Side Effects:
The Unintended Consequences of Health Reform on Public Hospitals

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Abstract

Long before the establishment of Medicaid or the passage of the Affordable Care Act, California counties provided their poorest residents with access to relatively comprehensive medical care. This paper analyzes the creation and closure of public hospitals in the State of California from the 1840s until today. It combines both qualitative historical research and event history analysis to assess what led first to the creation of the nation’s most comprehensive public health network and then to its gradual demise. A particular focus is on the role of Medicaid, which unintentionally accelerated this demise, and the lessons that can be drawn for the implementation of the Affordable Care Act. I find strong evidence that the creation and implementation of Medicaid in California significantly altered the calculus of local governments with regard to the operation of public hospitals. In particular, Medicaid shifted county hospitals from the realm of allocational, perhaps even developmental, to that of redistributive politics. Subsequently, reforms at the state and federal level further encouraged this development. Because of this shift, many counties decided to close their hospitals. Moreover, as expected for redistributive policies, the operation of public hospitals is not driven by need but instead merely the result of fiscal ability: counties that can afford public hospitals continue to maintain them while poorer counties with objective need close their doors. Developments under the ACA may further exacerbate this situation, as may the creation of two new medical schools.

Key Words

Policy termination, privatization, hospital closure, Affordable Care Act

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Introduction

The Affordable Care Act (ACA) has been one of the centerpieces of the Obama Administration’s domestic policy agenda. Much has been written about the ACA including a large number of studies describing, explaining, and assessing the developments leading up to its passage (see for example, Altman and Shactman 2011, Haeder 2012, Jacobs and Skocpol 2010, 2011, McDonough 2011, Starr 2011, The Staff of the Washington Post 2010, Brennan and Studdert 2010). One important component of the American healthcare system has received conspicuously little attention in scholarly accounts as well as public and political discourse: public hospitals. On the one hand, this is remarkable in view of the significant role public hospitals continue to play in the nation’s healthcare system (Zaman, Cummings, and Laycox 2012). On the other, the lack of attention is in line with past reforms and reform proposal (Goff 1980). However, in view of their importance to the overall system, particularly as part of the safety net, this inattention is inherently problematic. In this paper, I seek to shed light on the interaction between the operation and closure of public hospitals and federal health reforms. In particular, I utilize the experiences gained in California counties in the aftermath of the implementation of Medicaid to draw out potential effects for public hospitals under the ACA.

To do so, I proceed as follows. First, I ground the discussion of public hospital closures in the literature on policy termination. Specifically, I connect the policy termination literature to Paul Peterson's (1981) tripartite policy typology and explain how federal and state coverage expansions have introduced a dynamic component into the classification of local public hospitals within this typology. Second, I provide a brief overview of the emergence and evolution of public hospitals in light of Peterson’s typology. Third, I develop a set of hypotheses that seek to explain the closure...
of public hospitals in California. I do so with a particular focus on the California Medicaid program and its historic development, as well as the extant literature on hospital closures and policy termination. Fourth, I test these hypotheses utilizing Royston-Parmar models. After discussing the results, I offer an assessment of the future of public hospitals under the ACA.

I find strong evidence that the creation and implementation of Medicaid in California significantly altered the calculus of local governments with regard to the operation of public hospitals. In particular, Medicaid shifted county hospitals from the allocational, perhaps even developmental, to the redistributive category of policy. Reforms at the state and federal levels over subsequent decades further encouraged this shift. Because of this shift, many counties decided to close their hospitals. Moreover, as expected for redistributive policies, the operation of public hospitals is not driven by need but instead merely as the result of fiscal ability: counties that can afford public hospitals continue to maintain them while poorer counties close them. Developments under the ACA may further exacerbate this situation, as may the University of California's creation of two new medical schools.

**Public Hospital Closures as a Form of Policy Termination**

The closure of public hospitals is a prime example of policy termination (Bardach 1976, Daniels 1997, deLeon 1977). Not surprisingly, hospital closures have been subject to a small number of policy termination studies with a focus on Hansen’s Disease hospitals (Sato 2002, Frantz and Sato 2005, Frantz 2002, 1992). Other studies focus on hospitals in California (Graddy and Ye 2008) and Public Health Service hospitals (Frantz 1997). Additional healthcare-related topics in the literature consider programs in mental health (Bradley 1976, Cameron 1978, Wolpert
and Wolpert 1976), health reform in Tennessee (Daniels 1995), and federal health planning (Mueller 1988).

Policy terminations, particularly at the local level, are events that are rarely studied by political scientists and public policy scholars (Daniels 2001, Graddy and Ye 2008). One common explanation is that policy termination is a relatively rare process that is very difficult to study empirically (Bardach 1976, Bothun and Comer 1979, deLeon 1977, Kaufman 1976, 1985). Many hypotheses are presented to explain this perceived rarity, including the perception of sunk costs (Cameron 1978), high political costs (Bardach 1976, Frantz 2002), opposition by vested interests (Behn 1977, Sato 2002), intellectual reluctance (DeLeon 1978), ideological opposition (Cameron 1978), loss aversion (Behn 1977), procedural and legal constraints (Cameron 1978), and institutional permanence (deLeon 1977, Kaufman 1976).

At the same time, the number of public hospitals has significantly shrunk since its peak in the 1960s. If policy termination is such a challenging endeavor, then how can we explain the rapid decline of public hospitals nationwide in general, and in California in particular? I argue that we can gain theoretical leverage on the question by connecting the policy termination literature to Paul Peterson's (1981) tripartite policy typology. Specifically, I argue that reforms at the national and state level have introduced a dynamic, exogenous component into the operation of public hospital that, over time, has induced counties to terminate the operation of public hospitals.

According to Peterson, local politics can be classified into three relatively distinct policy types. Developmental policies, such as highways, “enhance the economic position of the city,” i.e. the community receives positive net benefits from them; they pay for themselves (41). Diametrically opposed are policies that incur net losses for the community: “redistributive policies
Redistributive policies involve a net transfer of wealth from taxpayers to recipients of the service and include local hospitals and welfare expenditures. They are merely provided at a level that the community can afford, i.e. redistribution is confined to those counties with significant economic resources. Finally, “allocational policies are more or less neutral in their economic effect” (41).

Peterson describes these policies as “the housekeeping services of local government,” i.e. all members of the community benefit from them in important ways without significant transfers of wealth. Peterson includes fire and police protection and garbage and refuse collection in this category. For Peterson local policymaking operates differently from state and national policymaking because, to a significant degree, it is subject to external constraints and influences. Because of the openness of their economic and political systems, local governments are primarily concerned with the economic effects of their policies. As a result, “local policies are treated differentially, depending upon their impact on economic vitality of the community” (41).

When Peterson proposed his framework, the classification of hospital services as redistributive was by and large appropriate. However, I argue that this classification is dynamic and that changes to the classification of local public hospitals can explain their creation and closure. Moreover, this reclassification was largely driven by forces exogenous to the local community. Specifically, the creation and implementation of Medicaid by federal and state governments triggered a movement of public hospitals from the allocational towards the redistributive category.¹ Naturally, this process was not instantaneous in the face of the power of

¹ Arguably, public hospitals may have been in the allocational, i.e. housekeeping, category for much of their early existence. However, particularly during the period from 1920 to 1950, public hospitals may very well have been
the status quo, loss aversion, and endowment effects (Kahneman, Knetsch, and Thaler 1991) and other cognitive and institutional limitations (Jones 2001, Jones and Baumgartner 2005). Over time, with the expansion of public health insurance programs and federal and state health services, public hospitals became more and more redistributive in nature. The reforms initiated under the ACA, i.e. the establishment of near-universal coverage, only encourages this drift further. Thus, the ACA may provide further impetus for local communities to shed their public hospitals.

Before turning towards the quantitative assessment of public hospital closures in the wake of the Medicaid implementation in California, I briefly describe the emergence and evolution of public hospitals until the 1950s. This discussion sets the stage by illustrating that public hospitals, at one time, were indeed allocational, if not developmental, types of local policies.

The Emergence of Public Hospitals

Poor Laws, Indigency, and the Public Hospital

The provision of care through public hospitals is inherently intertwined with the concept of medical indigency. The concept of indigency finds its origins in the Elizabethan Poor Laws, which strongly favored local responsibility while stigmatizing aid recipients (Terris 1951, Stern 1946). These laws emerged as a result of the growing need in the wake of the enclosure movement in the 1500s that could not be met by traditional providers of care like monasteries and other religious institutions, because they had been closed under Henry VIII (Dowling 1982). Transplanted from the continent, American colonists largely followed the British example, developmental due to the major innovations they created as well as the positive economic effects (Cihlar 1970, Dowling 1982, Davis and Plumley 1939). Moreover, large sophisticated medical centers may be much more than providers of indigent care. An exact classification is not of importance here except to recognize that, due to exogenous forces, over time public hospitals have become more and more redistributive.
although Americans lacked the national supervision of the English system (Shonick 1984). This lack of national supervision led to a dynamic system, constantly subject to change through new policies or court decisions.

