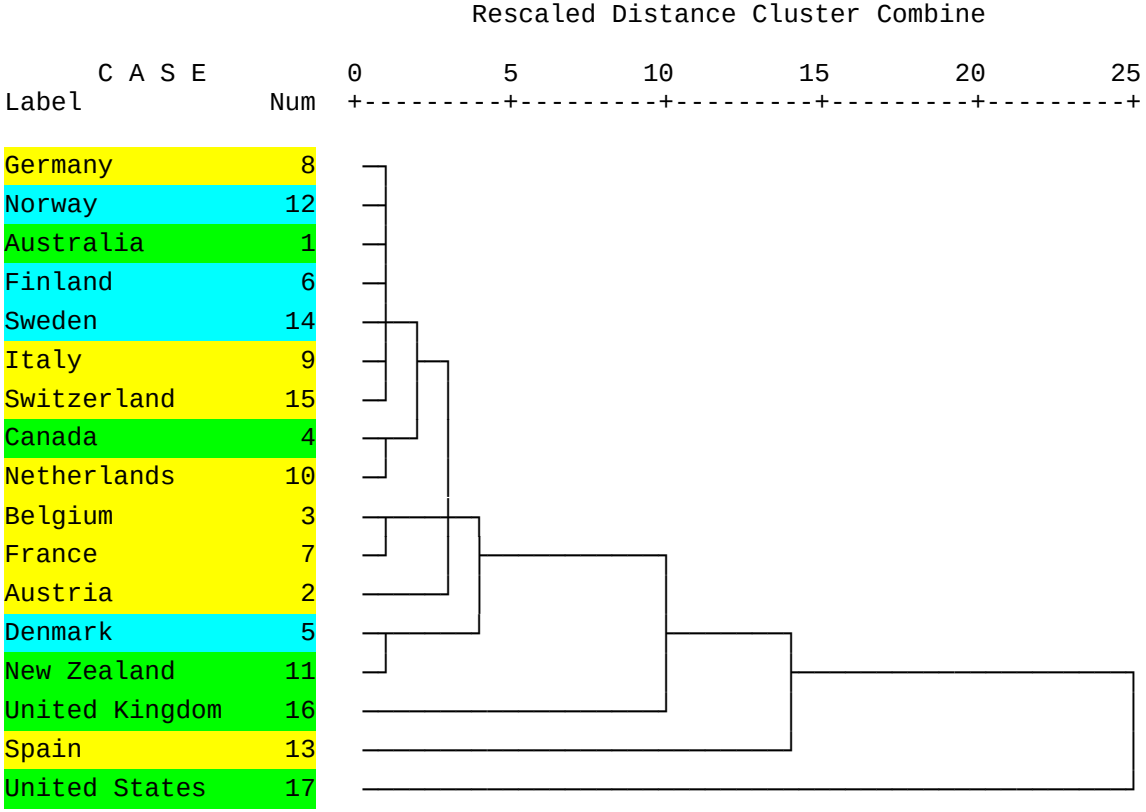
Derived Stimulus Configuration

Euclidean distance model

Case Numbers:

Australia	1	France	7	Spain	13
Austria	2	Germany	8	Sweden	14
Belgium	3	Italy	9	Switzerland	15
Canada	4	Netherlands	10	United Kingdom	16
Denmark	5	New Zealand	11	United States	17
Finland	6	Norway	12		

Dendrogram using Average Linkage (Between Groups)



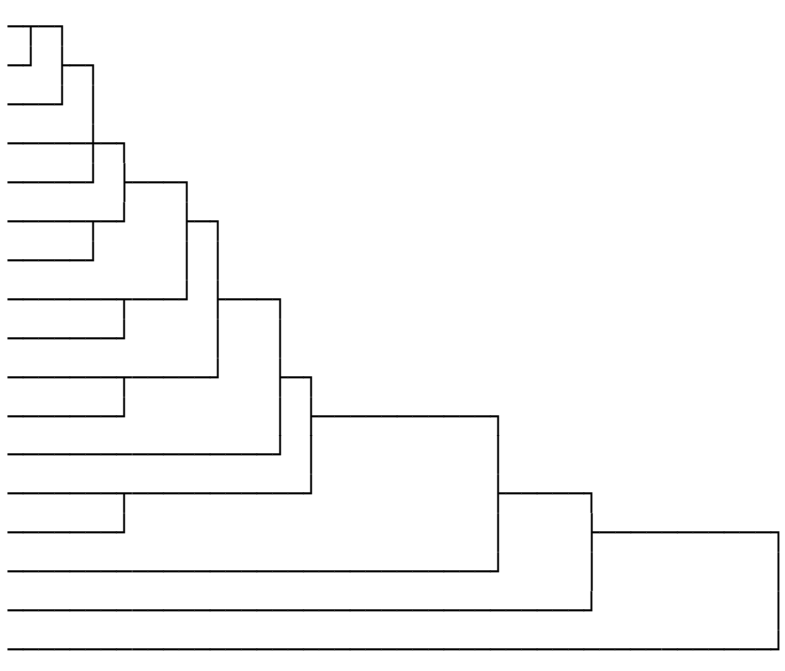
$Eta^2 = .225$

Cluster Dendrogram: Euclidean Distance Replication

Dendrogram using Average Linkage (Between Groups)

Rescaled Distance Cluster Combine

C A S E Label	Num
Germany	8
Norway	12
Australia	1
Finland	6
Sweden	14
Italy	9
Switzerland	15
Canada	4
Netherlands	10
Belgium	3
France	7
Austria	2
Denmark	5
New Zealand	11
United Kingdom	16
Spain	13
United States	17



