California Workers' Compensation Institute

Research Note

PPO to MPN: Impact of Physician Networks in the California Workers' Compensation System

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Key Findings

This study examines changes in the use of physician networks in California workers' compensation as they evolved from Preferred Provider Organizations (PPOs) to Medical Provider Networks (MPNs), and measures their impact on medical costs associated with work-related injuries. Using data compiled from more than 1.8 million claims from accident year (AY) 2000 through June of AY 2011, the authors compared the average medical benefit payments at 24 months post injury for claims where treatment was delivered by network providers to claims where treatment was delivered by non-network providers. In addition, the authors tracked changes in network utilization over the 11.5 year span of the study, and compared the changing nature and characteristics of claims where treatment was managed inside and outside of networks. Key findings include:

- Overall, network utilization increased from 55.4 percent in the PPO period (AY 2000 – AY 2002) to 79.5 percent in the full MPN period (AY 2009 – June AY 2011), while for indemnity claims it increased from 44.2 percent to 77.2 percent.
- The proportion of network indemnity claims with attorney involvement increased from 38.1 percent in the PPO period to 44.6 percent in the full MPN period, but network indemnity claims still had a lower attorney involvement rate than non-network claims.
- Network claims closed more quickly than non-network claims, however the claim closure rate for network claims at 12 months post-injury decreased from 72.7 percent in the PPO period to 61.2 percent in the full MPN period.
- The percentage of network indemnity claims with at least one opioid prescription increased from 39.1 percent in the PPO period to 54.5 percent in the full MPN period.
- Average risk-adjusted medical payments on indemnity claims at 24 months post injury were 16 percent less for network claims than for non-network claims in the PPO period, but were only 3 percent less in the full MPN period.
- Differences in average risk-adjusted medical payments between network and non-network claims varied greatly by region, ranging from no difference in Los Angeles County to a 20 percent difference in San Diego County in the full MPN period.
- Average risk-adjusted medical payments on indemnity claims with attorney involvement were 14 percent less for network claims than non-network claims in the PPO period, but were 2 percent more in the full MPN period.
- Average risk-adjusted medical payments on network claims with opioids were 16 percent less for network claims than non-network claims in the PPO period, but were 20 percent less in the full MPN period.

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Background: The Evolution of Physician Networks in the California Workers' Compensation System

For almost 40 years, the use of provider networks to deliver medical care to injured workers in California has fueled an ongoing debate as public policymakers attempt to reconcile the right of injured workers to seek treatment from a physician of their choice with the obligation of payors to balance cost, quality of care, and access to physicians. In large part, the debate has centered on the perceived efficacy of medical treatment and the impact of that treatment on related disability outcomes. After all, an injured worker's physician not only has a direct impact on the medical care that is provided, but on other related aspects of the worker's claim, including benefit management, return to work, temporary disability and permanent disability.

Over the past two decades, as the use of medical networks to treat injured workers has grown in California and in other states, so too has the need to understand the impact of networks on workers' compensation medical utilization and costs, other benefit costs, disability outcomes and patient satisfaction. Earlier public policy research consistently demonstrated that workers' compensation networks were most often associated with lower costs and facilitated return-to-work.[1,2,3]

There are several theories about how provider networks reduce costs. Network advocates suggest that the physicians who participate in workers' compensation networks have specialized knowledge of occupational injuries, are familiar with the administrative reporting requirements, and provide objectivity regarding the disability aspects of work-related injuries. Swedlow (2003) found an association between experience (the volume-based outcomes effect) and physician outcomes, and that networks tend to consolidate more experienced physicians.[4] On the other hand, critics argue that networks arbitrarily reduce medical utilization in order to reduce costs. They say that this reduction in medical utilization works to the detriment of the injured worker, reduces the quality of care, negatively impacts patient satisfaction and lengthens the duration of disability which increases indemnity costs.

Prior to 1976, employers in California had the right to select the physicians who treated their injured workers. Often, employers established close working relationships with a set of medical providers who were familiar with the needs of their particular population of injured workers. Critics of employer-directed medical care suggested that this model represented a "company doctor" relationship in which the physician considered the cost concerns of the employer ahead of the medical concerns of injured workers.