Arrangements for the indigent have varied significantly across time and space, but were generally upheld by courts under the police powers of the state (Kelch 2004, Greenfield 1959, Shonick 1984). Yet from their very beginnings as colonists, Americans distinguished between two categories of poverty. The deserving poor were usually taken care of by private charity while the undeserving were relegated to the uneven care of local governments (Kelch 2004). One way local governments fulfilled their obligation to the destitute was the local government hospital owned by either the city or the county, including the famous Philadelphia General Hospital (Rosenberg 1982), which was founded in 1731, and New York’s Bellevue Hospital, which was founded in 1736 (Opdycke 1999). These and other public hospitals find their origins in workhouses, county farms, pest houses, and almshouses (Brown 1981, Shonick 1984, Rosenberg 1977). Subject to abject squalor, these early “hospitals” “sought to encourage the multitudes who were surviving at the subsistence level to continue to live by their own efforts, rather than by financial dependence on the ‘betters’” (Brown 1981, 6). The poor who ended up seeking care provided the necessary teaching and research material for the nation’s doctors, who in turn would utilize their skills to heal the better-off in society (Brown 1981).

The Emergence and Growth of Public Hospitals in California

Indigency has been a particular challenge for California because the state’s early history was one of accidental explosive growth. The Gold Rush brought with it not only enormous population growth but also an incredible array of social and health problems (Cahn and Bary 1936,
Institute for the Future 1997, Greenfield 1959). It is not surprising that major migration termini like San Francisco and Sacramento as well as mining areas were confronted with particular challenges.\(^2\) Overwhelmed by the more than 500 ships that made port in 1850, San Francisco turned to the federal government, which established the first United States Marine Hospital Service facility in 1854 and a second one 1875 (Cahn and Bary 1936). The State of California also built a Marine Hospital in the city in the 1850s (Cahn and Bary 1936). Both Sacramento and San Francisco also contracted with private physicians for care (Cahn and Bary 1936).\(^3\) At times, the sick were housed in abandoned ships anchored in the Bay (Goldmann 1945).

As the explosive population growth overwhelmed local resources and institutions, the State of California appropriated funding for the construction and operation of two additional hospitals in Sacramento and in Stockton (Cahn and Bary 1936). However, citing abuses by the counties, the state abandoned these efforts and closed the Sacramento hospital quickly and converted the Stockton hospital into a mental institution (Cahn and Bary 1936). Moreover, the state legislature also passed the Poor Law of 1855, which devolved responsibility for the needy sick to the counties (Cahn and Bary 1936, Greenfield 1959, Shonick 1984). Simultaneously, the state abolished its San Francisco hospital and created a fund to be distributed among the counties for the provision of indigent care (Cahn and Bary 1936).

\(^2\) Monterey County actually was the first county to establish a county hospital. However, this hailed from its prior role as an administrative center under Spanish and Mexican rule.

\(^3\) In both cases, massive problems developed and the arrangement faltered quickly because the script in which the private physicians were paid devalued massively leading to lawsuits which significantly strained city resources (Cahn and Bary 1936).
In response to this massive growth and to their new responsibilities under the Poor Law, counties began setting up hospitals, often as a mixture of farm, poor and old folks' home, and hospital (Cahn and Bary 1936, Shonick 1984). Before 1860, hospitals were established in Trinity, Nevada, Siskiyou, Sacramento, San Francisco, and Santa Clara Counties (Cahn and Bary 1936, 141). By 1870, Alameda, Sierra, Placer, Yuba, Solano, Del Norte, Lassen, Los Angeles, Sutter, and Tulare Counties followed suit (Cahn and Bary 1936, 142-143). Table 1 contains information about the opening (and closing) of county hospitals across all 58 counties.

Over time, the state increased county responsibility for the indigent. The County Government Act of 1883 further empowered supervisors to care for the indigent sick and, in addition, to relieve the “otherwise dependent poor of the county” (Cahn and Bary 1936, 171). Going even further, the Pauper Act of 1901 held counties responsible “for the care of the indigent sick, the aged, the blind, and those otherwise physically disabled” (Cahn and Bary 1936, 146). Tasked with the care for the indigent, counties established 59 hospitals by 1904, housing 4,168 patients (Greenfield 1959, 31). However, the facilities often provided nothing more than a roof over peoples’ heads instead of actual care; only Los Angeles, San Francisco, and Santa Clara provided segregated facilities for hospital care (Greenfield 1959, 31).

Enormous growth of county hospitals followed for several reasons. For one, the two major industries, agriculture and mining, had attracted a workforce that was largely male, foreign, and single (Cahn and Bary 1936, 144). Most importantly, growth was driven by sheer need because other forms of care, by either relatives or charitable institutions, were simply non-existent in California at the time.
In 1933, the state legislature repealed the Pauper Act while simultaneously enacting measures to enlarge county responsibilities for the indigent that established the current system of county responsibility. Specifically, the state legislature decreed under Section 17000 of the California Welfare and Institutions Code that “every county […] shall aid and relieve all able-bodied indigent persons and those indigents incapacitated by age, disease, or accident, when such indigent persons are residents of the county, and are not supported and relieved by their relatives or friends or by public or private institutions.” However, neither law nor legal precedent specifically outlines how counties must meet this obligation (Kelch 2004).

As mentioned previously, allocational policies refer to “the housekeeping services of local government,” i.e. all members of the community benefit from them in important ways without significant transfers of wealth. During the period described, public hospitals were staunchly in this category because “all members of the community benefit” from these services although “the value each individual places on these services may vary, but all receive important benefits” (Peterson 1981, 44-45). In the case of hospitals, the most obvious benefit can be found in the reduction or containment of community epidemics and thus an increase in public safety and well-being (Peterson 1981, 44). Moreover, as Choi et al. (2010, 34) assert “growth generally creates demands for infrastructure and allocational services.” Similarly, the financing of the hospital function, almost completely locally funded with little state support and no federal funding, also places hospitals in the realm of allocation politics (Peterson 1981). Moreover, hospitals over time became employment opportunities, which also matches Peterson’s (1981) definition of allocational policies. Finally, as mentioned above, for some communities, particularly those with large
sophisticated medical centers, the hospital function may even have shifted into developmental policies.

**The Decline of Public Hospitals**

By the 1920s and 1930s, public hospitals had evolved into full-scale centers of medical care for the poor. Despite their originally poor reputation, they began to emerge as major innovators for health care and public health (Cihlar 1970). However, after the conclusion of World War II, the provision of healthcare in the United States changed dramatically and the earlier prestige proved fleeting (Cihlar 1970, Dowling 1982, Davis and Plumley 1939). As these changes accelerated in the 1960s and beyond, the outlook for public hospitals became increasingly dire, as they came under immense fiscal pressures. Public concerns for the health and sustainability of public hospitals first appeared in the 1970s after the creation of Medicare and Medicaid, particularly in urban centers (Breslow 1970). Even some of the nation’s oldest and most famous public hospitals, like the aforementioned Philadelphia General Hospital, could not escape the trend and were forced to close (Alexander and Rundall 1985). The crisis worsened over time. Today there are only about 1,100 state and local public hospitals left nationwide (Fraze et al. 2010). This compares to about 1,600 in 1985 (Legnini et al. 1999), and 1,745 in 1974 (American Hospital Association 1976).