Appendix 6: Expenditure on and Cost of Healthcare

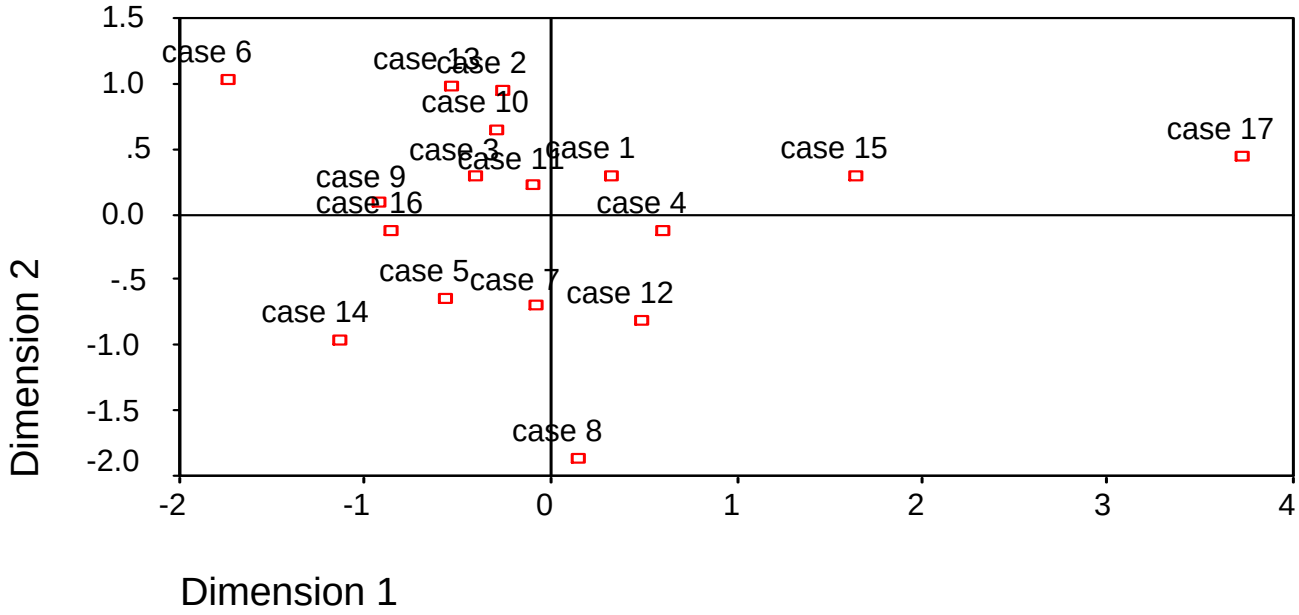
Proximity Matrix

Case	Squared Euclidean Distance																
	Australi	1:Austria	Belgium	Canad	Denmar	:Finlan	:France	Germar	9:Italy	0:Nethe lands	11:New Zealanc	2:Norwa	3:Spain	4:Swede	5:Switz rland	6:Unitec Kingdom	7:Unitec States
1:Australia	.000	3.136	2.691	.713	4.524	8.688	3.137	8.147	3.267	2.984	1.996	5.264	2.474	7.529	3.105	4.253	17.390
2:Austria	3.136	.000	3.009	4.425	5.434	3.745	5.843	15.867	2.825	.559	4.424	6.564	1.513	8.546	8.499	3.198	23.310
3:Belgium	2.691	3.009	.000	3.930	2.997	3.398	3.518	9.439	.683	3.696	6.107	7.203	2.416	2.716	9.803	4.371	24.181
4:Canada	.713	4.425	3.930	.000	3.472	11.960	1.686	5.423	4.714	3.522	2.393	2.518	5.082	7.157	2.267	4.258	15.164
5:Denmark	4.524	5.434	2.997	3.472	.000	8.217	.511	4.120	2.280	3.678	4.551	2.544	6.122	1.448	11.168	1.699	28.888
6:Finland	8.688	3.745	3.398	11.960	8.217	.000	10.842	21.547	2.406	5.151	10.507	15.326	2.710	7.433	20.358	6.389	39.634
7:France	3.137	5.843	3.518	1.686	.511	10.842	.000	2.627	3.402	4.023	3.648	1.474	6.636	2.804	7.535	2.509	23.354
8:Germany	8.147	15.867	9.439	5.423	4.120	21.547	2.627	.000	9.686	12.843	8.803	5.316	15.271	5.632	11.640	8.903	27.787
9:Italy	3.267	2.825	.683	4.714	2.280	2.406	3.402	9.686	.000	2.731	4.501	7.389	1.639	2.501	12.113	2.293	30.789
10:Netherla	2.984	.559	3.696	3.522	3.678	5.151	4.023	12.843	2.731	.000	2.569	4.420	2.068	7.562	8.377	1.314	25.496
11:New Zea	1.996	4.424	6.107	2.393	4.551	10.507	3.648	8.803	4.501	2.569	.000	5.329	3.430	9.366	6.515	2.036	27.184
12:Norway	5.264	6.564	7.203	2.518	2.544	15.326	1.474	5.316	7.389	4.420	5.329	.000	10.066	6.997	6.734	4.071	19.610
13:Spain	2.474	1.513	2.416	5.082	6.122	2.710	6.636	15.271	1.639	2.068	3.430	10.066	.000	8.070	10.011	3.540	28.673
14:Sweden	7.529	8.546	2.716	7.157	1.448	7.433	2.804	5.632	2.501	7.562	9.366	6.997	8.070	.000	16.709	4.975	34.155
15:Switzerla	3.105	8.499	9.803	2.267	11.168	20.358	7.535	11.640	12.113	8.377	6.515	6.734	10.011	16.709	.000	11.631	7.519
16:United K	4.253	3.198	4.371	4.258	1.699	6.389	2.509	8.903	2.293	1.314	2.036	4.071	3.540	4.975	11.631	.000	33.063
17:United S	17.390	23.310	24.181	15.164	28.888	39.634	23.354	27.787	30.789	25.496	27.184	19.610	28.673	34.155	7.519	33.063	.000

This is a dissimilarity matrix

Derived Stimulus Configuration

Euclidean distance model

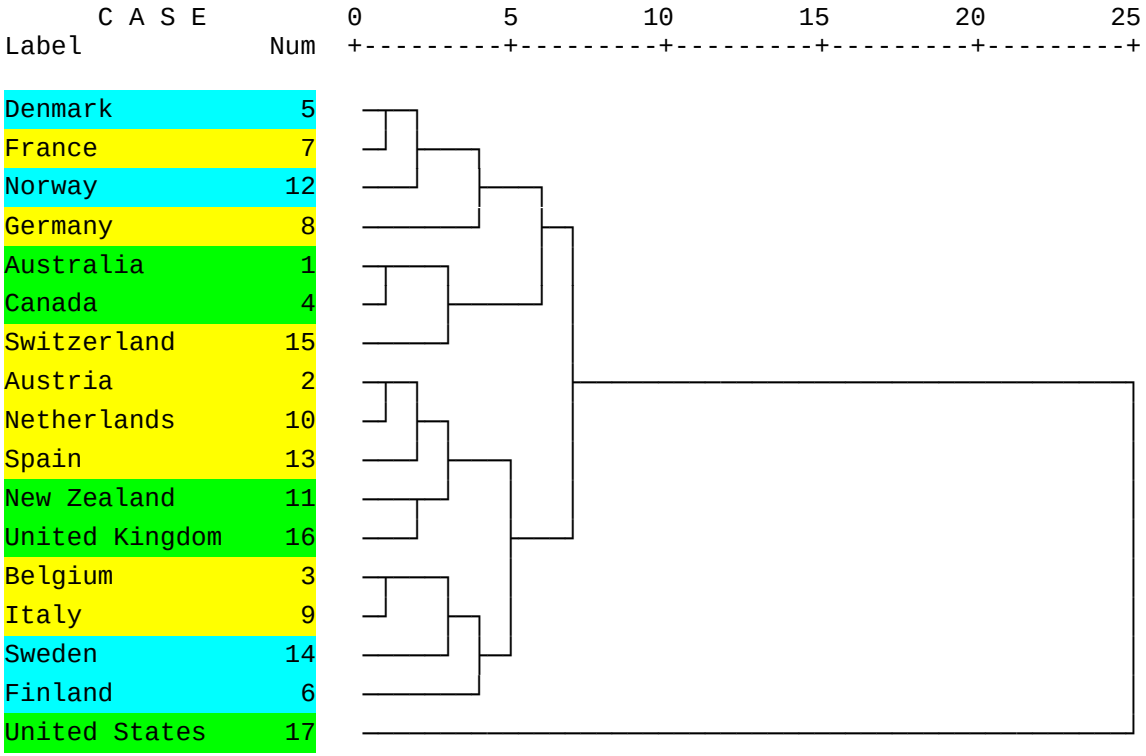


Case Numbers:

Australia	1	France	7	Spain	13
Austria	2	Germany	8	Sweden	14
Belgium	3	Italy	9	Switzerland	15
Canada	4	Netherlands	10	United Kingdom	16
Denmark	5	New Zealand	11	United States	17
Finland	6	Norway	12		

Dendrogram using Average Linkage (Between Groups)

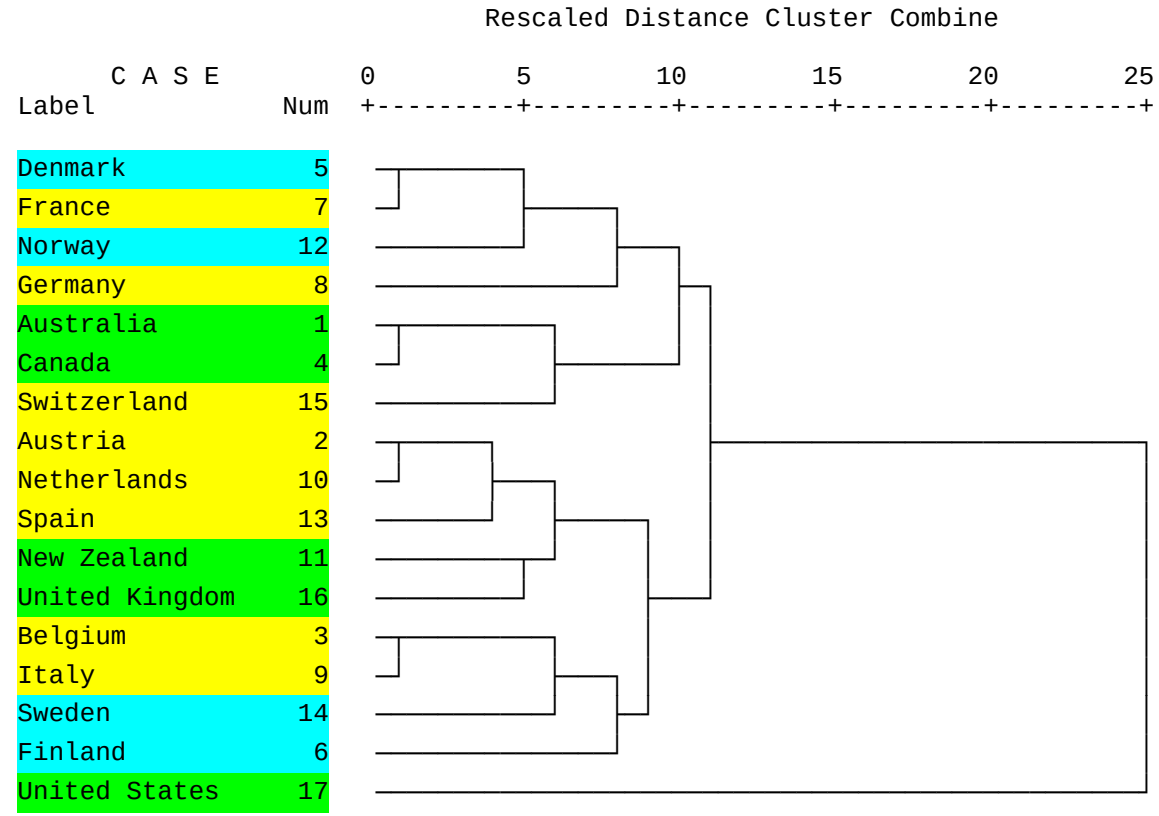
Rescaled Distance Cluster Combine



$Eta^2 = .028$

Cluster Dendrogram: Euclidean Distance Replication

Dendrogram using Average Linkage (Between Groups)

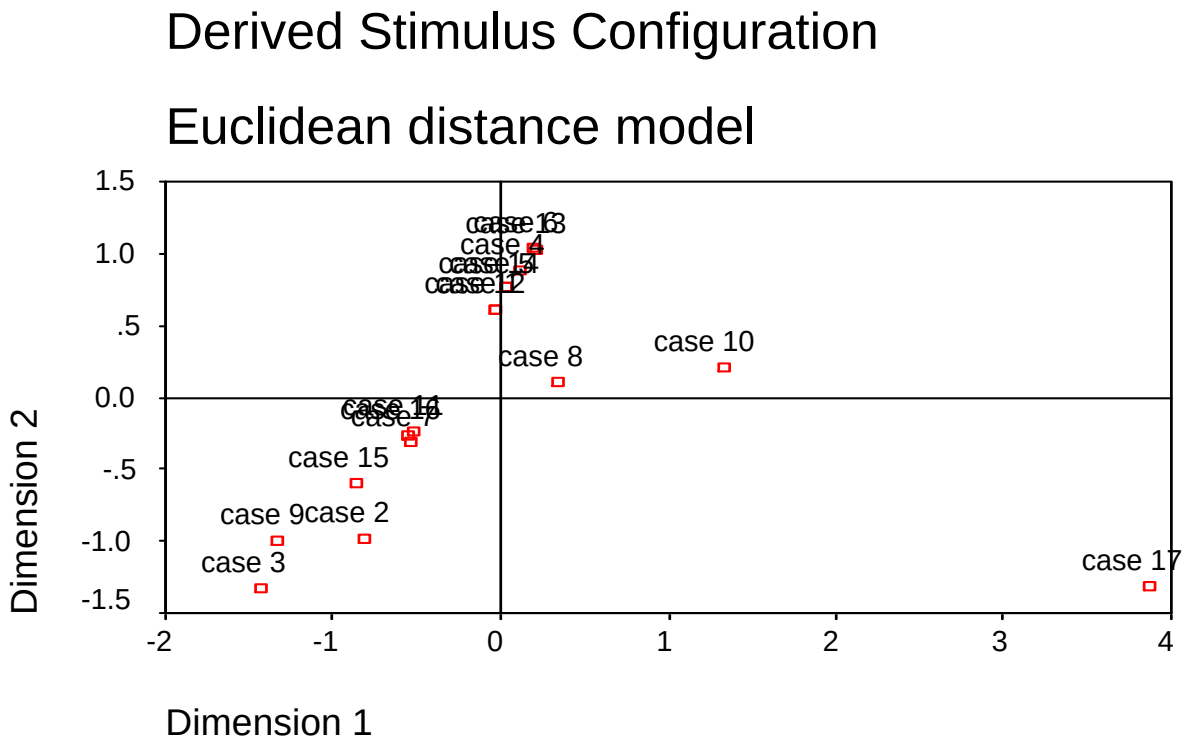


Appendix 7: Healthcare Coverage

Proximity Matrix

Case	Squared Euclidean Distance																
	1:Australi	2:Austria	3:Belgiun	4:Canada	5:Denmar	6:Finland	7:France	8:German	9:Italy	10:Nethe lands	11:New Zealand	12:Norwa	13:Spain	14:Swede	15:Switze rland	16:United Kingdom	17:United States
1:Australia	.000	3.772	6.195	.043	.019	.172	1.349	.289	5.203	1.883	1.223	.000	.172	.019	2.752	1.317	16.222
2:Austria	3.772	.000	.317	4.618	4.326	5.549	.624	3.046	.146	6.838	.714	3.772	5.546	4.326	.103	.647	17.839
3:Belgium	6.195	.317	.000	7.270	6.902	8.431	1.764	5.330	.046	10.002	1.914	6.195	8.430	6.902	.691	1.801	20.883
4:Canada	.043	4.618	7.270	.000	.005	.043	1.873	.424	6.192	1.754	1.725	.043	.043	.005	3.483	1.835	16.357
5:Denmark	.019	4.326	6.902	.005	.000	.076	1.689	.369	5.853	1.788	1.548	.019	.077	.000	3.230	1.653	16.303
6:Finland	.172	5.549	8.431	.043	.076	.000	2.484	.644	7.267	1.711	2.312	.172	.000	.076	4.300	2.440	16.578
7:France	1.349	.624	1.764	1.873	1.689	2.484	.000	1.118	1.254	4.181	.003	1.349	2.484	1.689	.248	.000	17.014
8:Germany	.289	3.046	5.330	.424	.369	.644	1.118	.000	4.483	1.074	1.023	.289	.634	.369	2.307	1.098	12.473
9:Italy	5.203	.146	.046	6.192	5.853	7.267	1.254	4.483	.000	8.979	1.381	5.203	7.267	5.853	.387	1.285	20.416
10:Netherlan	1.883	6.838	10.002	1.754	1.788	1.711	4.181	1.074	8.979	.000	4.024	1.883	1.683	1.788	6.012	4.152	7.767
11:New Zeal	1.223	.714	1.914	1.725	1.548	2.312	.003	1.023	1.381	4.024	.000	1.223	2.313	1.548	.306	.002	16.956
12:Norway	.000	3.772	6.195	.043	.019	.172	1.349	.289	5.203	1.883	1.223	.000	.172	.019	2.752	1.317	16.222
13:Spain	.172	5.546	8.430	.043	.077	.000	2.484	.634	7.267	1.683	2.313	.172	.000	.077	4.300	2.440	16.491
14:Sweden	.019	4.326	6.902	.005	.000	.076	1.689	.369	5.853	1.788	1.548	.019	.077	.000	3.230	1.653	16.303
15:Switzerlar	2.752	.103	.691	3.483	3.230	4.300	.248	2.307	.387	6.012	.306	2.752	4.300	3.230	.000	.262	18.240
16:United Kir	1.317	.647	1.801	1.835	1.653	2.440	.000	1.098	1.285	4.152	.002	1.317	2.440	1.653	.262	.000	17.031
17:United Sta	16.222	17.839	20.883	16.357	16.303	16.578	17.014	12.473	20.416	7.767	16.956	16.222	16.491	16.303	18.240	17.031	.000