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4 It is worth mentioning that several characteristics of public hospitals, while largely invariant across hospitals and time, may further exacerbate their situation. Particularly, the public ownership of these hospitals creates a variety of challenges that puts them at a disadvantage compared to other types of hospitals because they have to operate both in the political world and the marketplace (Rosenbloom 1978). First, open meeting laws require that all hospital business be conducted in public and thus in front of the eyes of competitors, resulting in a significant competitive disadvantage (Legnini et al. 1999). Moreover, competitors are also able to lobby governing institutions in order to improve their own position and harm the public hospital. Political meddling and electoral turnover have also seriously impeded long-term strategic planning (Hernandez and Kaluzny 1983, Cihlar 1970). Public accountability and procedural requirements, including the civil service system, also make effective management exceedingly more complex if not
What did the situation look like in California? As shown above, California’s public hospitals initially experienced dramatic growth, reaching 98 percent of the population by 1960 (Shonick 1981). However, the system has seen an equally dramatic decline since the 1960s. Contracting with private, for-profit hospital administrators during the 1970s proved only a short-lived intermediary step towards closure, as boards of supervisors often sought to abandon their public hospitals (Desai, Van Deusen Lukas, and Young 2000). By 1980, only 70 percent of California’s population had access to a public hospital (Shonick 1981). Today there are 12 counties with public hospitals left in California. Figures 1 and 2 illustrates the developments in the number of counties with a public hospital from 1950 to 2012. Note the relative stability until the mid-1960s and 1970s followed by a steady decline. Note another major drop in the mid-1990s.

What caused this dramatic decline? Much has been written about the problems of public hospitals. Most explanations focus on the large physical plants, purchasing practices governed by bureaucracy, personnel practices bound by patronage and civil service regulations, and inflexible budgets (Cihlar 1970). However, very few of these assertions have been quantitatively tested. As aforementioned, I argue that the creation and implementation of Medicaid by federal and state governments triggered a movement of public hospitals from the allocational towards the impossible (Legnini et al. 1999, Shonick 1979). In addition, their public character makes decisions about them political decisions, thus opening the door for ideology, political tempering, and politically driven decision (Shonick and Roemer 1983). As political bodies, they are also dependent on the attitudes of the local community and other providers, as well as the overall county fiscal situation (Shonick and Roemer 1983). Public hospitals, unlike third-party payments, also make visible all costs associated with the care in the form of taxes (Terenzio 1978, Stewart 1978). Finally, unions have found access to public hospitals much easier than to their private counterparts (California Taxpayers’ Association 1972, Currie, Farsi, and Macleod 2005). The one major exception is Graddy and Ye (2008). However, their study only looks at developments from 1980 through 1995. Arguably, that period misses a significant amount of termination activity. Moreover, they jointly estimate their models for county and district hospitals.

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redistributive category. The following a brief overview of the evolution of the California Medicaid program illustrates this point qualitatively.

**Medi-Cal: The California Medicaid Program**

When the Medicaid program was established in 1965 it was hailed by supporters as the successful mainstreaming of the underclass in healthcare (Brown 1981). California was one of the first states to establish a program, *Medi-Cal* (Brown 1981). Medi-Cal shifted expenditures for indigents from local to federal and state governments and thus began the process of re-classifying county hospital in terms of Peterson’s typology. Under the 1965 Medi-Cal legislation, counties were left with two choices (Schwartz et al. 1978, 16). The first option required counties to pay 90 percent of FY1964/65 costs for healthcare in addition to uncompensated care for all categorical aid recipients and care for all other persons aged 65 or over in county medical institutions. The second option, the *county option*, required counties to pay only 100 percent of their healthcare expenditures for FY1964/65 adjusted for population changes. Both options encouraged counties to expand services to new populations. At the same time, Medi-Cal legislation allowed many former county hospital patients to move into the private market by providing a funding source for their care (Blake and Bodenheimer 1975). Many private providers were eager to treat Medi-Cal patients because the program came with little oversight or restrictions (Blake and Bodenheimer 1975). Simultaneously, the injection of public monies into the system spurred a construction boom at private facilities as well as inflation.

**Governor Ronald Reagan**

The initial exuberance quickly subsided and the first cuts to the Medi-Cal program occurred in 1967 under Governor Reagan. These cuts severely restricted services by limiting and
discontinuing prescription drug coverage, hospital stays, non-emergency surgeries, optometry, dental services, speech therapy, and outpatient psychiatric services (Blake and Bodenheimer 1975). Next, the Reagan administration restricted eligibility, started to require preauthorization for hospitalization, and severely reduced provider fees (Blake and Bodenheimer 1975). Specifically, the new regulations stated that “prior authorization would be denied unless failure to provide treatment would result in ‘significant disability or death’” (Blake and Bodenheimer 1975, 24). While both efforts were eventually ruled illegal, it took several months to do so, thus causing significant harm to county hospitals, which were not only suffering from providing care to the uninsured but now also lost reimbursement from those patients on Medicaid who continued to seek care at county hospitals (Blake and Bodenheimer 1975).

Following a major recession, the Medi-Cal Reform Act of 1971 implemented virtually all restrictions previously deemed illegal (Blake and Bodenheimer 1975). The reforms dramatically reshaped the California Medicaid program by increasing county contributions, lowering Medi-Cal reimbursement rates, and increased the burden of bureaucratic procedures (Schwartz 1977). Again, county hospitals suffered. Moreover, the act introduced capitation into Medi-Cal, which proved particularly challenging to county hospitals because it restricted their reimbursements (Blake and Bodenheimer 1975). Second, the reforms created a medically indigent program under Medi-Cal that did not rely on the categorical link (Johnson 1986). This constituted a significant shift on the redistributive continuum by virtually removing indigent care from local governments. Not surprisingly, the number of county hospital closures spiked in the following years.
Cost Explosion after Medicaid and the California Tax Revolt

In the decade after the creation of Medicaid, healthcare costs increased dramatically (Weiner and Puhy 1978). Between 1965 and 1970, Medi-Cal expenditures went up by an incredible 500 percent (Schwartz 1977, 6). After the 1971 reforms, county Medicaid costs rose another 25 percent between FY1970/71 and FY1973/74 (Brown 1981, 18). Moreover, the Medically Indigent category soon became one of the fastest growing sections of Medi-Cal, increasing costs by 400 percent between 1971 and 1978 (Kelch 2005, 8). By 1974, 44 percent of Medicaid expenses went to the Medically Indigent (Davidson 1979, 103). Counties bore much of the brunt of these developments, as health costs for counties more than doubled between FY1966/67 and FY1973/74, county hospital expenditures rose 108 percent, and net county costs rose 876 percent (Schwartz et al. 1978, xii, Brown 1981, 18). As a result, by the early 1970s, 30 to 36 percent of property taxes in California were utilized to provide health care services (Brown 1983, 934). Fed up with rapidly rising property rates, California’s passed Proposition 13 (Roemer and Shonick 1980, Shonick 1981). Proposition 13 made the fiscal condition of counties increasingly untenable as it reduced county revenues, despite temporary state fill-ins, by more than 40 percent (Shonick 1981). With the ability to raise taxes limited, any redistributive policy was bound to be subject to reductions. Following Peterson’s expectation about redistributational policies, even more county hospitals closed their doors.

The 1982 Medi-Cal Reforms

In 1982, California reformed its Medi-Cal program once more by pushing responsibility for medically indigent adults back to the counties (Brown 1983, Brown and Cousineau 1987). Counties with populations below 300,000 individuals were allowed to contract with the state
through the County Medical Service Program (CMSP)\textsuperscript{6} while all others had to create their own programs.\textsuperscript{7} The state left counties with vast autonomy to set eligibility and determine services in their own programs (Brown and Cousineau 1987, Kelch 2004). When the state made the transfer decision, it allocated 70 percent of the estimated costs of $565 million to counties (Brown and Cousineau 1987, Rank 1982). The state match has been shrinking ever since (Institute for the Future 1997, 26). The transfer dramatically affected the ability of the indigent to access care. Common to redistributional politics, many counties were often neither willing nor able to provide adequate services (Brown and Cousineau 1987, Rank 1982). More importantly, CMSP eliminated any incentive for small counties to participate in redistributive county hospital policies, leading to the eventual closure of county hospitals in all counties with fewer than 300,000 residents. For larger counties, the incentive to provide redistributional county hospital services was further reduced as state support shrunk.

\textsuperscript{6} The state initially ran the program directly through the Department of Health Services. However, it abdicated that role in 1995 and a CMSP Governing Board made up of county representatives has since taken over. The program has been funded largely through realignment and county general fund dollars. The state also used to contribute a significant amount until the late 1990s when it first capped funding at just over $20 million annually only to eliminate funding completely later. Today, the program has a byzantine funding structure including state and county funds, tobacco taxes and repayments of hospital overcharges; two-thirds of funding emanate from sales taxes and vehicle license. For a detailed overview see Haeder (2010) The program will undergo significant changes due to the recent coverage expansion under the Affordable Care Act.

\textsuperscript{7} This is generally referred to as the Medically Indigent Services Program (MISP). MISP, unlike its counterpart the CMSP, has actually never been a unified program. Instead, there have been different programs in each of the 24 participating counties with vastly varying structures. Some counties, like Los Angeles, have even opted to implement several programs with different levels of eligibility and service. Many of the California Coverage Initiative counties, as part of California’s 1115 Medicaid Waiver, have also opted to implement a second indigent program Funding mechanisms usually have included realignment dollars, Proposition 99 funding and usually some county match. Some counties have also received disproportionate share funding. For a detailed overview see Haeder (2010)
Into the 1990s and Beyond

    After the initial transfer, various counties opted to sue the state (Kelch 2005). However, only San Diego maintained its opposition, as other counties accepted a compromise offered by the state in the wake of the $7 billion budget deficit in 1991. Counties nominally accepted responsibility for most health programs and services while the State established various intergovernmental transfer arrangements, called realignment, involving sales tax and vehicle license fee revenues in order to provide counties with the necessary funding (Kachadoorian 1997, Kelch 2004). However, a 2003 court ruling declared the 1982 transfer of MIAs a reimbursable mandate as prohibited under Proposition 4 and triggered a poison pill included in the realignment legislation intended to discourage county legal actions. The automatic repeal of the vehicle license fee increase dedicated to county revenues cost counties almost $1 billion, with only San Diego obtaining a settlement (Kelch 2005). With shrinking state contributions, more and more counties again decided to exit the realm of redistributive county hospital policies.

    Over time, public hospitals hence became subject to redistributive politics instead of allocation politics. Public hospitals were no longer essential for community safety and well-being as private hospitals, both for-profit and non-profit, proved willing to treat individuals covered by Medicaid. Adding additional populations to Medi-Cal thus greatly reduced the need for county hospitals as an allocative function because state and federal governments were taking over this function. Indeed, healthcare services provided above those offered by Medi-Cal became redistributive because they allocated scarce resources away from developmental policies and instead transferred them to low-income populations (Peterson 1981).
**Hypotheses: Why Do County Hospitals Close in California?**

The discussion of the history of the California Medicaid program informs the first set of hypotheses. One of the major determinants of county hospital closures should be the overall financial situation of the respective county (Kirkpatrick, Lester, and Peterson 1999, Graddy and Ye 2008, Frantz 1997). As shown above, changes to the Medicaid program have placed significant strain on county budgets. As Peterson (1981) points out, redistributional policies are driven by fiscal resources and not demand. It has also been argued that one of the major contributors to the decline of public hospitals has been the worsening fiscal situation of governments since the 1970s brought about by high unemployment and inflation (Blake and Bodenheimer 1975). Fiscal problems can also serve as indicators or focusing events (Kingdon 2003, Birkland 1997). *County Balance* hence subtracts county expenditures from county revenues. The variable is measured on a per capita basis. As we would not expect a single bad year to have a significant impact, I create various moving averages. Moreover, richer counties have more resources, and require a smaller tax effort, to support their county hospitals (Terenzio 1978, Peterson 1981). The natural logarithm *Net Valuation* thus measures the total amount of property in dollars subject to local property taxes on a per capita basis. Large counties may also be better able to muster the necessary resources to maintain a county hospital. *Population* is the natural logarithm of the county population in a given year. In view of the high correlation between hospital size and county population, this should also serve as indicator of vested interests in form of organizational opposition (Graddy and Ye 2008). Finally, budget pressure may lead counties to push hospitals off their balance sheets while maintaining a degree of public character. California offers this opportunity through hospital districts, a form of special district with taxing authority made available in 1945. *Hospital District*
Creation is the count of the number of hospital districts created or terminated in a county in a given year. 

Second, when confronted with budget shortfalls, counties have the ability to adjust their property tax rates to balance their budgets. However, taxpayer willingness to underwrite local hospitals has declined dramatically over time (Alexander and Rundall 1985). Hence, we would expect that higher initial tax rates indicate a willingness to continue to support the county hospital. However, over time, the relationship may be reversed as property owners may come to loathe paying higher taxes (Blake and Bodenheimer 1975). In short, after initially attempting to solve the problem by increasing taxes, governments suffered a backlash that significantly impeded their ability to raise funds (Alexander and Rundall 1985). As a result, residents may either seek change in the political leadership or relocate (Hirschman 1970, Tiebout 1956). Tax Rate thus measures the moving average of property tax rates for the respective county at various lengths.

Similarly, counties in which the health function consumes an ever-larger share of county expenditures may be more likely to abandon their county hospital. Percentage Health thus measures the total amount of health-related spending by counties, excluding sanitation, divided by the county’s total expenditures. Feeling the pinch from both rising deficits at their local public hospital as well as ever increasing contributions to Medicaid, counties with higher percentage should be more likely to close their hospital (Blake and Bodenheimer 1975). Moreover, operating deficits have long been associated with hospital closures (Sloan, Ostermann, and Conover 2003).

An alternative measure used was Hospital Districts, the count of the number of hospital districts in a given county.

An alternative measure used was Health Spending, county health spending on a per capita basis.
Given the soft budget constraints of public hospitals as creatures of the respective government owner (Duggan 2000), these measures should also serve as an indicator of perceived policy failure (Graddy and Ye 2008) when controlling for objective need. However, it could also be argued that higher health spending reflects a community's commitment to the poor (Graddy and Ye 2008).

Fourth, as Peterson points out, redistributioonal policies are driven by fiscal resources and not demand (Peterson 1981). A good measure of need is the amount of Total Welfare Spending per capita for each county. Whereas in earlier times local welfare spending was very much subject to local decisionmaking, today local welfare spending is subject to local control only to a very limited degree. Moreover, most of the revenues dedicated to this function, particularly in California, are transfer payments from state and national governments subject to spending restrictions. Again, I create various moving averages of the variable. As no good measure of insurance status exist at the county level going back to the 1960s, the measure should also serve as a proxy for the changing number of uninsured and underinsured (Streeter et al. 2011).

I develop a second set of hypotheses from the extant literature on public hospitals and policy termination. Some have argued that the location of public hospitals is also relevant to their decline. One the one hand, while many non-profit hospitals have followed their preferred clientele to the suburbs, public hospitals remained downtown where socioeconomic conditions deteriorated (Alexander and Rundall 1985, Levine 1978, Enright and Jonas 1981). The urban environment also poses challenges to the operation of hospitals due to a variety of socio-economic problems that are directly related to the provision of healthcare (Finley 1978, O'Rourke 1978). Hospitals thus find

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10 The Annual Report of Financial Transactions Concerning Counties of California nicely illustrates both points.
themselves in high-cost areas yet with low-income clients. Moreover, they are funded by a declining tax base because more affluent residents move to the fringes of town and into new enclaves (Terenzio 1978). However, this may not be much of a problem for counties because they usually include urban, suburban, and at times rural areas. Nonetheless, public hospitals, particularly in larger cities, have also long been alleged to serve as dumping grounds for indigents who did not fit into the client roster of private facilities (Cihlar 1970). Private hospitals, particularly nonprofits, it is argued, often do not feel responsible to provide help for conditions they saw as a societal problem, including alcoholism, drug abuse, attempted suicide, trauma, mental disorders, incomplete abortion, and infectious disease (1972, Goff 1980). At the same time, the problems may be compounded in rural areas by provider shortages, lack of transportation, lower reimbursements, and high operating costs (Alexander and Rundall 1985, Alexander 1978, Bindman, Keane, and Lurie 1990). A problem specific to rural hospitals has been their relatively small size, which often makes them harder to operate efficiently in order to realize economies of scale (Hernandez and Kaluzny 1983). To account for differences based on urbanization, three variables are included. First, Rural County is an indicator coded one for counties that are part of the Rural County Representatives of California, an organization that represent the boards of supervisors of California’s rural counties at the state and federal level. Alternatively, CMSP is an indicator coded one whether a county is eligible to participate in the CMSP program. Finally, Urban is coded one for county hospitals located in cities with a population in excess of 50,000 (Peterson 1981). This follows the definition of the U.S. Census Bureau for an urbanized area.

Public hospitals have a long tradition as teaching institutions for America’s doctors. However, teaching activities create inefficiencies and thus lead to higher costs (Alexander and
Unfortunately, it is not practical to include teaching status as a covariate because the information is not available. Instead, I include Public Medical School, which is an indicator coded one for counties with a public medical school. Public medical schools are often eager to shed the restraints of county politics and tend to prefer full control over hospital operations (Blake and Bodenheimer 1975). Hence, the presence of a public medical school should lead to swifter closure decisions.