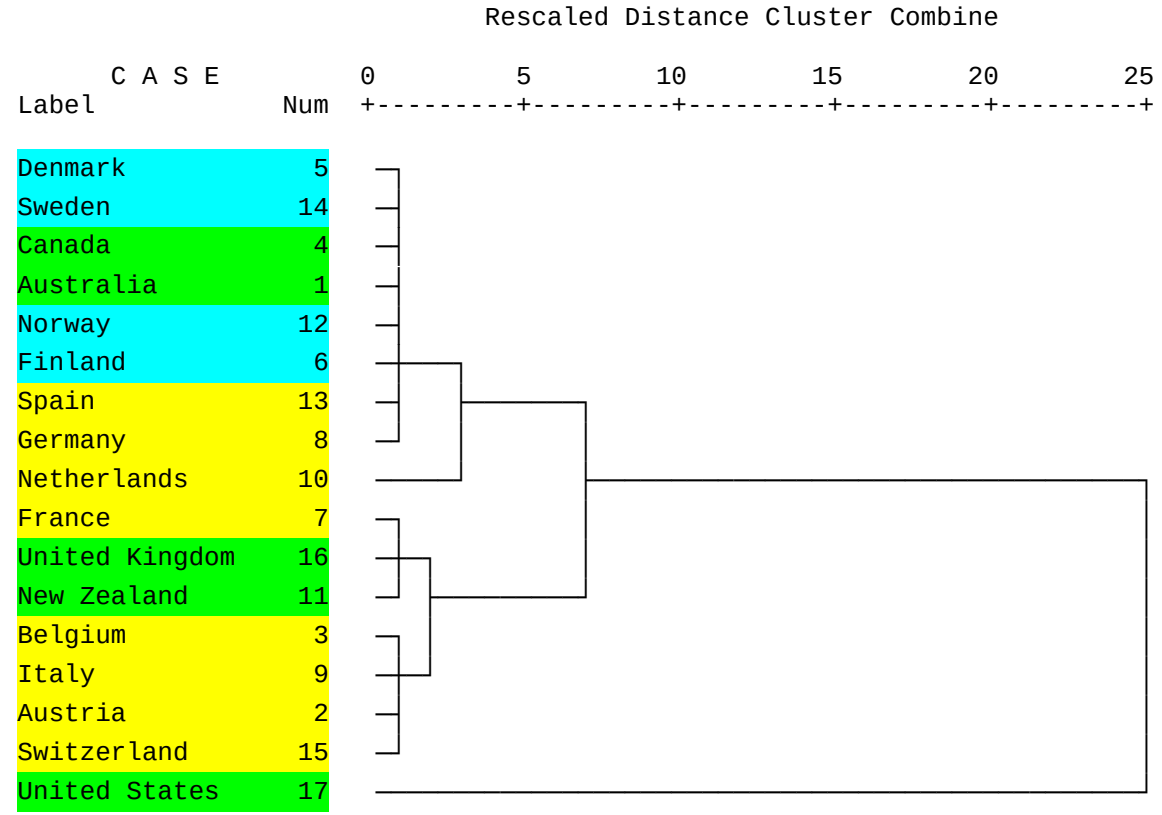
This is a dissimilarity matrix



Case Numbers:

Australia	1	France	7	Spain	13
Austria	2	Germany	8	Sweden	14
Belgium	3	Italy	9	Switzerland	15
Canada	4	Netherlands	10	United Kingdom	16
Denmark	5	New Zealand	11	United States	17
Finland	6	Norway	12		

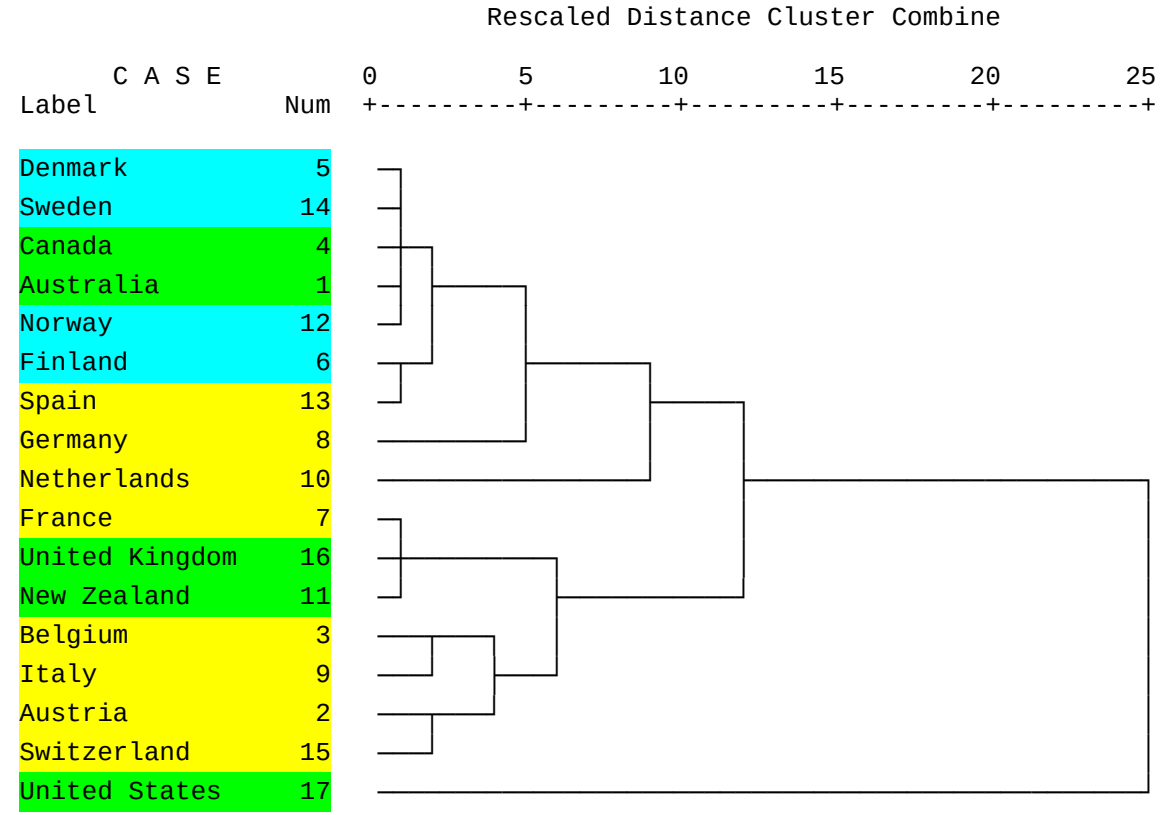
Dendrogram using Average Linkage (Between Groups)



$Eta^2 = .262$

Cluster Dendrogram: Euclidean Distance Replication

Dendrogram using Average Linkage (Between Groups)