Next, public hospitals have also been alleged to struggle to raise capital for improvements because they are often unable to go to the bond market independently or issue stocks (Legnini et al. 1999, Shonick and Roemer 1983). The results have been obvious, particularly with regard to the physical plant and technological advancements (Terenzio 1978, Stewart 1978, Andrulis et al. 1996, Fraze et al. 2010, Hernandez and Kaluzny 1983, Shonick and Roemer 1983, Tetleman 1972). Three variables speak to this issue. First, the Hill-Burton Hospital Construction program offered an opportunity for public and non-profit hospitals to obtain a 33 percent match from the federal government (Coleman 2005, Hoge 1946). Many counties used this opportunity to upgrade their existing facilities or built new ones (Health Care Facilities Service 1971, Lave and Lave 1974). Hill-Burton measures the amount, per capita, spent by counties on these construction activities. Following standard procedures, the measure is discounted annually by the Medical Inflation Index (Boardman et al. 2011). Higher rates of spending should make counties more hesitant to shed their hospitals because of the perception of sunk costs (Cameron 1978). Second, Debt Service reflects the amount, per capita, that counties spend annually to service their bonded indebtedness. Counties with larger debt service requirements should be less able to make major improvements to their
hospitals. Finally, Percentage Debt Service measures the percentage of expenditures a county spends to service its debt.

Attitudes about welfare may also play a major role in the decline of public hospitals. In view of the differences in party ideology between Democrats and Republicans after 1945 (Gerring 1998) and conservatives’ preference for the private provision of goods (Savas 1982, 1987, 2005), I expect Democrats to exhibit more support for public hospitals. Moreover, it has been asserted that ideology is the most important factor affecting policy termination (DeLeon 1983, Cameron 1978, Harris 1997), and that it may have a significant effect on county policies (Choi et al. 2010). This effect should only intensify over time, particularly in after 1978. Percentage Democrat is then the percentage of registered voters who registered under the Democratic Party label.

Finally, it seems reasonable to expect some regional diffusion effect with regard to the closure of public hospitals. Closure in a neighboring county may add additional stress on the hospital services of the remaining counties. Because of the relatively short distances between counties, welfare migration appears a plausible response. As a result, closure by one county in a particular region may trigger others to follow suit; a race to the bottom may ensue (Cary 1974, Bailey and Rom 2004). Dividing California into distinct regions is relatively straightforward. Based on the recommendations of the California Economic Strategy Panel I initially created nine distinct regions: Northern California, San Joaquin Valley, Northern Sacramento Valley, Greater Sacramento, Central Coast, Central Sierra, Bay Area, Southern California, and Southern Border. Because of the small number of counties in the Southern California and Southern Border regions, and because they are no major underlying distinguishing characteristics or geographic boundaries,
I merged these regions. *Regional Effect* then is the percentage of county hospitals in a given regions that have closed.

Data for all variables were largely obtained from three sources. First, the *Annual Report of Financial Transactions Concerning Counties of California* provided information on county finances, including debt servicing and health and welfare spending, population data, and tax rates. Information on hospital districts was accessed through the *Annual Report of Financial Transactions Concerning Special Districts of California*. Voter registration information was obtained from the *Report of Registration* issued by the California Secretary of State. In addition, information about medical schools comes from the University of California. Information on county hospital openings and closures was obtained from a wide variety of sources, including the hospitals themselves, county governments, county historical societies, the California Office of Statewide Health Planning and Development (OSHPD), the Local Government Records Program at the Wisconsin Historical Society, and reports to the California legislature. Finally, a series of publications of county histories as well as histories of California published in the late 1800s and early 1900s filled in many gaps. An overview of the covariates can be found in Table 2.11

**Quantitative Assessment of the Decline of Public Hospitals in California**

Event history analysis is a suitable technique for studying policy termination because it allows us to assess not only what factors affect the termination decision but also to analyze the

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11 Social scientists frequently have to make tradeoffs when using quantitative methods. These challenges only increase when the social phenomenon is studied over long periods of time, as is the case here. Several of the measures are compromises; at times proxies have to be used because no good measures are available consistently or at all. Nonetheless, I believe the long-term approach taken here has much to recommend it and offers an opportunity to study interesting policy questions.
temporal dimension. Political scientists have used event history methods for several decades. Over the years, applications have become more sophisticated and political scientists have moved toward using more advanced approaches (Box-Steffensmeier and Jones 1997, Zorn 2000, Box-Steffensmeier and Zorn 2001). Event history analysis has been used in several of the few quantitative assessments of policy termination (Boin, Kuipers, and Steenbergen 2010, Carpenter and Lewis 2004, Lewis 2002). However, some of the most sophisticated models have yet to find widespread application in Political Science: Royston-Parmar models (Lambert and Royston 2009, Royston 2001, Royston and Lambert 2011, Royston and Parmar 2002).\footnote{A search for the term “Royston-Parmar” in 25 major political science journals only returned one citation, Kim (2013). However, the author does little to discuss the method and eventually resorts to a traditional Weibull model.}

Utilizing the covariates described above, I estimate a variety of Royston-Parmar models for my data, which covers the period from 1965 through 2012. Following Royston and Lambert (2011), I estimate hazard-, odds-, and probit-scale models with a variety of different knots. Royston and Lambert (2011) advise researchers to utilize AIC and BIC to select the appropriate model. Coefficients are consistent across various specifications. Various models exhibit similar information criteria and I display the results for the odds-scale model with one and two interior knots. I also included the coefficients from a traditional Cox model for comparison. As becomes evident immediately, the Royston-Parmar model is much more efficient because it utilizes the entirety of the available data. Negative coefficients in the odds-scale model indicate decreased risk of failure while positive coefficients indicate an increased risk of failure (Table 3).\footnote{Note that I included several different versions of the moving-average variables in the various models. As I have no strong underlying theory how large the moving window should, I based my selection decision on model fit.}
A number of covariates reach significance at traditional levels. As expected by Peterson, county hospitals in larger counties are at a lower risk for closure, as are county hospitals in wealthier counties. Hill-Burton funding also appears to indicate lower risk, as do a higher tax rates, the percentage of county expenditures spent on healthcare, and the percentage of Democrats in a county. In addition, a variety of covariates appears to increase the risk of hospital closure including the existence of a public medical school and location in an urban area. Regional effects are also present: the closing of hospitals in the same region increases the risk for additional closures. A strained county financial situation has no effect; neither debt service nor County Balance reach significance. The various indicators for rural counties do not come close to reaching significance in any specification. The same holds for various specifications for hospital districts. Similarly, again as predicted by Peterson, welfare spending, i.e. objective need also fails to exert a significant effect. In short, Peterson’s predictions about redistributive policies, mitigated by factors specific to hospitals and the California healthcare system, bear out that fiscal resources and not objective need drive the provision of public goods.

The Royston-Parmar framework offers additional benefits because it provides a variety of convenient ways to illustrate and present empirical findings. Unfortunately, scholars often do not take advantage of the vast information contained in survival models. What is much more interesting than coefficients and hazard rates, and substantively important, are differences in hazard rates, and hence differences survival curves. Traditionally, this comparison has utilized Kaplan-Meier estimates. Others simply plot Cox model hazard rates at values of interest. Here I utilize the Royston-Parmar estimates to compare differences in hazard rates across the entire data set. Plotting the differences in hazard rates also allows me to investigate at what times covariates
are statistically significant, i.e. whether hazard rates differ across the entire data set or whether they differ at certain intervals only. I utilize 90 percent confidence intervals to make this assessment. A positively-signed difference in hazard rates indicates a reduced risk of failure while a negatively-signed difference indicates an increase risk. Statistical significance is reached when the confidence interval, indicated here by the two dashed lines, does not include zero. For easy interpretation, I plotted the hazard curves for relatively large, but realistic, differences in the respective covariate while holding all other values at their mean or median. For indicator variables, the hazard rate difference indicates the differences for the two hazard rates with the indicator switched on and off. Only a limited number of these graphs are included here.

Several variables decrease the risk for county hospital closures. As Figure 3 indicates, population is statistically significant almost throughout the entire period. It is also monotonically declining when significant. Similarly, county wealth is also significant for large parts of the observation period. Interestingly, initially Hill-Burton funding falls just below the significance cut off and it does not reach significance until about 16 years into the data set (Figure 5). Property tax rates reach significance after about 17 years and remain relatively flat (Figure 6). The percentage of county expenditures spent on healthcare (Figure 7) and the percentage of Democrats in a county (Figure 8) also take almost twenty years to become significant. This could indicate the growing difference in attitude about government provision in the 1980s. Population and county wealth exert the substantively largest effects.

\[\text{\cite{14}}\]

To a degree this is an artifact of the modelling approach. In PO models, hazard rates for continuous variables tend to zero as \( t \to \infty \) whereas hazard ratios for binary variables tend to 1 as \( t \to \infty \).
With regard to covariates increasing the risk for closure, medical schools (Figure 9) and urban areas (Figure 10) reach significance around 11 and 18 years, respectively, and approach insignificance towards the end of the data set. Regional effects appear around 11 years and remain significant throughout (Figure 11). County Balance briefly reaches significance from about 1991 through 2011 (Figure 12). Medical schools and closures within the same region exert the substantively largest effects. Finally, welfare spending, debt service, and hospital districts never reach statistical significance (omitted).