Appendix 8: Healthcare Resources

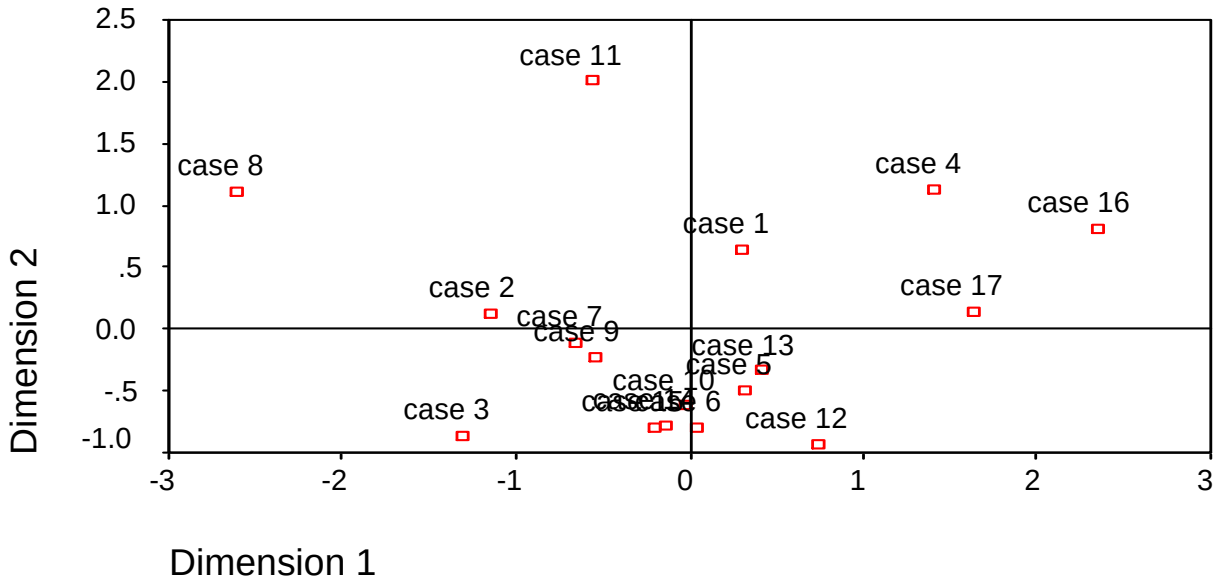
Proximity Matrix

Case	Squared Euclidean Distance																
	Australi	:Austria	:Belgiun	:Canad	Denmar	:Finlan	:France	German	9:Italy	0:Nethe lands	11:New Zealand	2:Norwa	3:Spain	4:Swede	5:Switz rland	6:United Kingdom	7:United States
1:Australia	.000	5.088	7.227	1.515	3.271	2.195	2.463	12.075	3.329	3.114	3.968	5.147	1.774	2.308	4.975	6.898	3.041
2:Austria	5.088	.000	1.546	11.080	3.905	5.076	1.843	3.408	.802	2.851	5.636	5.539	4.533	4.884	2.499	14.745	10.206
3:Belgium	7.227	1.546	.000	14.863	4.299	3.674	1.476	7.724	1.140	2.202	11.217	5.617	4.514	3.384	2.145	20.263	13.120
4:Canada	1.515	11.080	14.863	.000	6.121	6.012	7.751	19.368	8.414	7.321	6.373	7.783	4.375	6.463	9.614	3.696	1.799
5:Denmark	3.271	3.905	4.299	6.121	.000	2.210	3.013	13.978	1.432	.505	10.591	.258	.495	2.651	.559	6.825	2.917
6:Finland	2.195	5.076	3.674	6.012	2.210	.000	1.131	15.134	2.166	1.004	9.988	3.474	.791	.038	2.688	12.285	5.663
7:France	2.463	1.843	1.476	7.751	3.013	1.131	.000	8.248	.809	1.318	6.437	4.833	2.042	.907	2.464	14.512	8.129
8:Germany	12.075	3.408	7.724	19.368	13.978	15.134	8.248	.000	7.406	12.302	5.322	16.951	14.781	14.499	11.623	24.634	21.114
9:Italy	3.329	.802	1.140	8.414	1.432	2.166	.809	7.406	.000	.630	7.290	2.578	1.688	2.167	.706	11.862	6.810
10:Netherlar	3.114	2.851	2.202	7.321	.505	1.004	1.318	12.302	.630	.000	10.090	1.185	.488	1.193	.411	10.379	4.988
11:New Zea	3.968	5.636	11.217	6.373	10.591	9.988	6.437	5.322	7.290	10.090	.000	13.831	9.396	9.696	11.534	12.828	10.606
12:Norway	5.147	5.539	5.617	7.783	.258	3.474	4.833	16.951	2.578	1.185	13.831	.000	1.217	4.076	.861	6.927	3.277
13:Spain	1.774	4.533	4.514	4.375	.495	.791	2.042	14.781	1.688	.488	9.396	1.217	.000	1.110	1.436	7.407	2.681
14:Sweden	2.308	4.884	3.384	6.463	2.651	.038	.907	14.499	2.167	1.193	9.696	4.076	1.110	.000	2.957	13.356	6.452
15:Switzerla	4.975	2.499	2.145	9.614	.559	2.688	2.464	11.623	.706	.411	11.534	.861	1.436	2.957	.000	10.744	5.963
16:United Ki	6.898	14.745	20.263	3.696	6.825	12.285	14.512	24.634	11.862	10.379	12.828	6.927	7.407	13.356	10.744	.000	1.386
17:United St	3.041	10.206	13.120	1.799	2.917	5.663	8.129	21.114	6.810	4.988	10.606	3.277	2.681	6.452	5.963	1.386	.000

This is a dissimilarity matrix

Derived Stimulus Configuration

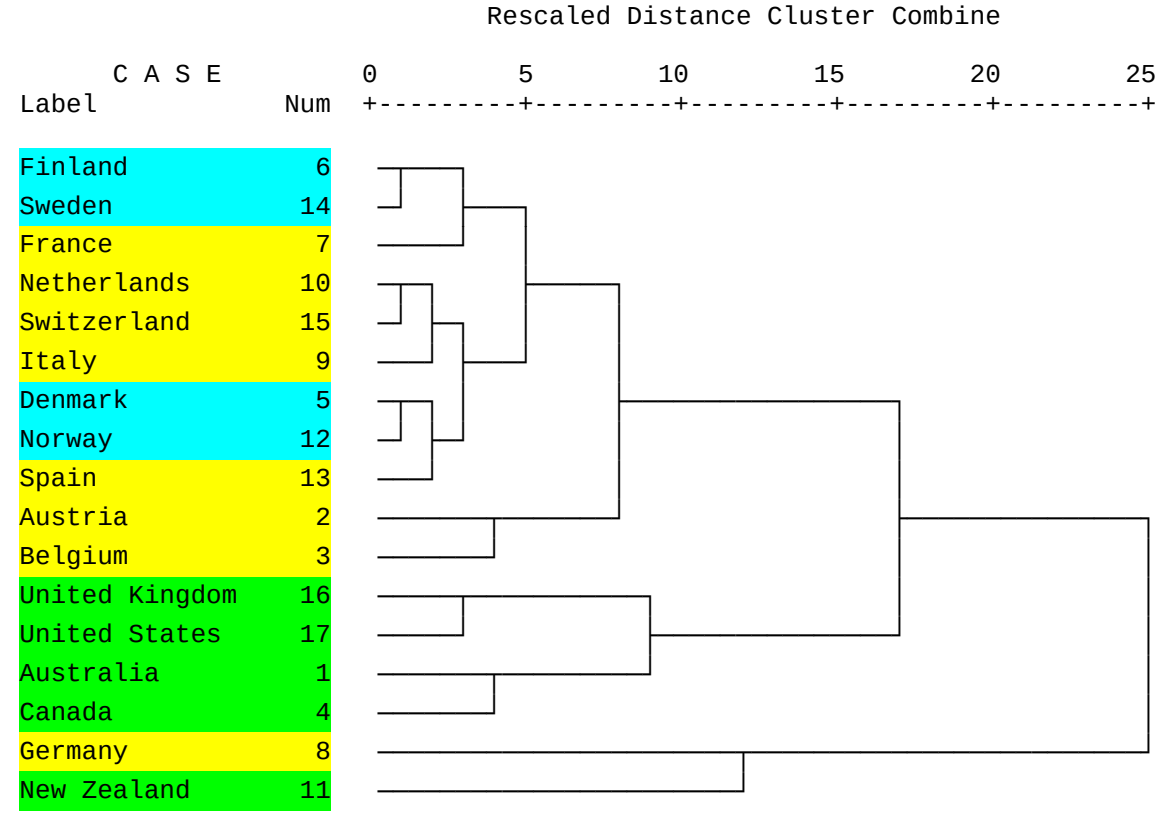
Euclidean distance model



Case Numbers:

Australia	1	France	7	Spain	13
Austria	2	Germany	8	Sweden	14
Belgium	3	Italy	9	Switzerland	15
Canada	4	Netherlands	10	United Kingdom	16
Denmark	5	New Zealand	11	United States	17
Finland	6	Norway	12		

Dendrogram using Average Linkage (Between Groups)

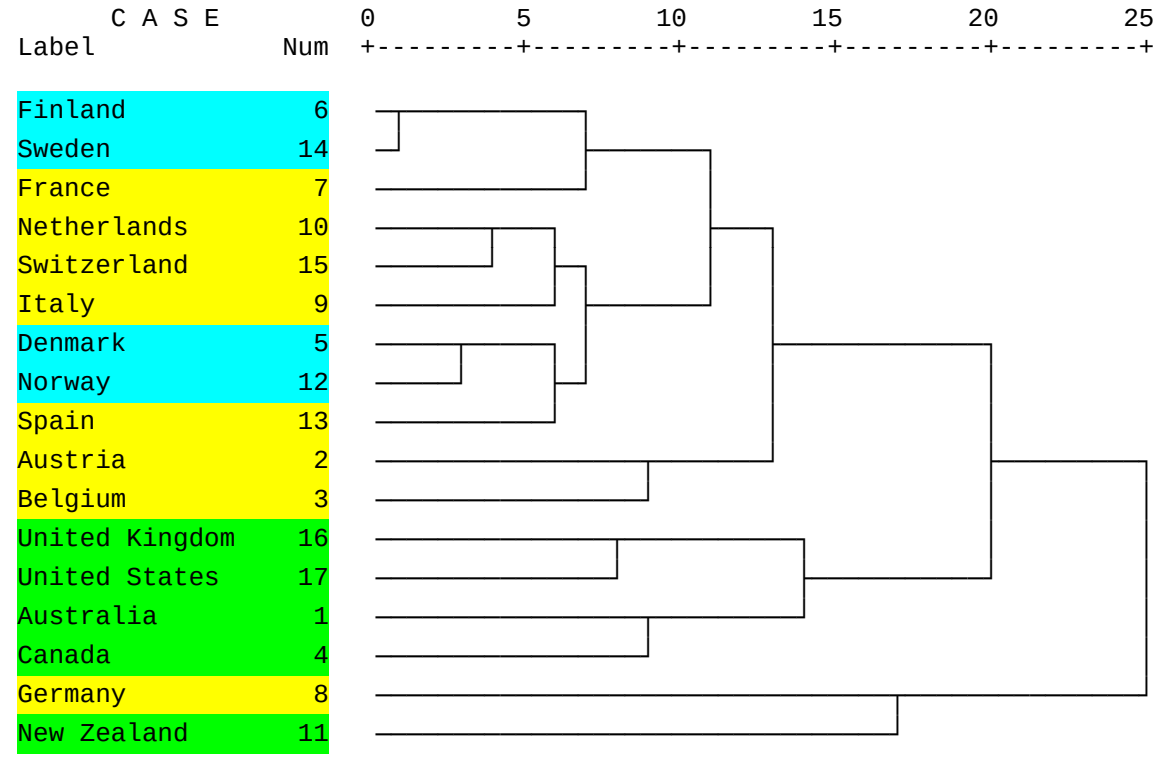


$Eta^2 = .215$

Cluster Dendrogram: Euclidean Distance Replication

Dendrogram using Average Linkage (Between Groups)

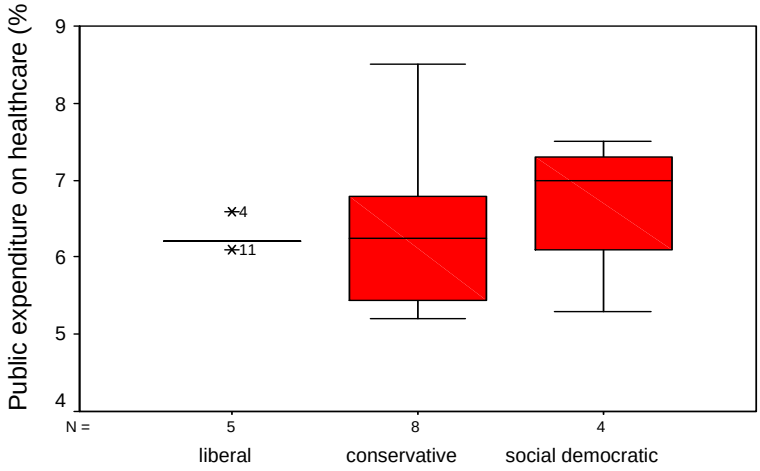
Rescaled Distance Cluster Combine



Appendix 9: Boxplots for Individual Measures by Welfare State Regime

Expenditure/Cost of Healthcare

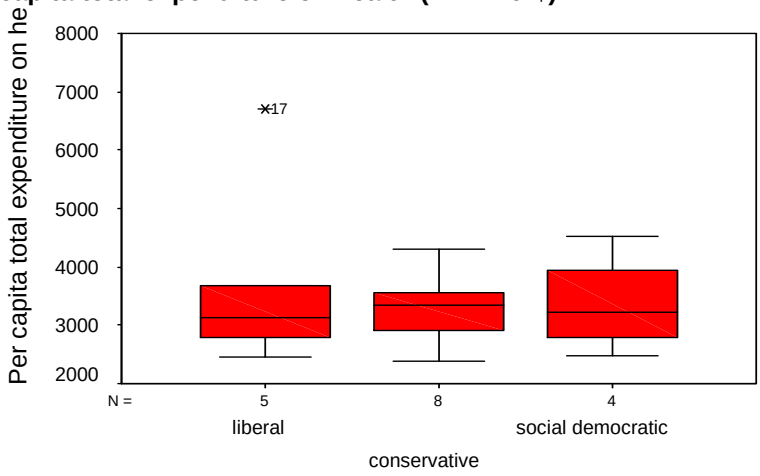
Public expenditure on healthcare (% GDP)



Welfare State Type

$eta^2 = .042$

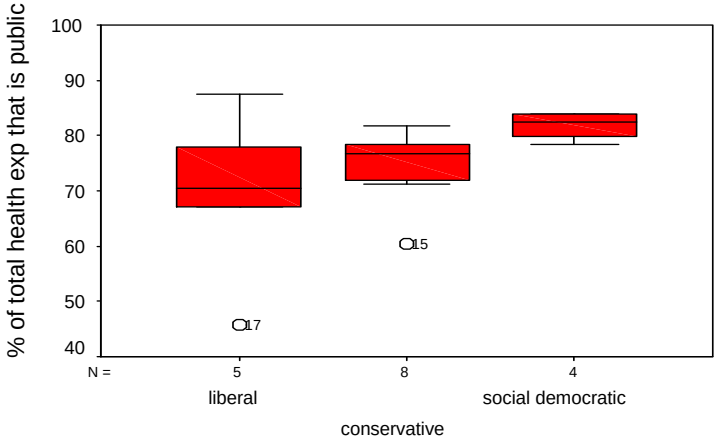
Per capita total expenditure on health (PPP int. $)



Welfare State Type

$eta^2 = .039$

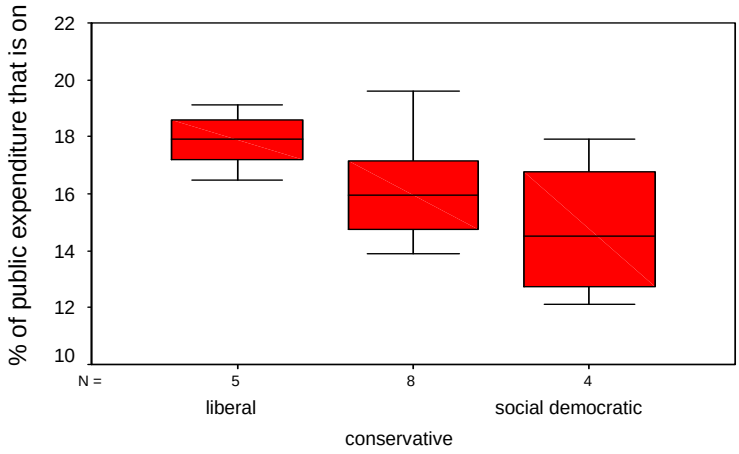
public health expenditure as % of total health exp (WHO 2006)



Welfare State Type

eta^2 = .202

Public health expenditure as % of total public expenditure

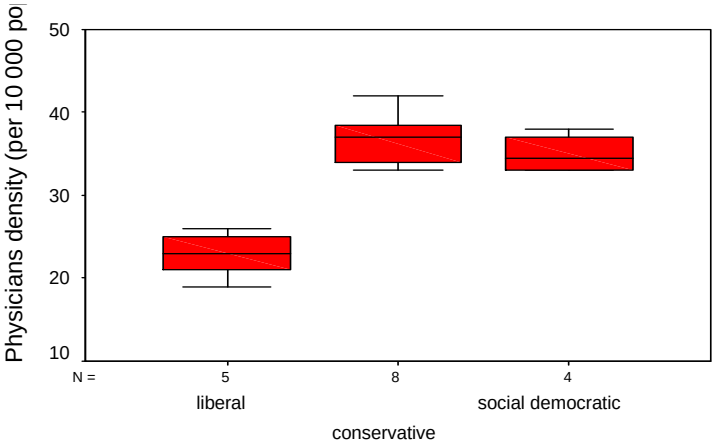


Welfare State Type

eta^2 = .313

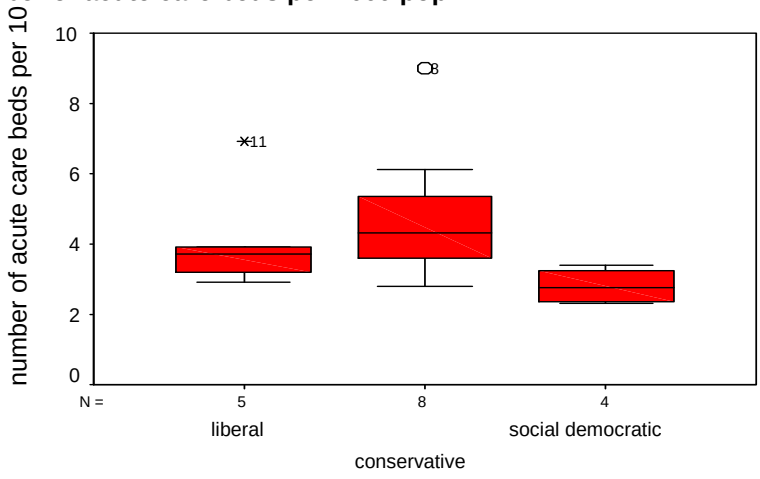
Health Resources

Physicians density (per 10 000 population)