Perhaps one of the most useful benefits gained from Royston-Parmar models is the ability to utilize prognostic models (Clark et al. 2001, Royston and Lambert 2011). Prognostic models allow for the prediction of future outcomes given the data at hand. Crucial to the development of prognostic models is the establishment of a meaningful baseline hazard function, which can be easily done with Royston-Parmar models by using the prognostic index instead of resorting to referencing or centering.¹⁵ I can then use the survival function to extrapolate from the observed data to make predictions beyond the data at hand as illustrated in Figure 13 for the PO (2) model. The extrapolation was done for an “average” hospital defined as the mean of the prognostic index. Here that extrapolation, for illustrative purposes, is presented up to 80 years (i.e. 2045). A Kaplan-Meier curve is also included for comparative purposes. While caution should be taken moving too far away from the observed data, predictions are nonetheless crucial tools for social scientists. As shown in Figure 14, the survival probability for the average hospital at the end of the data set, i.e.

¹⁵ This is often also referred to as the risk score. For more detail, see Royston and Lambert (2011, 127-128). Utilizing the prognostic index allows us to use the “average” survival curve as the reference baseline.
in 2013, is about 0.22; towards the end of the extrapolation, i.e. in 2045, the probability of survival hovers around 0.04.

**Discussion**

As illustrated both in the qualitative and quantitative assessment of the California Medicaid program, the program did much to shift county hospitals from the realm of allocative policies to that of redistributive policies. As Peterson (1981) hypothesized, the decision to maintain a public hospital is driven by fiscal consideration and not objective need. Naturally, the termination process is mitigated by factors specific to hospitals and the California healthcare system as well as to a degree of delay given cognitive and institutional limitations (Kahneman, Knetsch, and Thaler 1991, Jones 2001, Jones and Baumgartner 2005). The 1970s, just after the initiation of the Medicaid program and only briefly after the 1971 Reagan Medi-Cal reforms, was clearly a highpoint of closure activities. Where possible, as in the cases of San Diego, Orange County, and Sacramento, counties have turned over their hospitals to the University of California. They took advantage of the rapid expansion of the university system which at the time was developing several medical schools and was in search of hospital space (Blake and Bodenheimer 1975). Even counties that have maintained their hospitals often closed smaller ones in order to focus on major facilities (Schwartz et al. 1978). Over time, given the growing fiscal stresses on local government and the continuous shift of county hospitals towards the redistributive continuum, more and more counties closed their hospitals. Moreover, smaller counties lost any incentive to maintain their hospitals after the creation of CMSP. Today, county hospitals are left in only 12 counties.

Why should we care about public hospital closures? For one, public hospitals play a major role in the U.S. and California healthcare systems and have done so for a very long period of time
(Brown 1978, Terenzio 1978). The hospitals in the remaining 12 counties, while only amounting to about 7 percent of capacity for the entire system, continue to exert a tremendous influence on the healthcare system in California. For example, they provide 22 percent of psychiatric beds, account for 28 percent of clinic and 9 percent of ER visits, and provide training for 27 percent of all full-time equivalent students (Office of Statewide Health Planning and Development 2013). Including the hospitals that are part of the University of California, public hospitals provide almost 60 percent of Level I trauma care, almost 45 percent of burn centers, more than 60 percent of emergency psychiatric care, 11 percent of outpatient visits, and almost 50 percent of hospital care to the uninsured (California Association of Public Hospitals and Health Systems 2008). Moreover, they train almost 50 percent of California’s doctors (California Association of Public Hospitals and Health Systems 2008) and provide 90 percent of outpatient indigent care (Bharucha and Oberlin 2009). In addition California’s county hospitals are crucial for special populations like farmworkers and people of color (California Association of Public Hospitals and Health Systems 2003).

Advocates for the privatization of public services have argued that we must differentiate between terminations of the production or provisions function (Niskanen 1971, Kolderie 1986, Greene 2002, Ferris and Graddy 1988). This split is based on the conception that public action can be divided in public financing, i.e. public payment for public goods and services, and public production, i.e. public delivery of public goods and services. Proponents of privatization tend to emphasize that all that is required to provide public goods is a mechanism for collective action in order to provide funding. In their eyes, government ought to be nothing more than an authoritative enforcer of collective decisions. However, in the case of county hospital closures in California, it
can be argued that in many cases the termination of the production function is often functionally equivalent to the termination of the provision function. In particular, most counties without a public hospital have not entered into an agreement with local hospitals to ensure the provision of care for the indigent (Brown 1981, Haeder 2010). Arguably, the closure of the public hospital may thus serve as a first step toward the eventual disengagement from healthcare in general and healthcare for the poor in particular because the county loses a focal point as well as the vested interests advocating for the provision of adequate services (Haeder 2010).

Nonetheless, analyses of the effects of public hospitals closures are rare. Bindman, Keane, and Lurie (1990) conducted a comparative study of San Luis Obispo County, which kept its public hospital open, and Shasta County, which closed its hospital. The focus of their work was the impact of public hospital closures on health access and health status. They find a significant drop in health outcomes and health status, perceptions of access, and access to a regular provider of care, as well as major increases in denial rates for care and wait times. They also point out that patient care was hardly at the center of closure debates and that uncompensated care is significantly higher in areas with public hospitals. Findings with regard to access and uncompensated care have been confirmed by a variety of researchers (Thorpe and Brecher 1989, Thorpe and Brecher 1987, Desai, Van Deusen Lukas, and Young 2000). Closures have also led to a reduction in residency training spots and medical student rotations, particularly for students of color (Walker et al. 2008). They often also have major impacts on the local community and economy as public hospitals employ disproportionate numbers of minorities (Hernandez and Kaluzny 1983).
Early Effects of the Affordable Care Act

As illustrated above, the California Medicaid program contributed significantly to the demise of California’s county hospitals. This occurred primarily by significantly altering the financial dynamics of the healthcare marketplace and by shifting the provision of hospital care towards redistributive politics. Other federal programs like the Federal Emergency Relief Administration (American Public Welfare Association 1934, Shonick 1984), the Social Security Act (Shonick 1984), and disproportionate share hospital payments (Duggan 2000) have equally done little to help public hospitals. In fact, the mostly did more harm than good because they constitute incomplete financing shift from local to state and federal governments that simultaneously shifted the perception about the necessity of public hospitals (Blake and Bodenheimer 1975).

Two components of the ACA hold significant potential to damage the survival of county hospitals further. First, the phase out of disproportionate-share hospital payments (DSH), the largest source of funding for uncompensated care in the United States, may significant damage county hospitals due to their extensively reliance on the payments to make up for uncompensated care. The most recent data available show that only one county hospital made a profit without additional DSH payments (Office of Statewide Health Planning and Development 2013). The average DSH payment per county amounted to more than $100 million while the average loss per county amounted to almost $75 million. Largely responsible for this deficit are bad debts and charity care, which average almost $115 million per county.

Second, insurance marketplaces are intended to provide coverage for millions of Americans (Haeder and Weimer 2013). However, selective contracting by carriers offering plans
on the insurance marketplace, Covered California, may exclude county hospitals from their narrow, cost-conscience networks. Selective contracting under Medi-Cal has already proven a significant problem for county hospitals (Friedman 1984). A preliminary look at the provider networks offered at Covered California confirms these concerns (Haeder, Weimer, and Mukamel 2015). Only a single county hospital, Ventura County Medical Center, is part of all plans offered in the region. Only four other hospitals in Kern, Riverside, Contra Costa, and San Francisco County are offered in more than 50 percent of Covered California plans in the respective region. While many Californians will gain access to medical coverage through Covered California and thus no longer leave hospitals with unpaid medical bills, county hospitals may not profit from this windfall. Even worse, California’s more than two million undocumented immigrants are likely to continue to seek care in county facilities, particularly with expanded funding for federally qualified health centers coming to an end (Johnson and Mejia 2013, Health Resources and Services Administration 2014, Terenzio 1978). The creation of two need medical schools by the University of California may also put further strain on county hospitals.

Conclusion

Long before the establishment of Medicaid or the passage of the ACA, California counties provided their poorest residents with access to relatively comprehensive medical care. This paper analyzed the creation and closure of public hospitals in the State of California from the 1840s until 1996. It combined both qualitative historical research and advanced event history analysis to assess what led to the creation of the nation’s most comprehensive public health network and to its gradual demise over time. In particular, I utilized the experiences gained in the State of California in the aftermath of the implementation of Medicaid to draw out potential effects for public
hospitals under the ACA. I find strong evidence that the creation and implementation of Medicaid in California significantly altered the calculus of local governments with regard to the operation of public hospitals. In particular, Medicaid shifted county hospitals from the allocational to the redistributive category. Reforms at the state and federal level over subsequent decades further encouraged this development. Because of this shift, many counties decided to close their hospitals. Moreover, as expected for redistributive policies, the operation of public hospitals is not driven by need but instead merely the result of fiscal status (Peterson 1981): counties who can afford public hospitals continue to maintain them while poorer counties close their doors. Developments under the ACA may further exacerbate this situation, as may the creation of two new medical schools by the University of California.
Figures and Tables
Table 1: Overview of County Hospital Openings and Closures

<table>
<thead>
<tr>
<th>County</th>
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<th>County Hospital Year of Opening</th>
<th>County Hospital Year of Closure</th>
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<td>2007</td>
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<tr>
<td>Ventura County</td>
<td>1872</td>
<td>1887</td>
<td>Open</td>
</tr>
<tr>
<td>Yolo County</td>
<td>1850</td>
<td>1863</td>
<td>1991</td>
</tr>
<tr>
<td>Yuba County</td>
<td>1850</td>
<td>1856</td>
<td>1975</td>
</tr>
</tbody>
</table>

The opening year was obtained from a wide variety of sources including the hospitals themselves, county governments, county historical societies, and reports to the California legislature. Finally, a series of publications of county histories as well as the history of California published in the late 1800s and early 1900s also filled in many gaps.
Table 2: Descriptive Statistics

<table>
<thead>
<tr>
<th>Variable</th>
<th>overall</th>
<th>Std. Dev.</th>
<th>Min</th>
<th>Max</th>
</tr>
</thead>
<tbody>
<tr>
<td>Population</td>
<td>11.90</td>
<td>1.61</td>
<td>7.90</td>
<td>16.16</td>
</tr>
<tr>
<td></td>
<td>between</td>
<td>1.59</td>
<td>9.09</td>
<td>15.94</td>
</tr>
<tr>
<td></td>
<td>within</td>
<td>0.32</td>
<td>10.23</td>
<td>12.75</td>
</tr>
<tr>
<td>Net Valuation</td>
<td>10.87</td>
<td>0.82</td>
<td>9.13</td>
<td>13.41</td>
</tr>
<tr>
<td></td>
<td>between</td>
<td>0.29</td>
<td>10.33</td>
<td>12.03</td>
</tr>
<tr>
<td></td>
<td>within</td>
<td>0.77</td>
<td>9.02</td>
<td>13.62</td>
</tr>
<tr>
<td>Percentage Health (MA3)</td>
<td>13.71</td>
<td>6.39</td>
<td>1.10</td>
<td>36.68</td>
</tr>
<tr>
<td></td>
<td>between</td>
<td>3.54</td>
<td>6.47</td>
<td>22.13</td>
</tr>
<tr>
<td></td>
<td>within</td>
<td>5.35</td>
<td>-4.50</td>
<td>34.53</td>
</tr>
<tr>
<td>Total Welfare Spending (MA3)</td>
<td>496.63</td>
<td>188.63</td>
<td>155.44</td>
<td>1730.80</td>
</tr>
<tr>
<td></td>
<td>between</td>
<td>133.20</td>
<td>243.28</td>
<td>760.54</td>
</tr>
<tr>
<td></td>
<td>within</td>
<td>134.81</td>
<td>153.15</td>
<td>1564.08</td>
</tr>
<tr>
<td>Hill-Burton</td>
<td>14.99</td>
<td>60.13</td>
<td>0.00</td>
<td>950.12</td>
</tr>
<tr>
<td></td>
<td>between</td>
<td>27.99</td>
<td>0.00</td>
<td>136.07</td>
</tr>
<tr>
<td></td>
<td>within</td>
<td>53.36</td>
<td>-121.07</td>
<td>829.04</td>
</tr>
<tr>
<td>Percentage Democrat</td>
<td>48.86</td>
<td>8.98</td>
<td>25.39</td>
<td>80.11</td>
</tr>
<tr>
<td></td>
<td>between</td>
<td>4.93</td>
<td>36.77</td>
<td>60.91</td>
</tr>
<tr>
<td></td>
<td>within</td>
<td>7.53</td>
<td>24.79</td>
<td>81.41</td>
</tr>
<tr>
<td>Tax Rate (MA5)</td>
<td>1.53</td>
<td>0.81</td>
<td>1.00</td>
<td>7.18</td>
</tr>
<tr>
<td></td>
<td>between</td>
<td>0.17</td>
<td>1.22</td>
<td>1.96</td>
</tr>
<tr>
<td></td>
<td>within</td>
<td>0.80</td>
<td>0.57</td>
<td>6.75</td>
</tr>
<tr>
<td>County Balance (MA3)</td>
<td>36.51</td>
<td>294.58</td>
<td>-3402.30</td>
<td>5209.69</td>
</tr>
<tr>
<td></td>
<td>between</td>
<td>73.05</td>
<td>-187.09</td>
<td>363.16</td>
</tr>
<tr>
<td></td>
<td>within</td>
<td>285.56</td>
<td>-3178.70</td>
<td>4883.04</td>
</tr>
</tbody>
</table>


<table>
<thead>
<tr>
<th>Category</th>
<th>overall</th>
<th>between</th>
<th>within</th>
<th>between</th>
<th>within</th>
</tr>
</thead>
<tbody>
<tr>
<td>Debt Service (MA3)</td>
<td>17.51</td>
<td>13.77</td>
<td>25.56</td>
<td>-0.02</td>
<td>289.02</td>
</tr>
<tr>
<td>Regional Effects</td>
<td>47.77</td>
<td>21.17</td>
<td>21.91</td>
<td>0.00</td>
<td>100.00</td>
</tr>
<tr>
<td>Public Medical School</td>
<td>0.08</td>
<td>0.26</td>
<td>0.06</td>
<td>0.00</td>
<td>1.00</td>
</tr>
<tr>
<td>Rural County</td>
<td>0.54</td>
<td>0.50</td>
<td>0.00</td>
<td>0.54</td>
<td>0.54</td>
</tr>
<tr>
<td>Urban</td>
<td>0.34</td>
<td>0.43</td>
<td>0.21</td>
<td>-0.58</td>
<td>1.21</td>
</tr>
<tr>
<td>Hospital District Creation</td>
<td>0.00</td>
<td>0.02</td>
<td>0.25</td>
<td>-2.02</td>
<td>2.04</td>
</tr>
</tbody>
</table>
Table 3: Estimation Results, Hospital Closures, 1965-2012