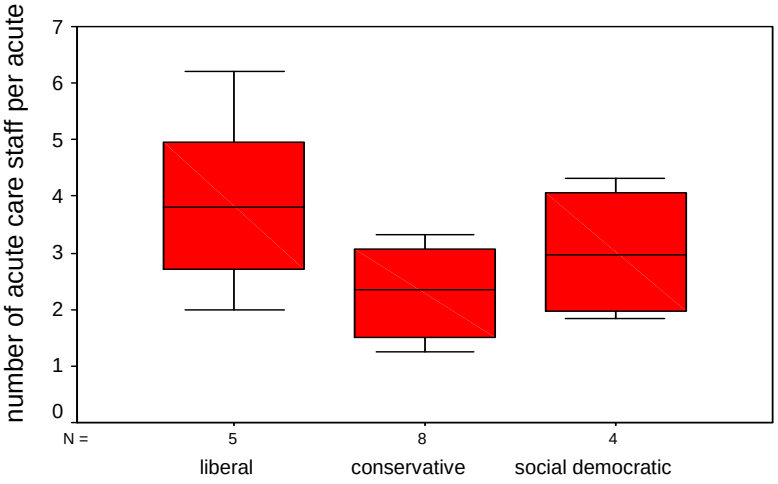
eta^2 = .844

number of acute care beds per 1000 pop



eta^2 = .216

number of acute care staff per acute care bed

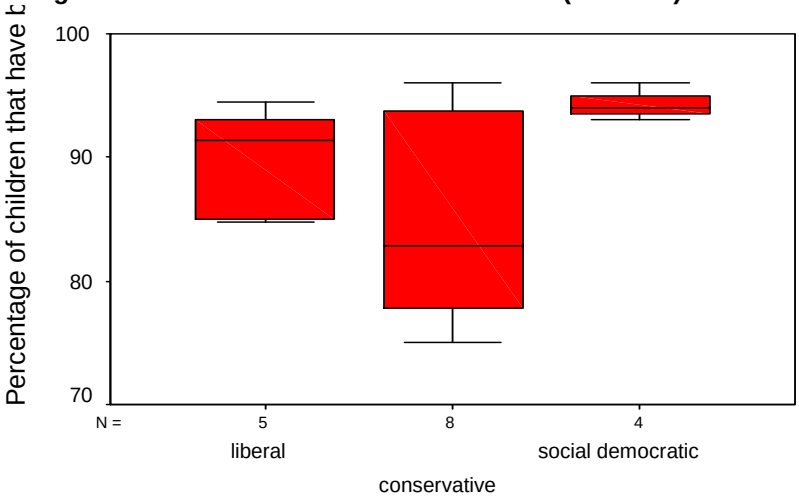


Welfare State Type

eta^2 = .285

Health Coverage

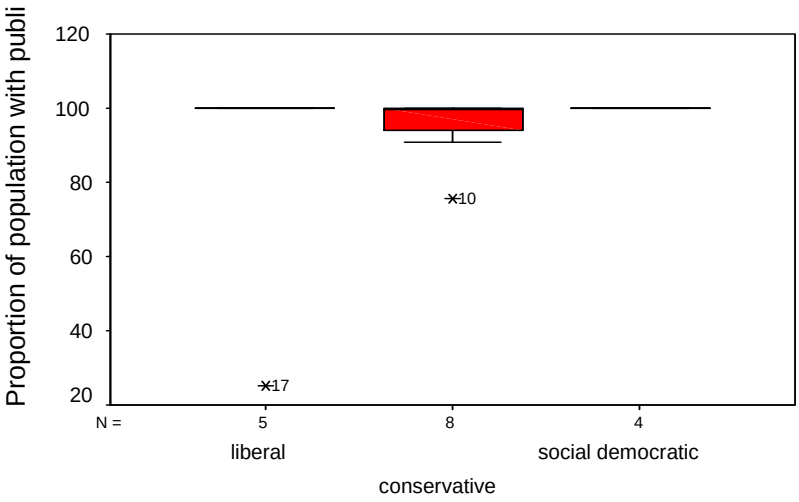
Percentage of children that have been immunized (measles)



Welfare State Type

eta^2 = .288

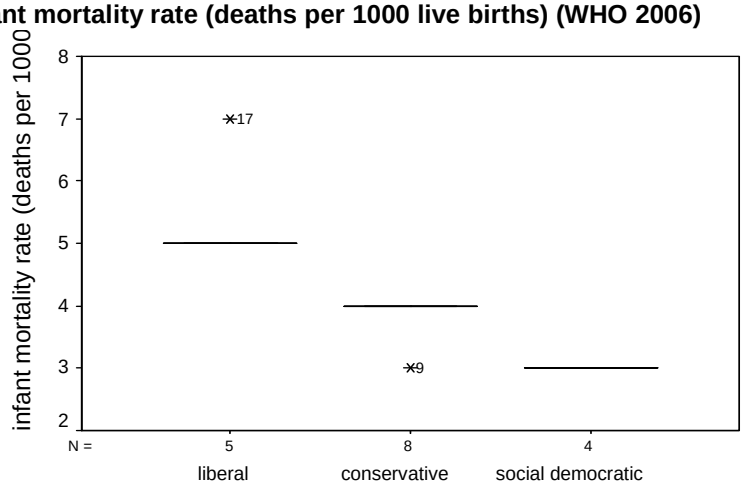
Proportion of population with public healthcare coverage



$eta^2 = .100$

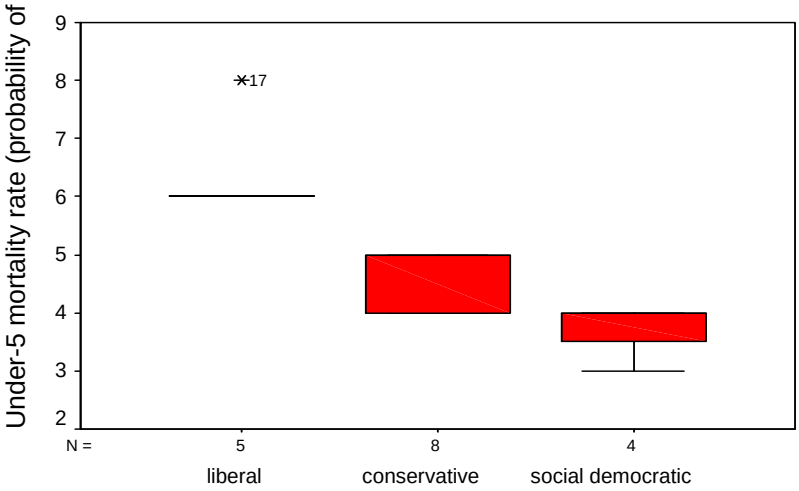
Child Health

infant mortality rate (deaths per 1000 live births) (WHO 2006)



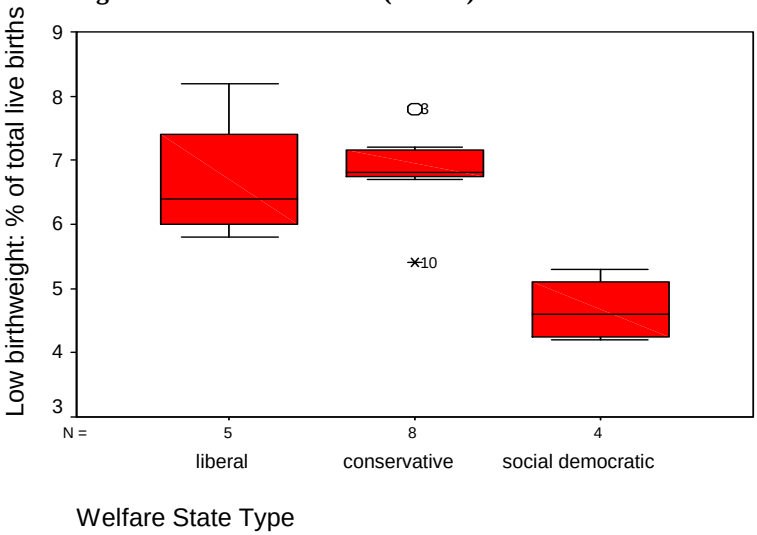
$eta^2 = .771$

Under-5 mortality rate (probability of dying by age 5 per 1000 live births) both sexes (WHO 2006)



eta^2 =.746

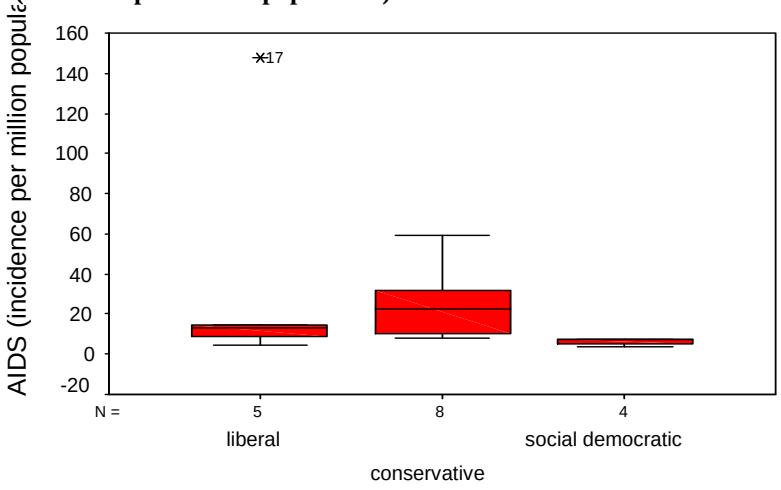
Low birthweight: % of total live births (OECD)



eta^2 = .630

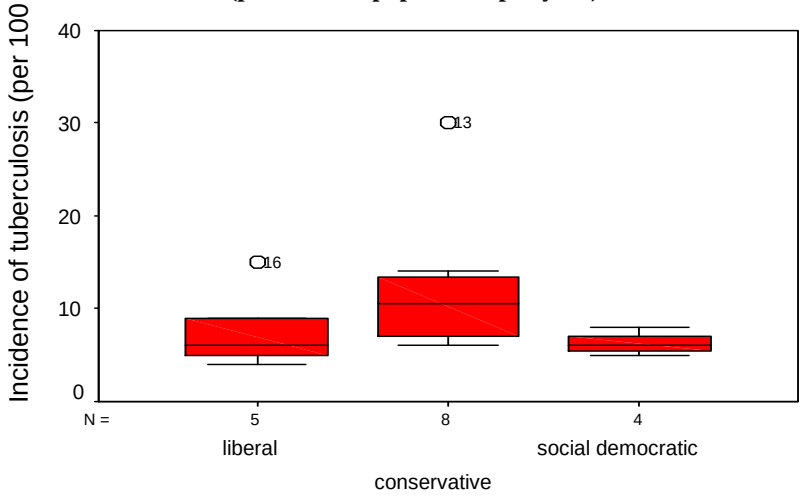
Chronic and Infectious Disease

AIDS (incidence per million population)



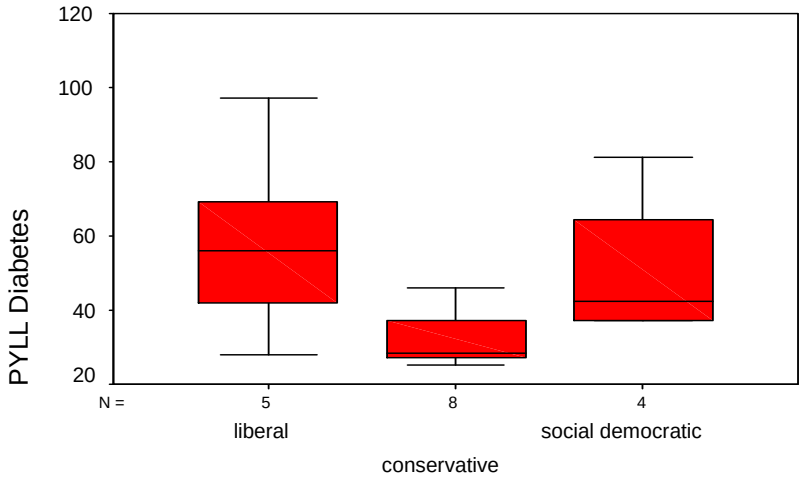
$eta^2 = .113$

Incidence of tuberculosis (per 100 000 population per year)



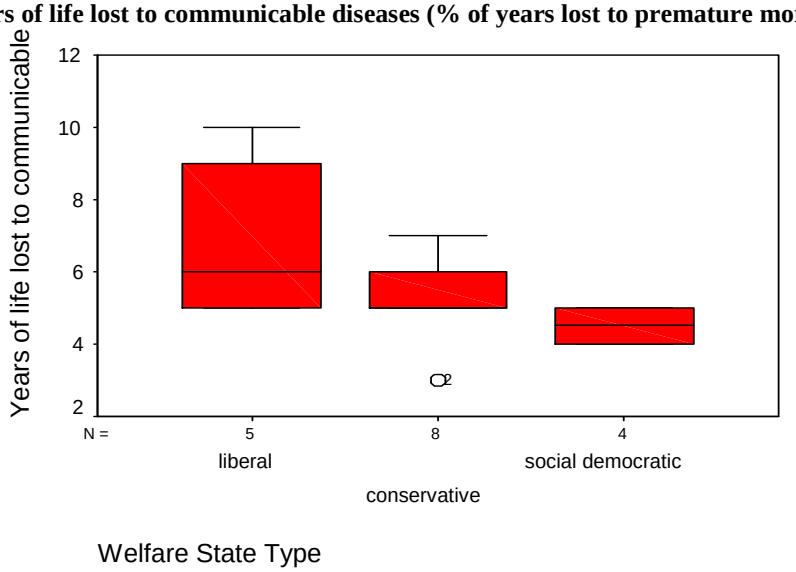
$eta^2 = .185$

PYLL to Diabetes



$eta^2 = .346$

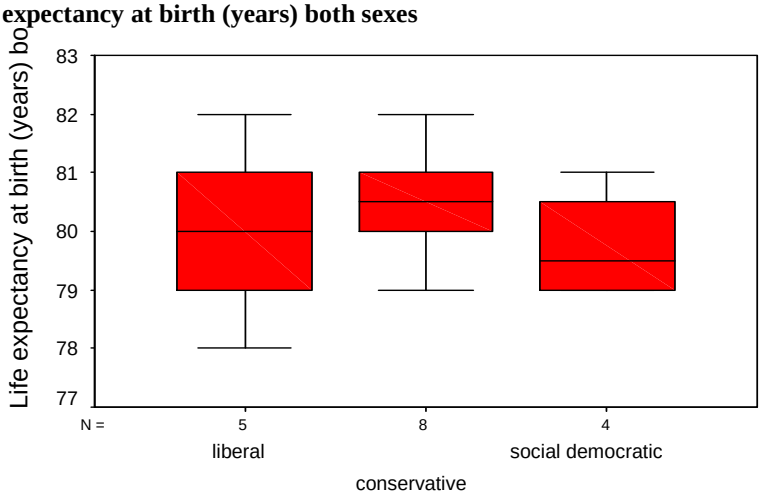
Years of life lost to communicable diseases (% of years lost to premature mortality) (WHO 2002)



$eta^2 = .325$

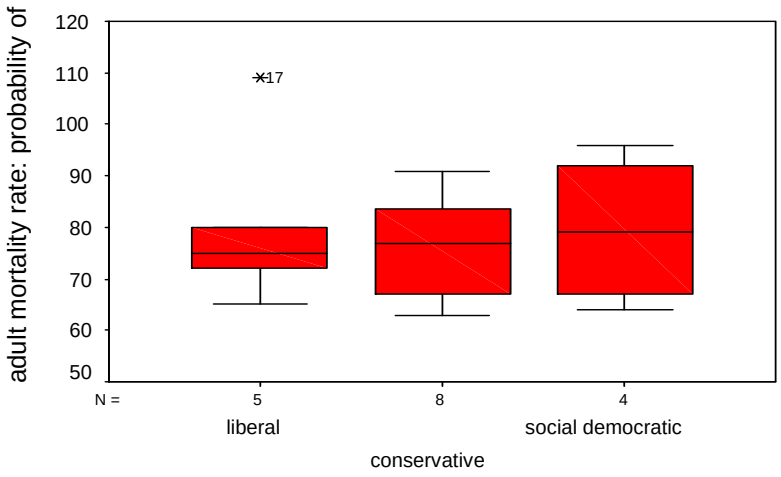
Adult Health

Life expectancy at birth (years) both sexes



$eta^2 = .084$

adult mortality rate: probability of dying between 15-60 per 1000 pop (WHO 2006)



$eta^2 = .023$

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