<table>
<thead>
<tr>
<th>VARIABLES</th>
<th>Odds (1) Model County Hospital Closures</th>
<th>Odds (2) Model County Hospital Closures</th>
<th>Cox Model County Hospital Closures</th>
</tr>
</thead>
<tbody>
<tr>
<td>Population</td>
<td>-2.264***</td>
<td>-2.246***</td>
<td>-0.335</td>
</tr>
<tr>
<td></td>
<td>(0.652)</td>
<td>(0.634)</td>
<td>(0.258)</td>
</tr>
<tr>
<td>Net Valuation</td>
<td>-3.485***</td>
<td>-3.509***</td>
<td>-0.346</td>
</tr>
<tr>
<td></td>
<td>(1.044)</td>
<td>(1.038)</td>
<td>(0.743)</td>
</tr>
<tr>
<td>Percentage Health (MA3)</td>
<td>-0.150*</td>
<td>-0.161**</td>
<td>-0.00445</td>
</tr>
<tr>
<td></td>
<td>(0.0779)</td>
<td>(0.0789)</td>
<td>(0.0411)</td>
</tr>
<tr>
<td>Total Welfare Spending (MA3)</td>
<td>0.00199</td>
<td>0.00189</td>
<td>-0.00189</td>
</tr>
<tr>
<td></td>
<td>(0.00186)</td>
<td>(0.00186)</td>
<td>(0.00138)</td>
</tr>
<tr>
<td>Hill-Burton</td>
<td>-0.0297**</td>
<td>-0.0286**</td>
<td>-0.0232**</td>
</tr>
<tr>
<td></td>
<td>(0.0131)</td>
<td>(0.0132)</td>
<td>(0.0113)</td>
</tr>
<tr>
<td>Percentage Democrat</td>
<td>-0.112*</td>
<td>-0.114*</td>
<td>-0.0114</td>
</tr>
<tr>
<td></td>
<td>(0.0672)</td>
<td>(0.0668)</td>
<td>(0.0360)</td>
</tr>
<tr>
<td>Tax Rate (MA5)</td>
<td>-2.079**</td>
<td>-1.873*</td>
<td>0.658</td>
</tr>
<tr>
<td></td>
<td>(0.942)</td>
<td>(0.964)</td>
<td>(0.515)</td>
</tr>
<tr>
<td>County Balance (MA3)</td>
<td>0.0113</td>
<td>0.0115</td>
<td>0.000109</td>
</tr>
<tr>
<td></td>
<td>(0.00723)</td>
<td>(0.00749)</td>
<td>(0.000394)</td>
</tr>
<tr>
<td>Debt Service (MA3)</td>
<td>0.0292</td>
<td>0.0212</td>
<td>0.0137*</td>
</tr>
<tr>
<td></td>
<td>(0.0298)</td>
<td>(0.0280)</td>
<td>(0.00763)</td>
</tr>
<tr>
<td>Regional Effects</td>
<td>0.0515***</td>
<td>0.0524***</td>
<td>0.0219**</td>
</tr>
<tr>
<td></td>
<td>(0.0186)</td>
<td>(0.0182)</td>
<td>(0.0108)</td>
</tr>
<tr>
<td>Public Medical School</td>
<td>3.242**</td>
<td>3.200**</td>
<td>0.891</td>
</tr>
<tr>
<td></td>
<td>(1.499)</td>
<td>(1.505)</td>
<td>(0.939)</td>
</tr>
<tr>
<td>Rural County</td>
<td>-0.783</td>
<td>-0.766</td>
<td>1.063</td>
</tr>
<tr>
<td></td>
<td>(1.086)</td>
<td>(1.098)</td>
<td>(0.767)</td>
</tr>
<tr>
<td>Urban</td>
<td>2.135*</td>
<td>2.152*</td>
<td>0.784</td>
</tr>
<tr>
<td></td>
<td>(1.234)</td>
<td>(1.248)</td>
<td>(0.694)</td>
</tr>
<tr>
<td>Hospital District Creation</td>
<td>0.273</td>
<td>0.350</td>
<td>-0.0340</td>
</tr>
<tr>
<td></td>
<td>(1.950)</td>
<td>(1.989)</td>
<td>(0.689)</td>
</tr>
<tr>
<td>Constant</td>
<td>70.06***</td>
<td>70.07***</td>
<td>0.175</td>
</tr>
<tr>
<td></td>
<td>(19.31)</td>
<td>(18.94)</td>
<td></td>
</tr>
</tbody>
</table>

Observations 1,168 1,168 1,168
BIC 131 134 297
AIC 106 107 226
(Pseudo) Log Likelihood -37.24 -36.59 -99.11
Total Time at Risk 1168 1168 1168
Failures 36 36 36
Number of Counties 47 47 47
R² 0.804 0.808 0.175

Standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1
Figure 1: Percentage of California Counties with a County Hospitals, 1950 to 2012
Figure 2: California Counties with County Hospitals over Time, 1965-2013
**Figure 3:** Difference in Hazard Rates over Time for County Population

![Population: Large Differences](image1)

**Figure 4:** Difference in Hazard Rates over Time for Net Valuation

![Net Valuation: Large Differences](image2)
Figure 5: Difference in Hazard Rates over Time for Hill-Burton Funding

![Hill Burton Funding: Large Differences](image)

Figure 6: Difference in Hazard Rates over Time for Property Tax Rates

![Property Tax Rates: Large Differences](image)
**Figure 7:** Difference in Hazard Rates over Time for Percentage Health Spending

![Percentage Health Spending: Large Differences](image)

**Figure 8:** Difference in Hazard Rates over Time for Percentage Democrats

![Percentage Democrats: Large Differences](image)
**Figure 9**: Difference in Hazard Rates over Time for Public Medical School

**Figure 10**: Difference in Hazard Rates over Time for Urban Area
Figure 11: Difference in Hazard Rates over Time for Regional Effects

Figure 12: Difference in Hazard Rates over Time for County Balance
**Figure 13:** Survival Curve Extrapolation to 2045
Technical Appendix
In many respects, Royston-Parmar models provide a sound middle ground between the semi-parametric Cox model and a fully parameterized approach. For one, they improve on the noisy hazard and survival functions of the Cox model as well as the Kaplan-Meier and Nelson-Aalen estimators, which allows for easier interpretation. Moreover, Royston-Parmar models specifically estimate a baseline hazard and thus allow the researcher to utilize the information contained in the baseline across the observation period to evaluate absolute as well as relative risk. Royston-Parmar models are also not restricted to the proportional hazard assumption and are estimated by full maximum likelihood. Finally, Royston-Parmar models also allow for out-of-sample predictions and multiple time scales, and facilitate the graphical display of results.

At the same time, Royston-Parmar models provide added flexibility over parametric models. This flexibility allows more complex hazard functions as well as the estimation of new classes of models, such as proportional odds and probit-scale models. Conveniently, the various scales nest Weibull, loglogistic, and lognormal models. Moreover, they allow for non-monotonic hazard functions and multiple turning points. Royston-Parmar models may also approximate the ability of split-population models to address group heterogeneity appropriately. Finally, Royston-Parmar models allow for multiple events as well as Bayesian approaches.

The derivation of Royston-Parmar models is relatively straightforward following Royston and Lambert (2011):

\[ \log H(t) = f(t; \gamma) + x\beta \]
i.e. the logarithm of the cumulative hazard function is a function of time and a parameter vector $\gamma$ in addition to $x\beta$, where $x$ is a set of covariates and $\beta$ the parameter vector. Royston and Lambert (2011) suggest replacement with the restricted cubic spline function $s(log t; \gamma)$.\(^1\) Hence

$$
\log H(t) = s(log t; \gamma) + x\beta
$$

$$
= \eta_i
$$

$$
= \gamma_0 + \gamma_1 \log t + \gamma_2 z_1(\log t) + \gamma_2 z_2(\log t) + \cdots + x\beta
$$

The hazard function can then be retrieved as

$$
\tilde{h}(t) = \frac{d\tilde{H}(t)}{dt}
$$

Hence we can write

$$
\log H(t) = \log \{-\log S(t)\} = \log \{-\log S_0(t)\} + x\beta
$$

Royston and Lambert (2011) generalize this to

$$
g_\theta\{S(t)\} = g_\theta\{S_0(t)\} + x\beta
$$

where

$$
g_\theta(x) = \log \left\{ \frac{x^{-\theta} - 1}{\theta} \right\}
$$

which is known as the Aranda-Ordaz function (Aranda-Ordaz 1981). Added flexibility is gained by utilizing restricted cubic spline functions of log time. This allows, for example, for non-monotonic hazard rates and multiple turning points. Moreover, the number and location of knots can be altered relatively freely.

\(^1\) Although technically these may not be monotonically increasing at all times.
The specification nests three different models. First, it nests the proportional hazards models (PH) when \( \theta = 0 \). Models of the hazard scale reduce to the Weibull model when no interior knots are modeled. Coefficients can be interpreted as hazard ratios. Second, when \( \theta = 1 \) we obtain the proportional odds model (PO). These models reduce to the loglogistic model when no interior knots are modeled. Coefficients can be interpreted as odds ratios. Third, \( \theta \) is redundant for the probit scale models (PR). These models reduce to the lognormal model when no interior knots are modeled. Finally, as Royston and Lambert (2011) point out, technically \( \theta \) can take any non-negative value although lacking a natural scale for the covariates makes interpretation challenging when \( \theta \) differs from 0 or 1.

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2 See Royston and Lambert (2011) 101-111
3 The Weibull model can of course be interpreted as an AFT model as well.
4 See Royston and Lambert (2011) 111-114
5 The loglogistic model can of course be interpreted as an AFT model as well.
Works Cited


Johnson, Judy. 1986. "What Are the Common Characteristics of MIAs?" Master's in Nursing, Nursing, San Jose State University.


doi: 10.1017/S0020818313000131.