In response to concerns that employer-selected physicians did not always have the best interests of the injured worker as their first priority, in 1976 California lawmakers enacted legislation that limited employers' medical control to 30 days from their date of knowledge of a work-related injury. After this

1. Dembe, A. E. 1998. Evaluating the Impact of Managed Health Care in Workers' Compensation. *Occupational Medicine: State of the Art Reviews* 13 (4): 799-821.
2. Cheadle A., T. M. Wickizer, G. Franklin, K. Cain, J. Joesch, K. Kyes, C. Madden, L. Murphy, R. Plaeger-Brockway, and M. Weaver. 1999. Evaluation of the Washington State Workers' Compensation Managed Care Pilot II: Medical and Disability Costs. *Medical Care* 37 (10): 982-993.
3. Dr. William G. Johnson, Dr. Marjorie L Baldwin, Steven C. Marcus. The Impact of Workers' Compensation Networks on Medical Costs and Disability Payments, Cambridge, MA. Workers' Compensation Research Institute, November 1999.
4. Swedlow A., Gardner L. Provider Experience in the California Workers' Compensation System and Volume-Based Outcomes – Does "Practice Make Perfect?" *CWCI Research Note*. January 2003.

initial 30-day period, an injured worker was given the right to select any physician to continue treatment, as well as the right to change treating physicians an unlimited number of times. This "free choice model" of physician selection tended to fragment medical treatment and complicate communications between physicians and claims administrators who depend on medical information to adjudicate claims.

In 1993, California legislators enacted additional reforms intended to curb the growing inflation in workers' compensation. Among other things, these reforms allowed employers or insurers to establish Health Care Organizations (HCOs) to treat their injured workers for up to 180 days after an injury. HCOs were representative of a movement toward a managed care model reflective of systems developed in the general health care market. Injured workers covered by an HCO were directed to a list of network providers and were allowed to change their primary treating physician up to three times during the course of the HCO medical control period – but always within the established network and in cooperation with the HCO. From the beginning, however, administrative complexities associated with HCOs limited their use by employers, and although a few HCOs continue to operate in California, they have never gained widespread appeal and only cover a small proportion of the state's total work force.

In April 2004, the increased cost of workers' compensation medical care prompted state lawmakers to enact another set of reforms (SB 899) that attempted to minimize disputes and ensure that high-quality medical care is delivered promptly to injured workers. The centerpiece of that effort was the introduction of Medical Provider Networks (MPNs). MPNs are managed care programs that first became operational in January 2005. Under an approved MPN program, self-insured employers, insurers, state departments and joint powers authorities were given the right to utilize networks of preferred providers to render medical care to their injured workers. As with HCOs, MPNs must meet defined access standards and include medical providers from a wide array of medical specialties. However, unlike HCOs, the employer retains medical control for the life of the claim, subject to strict statutory and regulatory controls. These controls include the employee's right to:

- Predesignate their personal physician for the treatment of work injuries, even when their employer has contracted with an MPN;
- Choose any MPN physician within reasonable geographic proximity of their work or home; and
- Switch to other physicians within the MPN an unlimited number of times following their initial visit with an MPN provider.

The MPN model was designed to balance the anticipated high quality/cost effective care associated with defined provider networks with an injured worker's right to choose a physician (i.e., unlimited physician choice within the network). In sum, MPNs were intended to ensure appropriate levels of treatment, improve efficiency, better coordinate treatment, and reduce the cost of care.

In late 2004, the Division of Workers' Compensation (DWC) adopted regulations to allow implementation of MPNs. These included strict medical provider access standards, and detailed requirements defining the proportions and types of physicians that must be available within each network. The regulations and ensuing judicial decisions also made it relatively easy for employees to opt out of MPNs.

In 2012, state lawmakers enacted SB 863, which addressed some of the issues that had arisen under the earlier reforms. In regard to MPNs, SB 863 included provisions to:

- Facilitate injured workers' access to medical treatment within an MPN;
- Simplify the MPN application process; and
- Reinforce the burden of proof for injured workers who attempt to seek treatment outside of an MPN due to a breach in the MPN regulations.

Regulations adopted by the DWC to implement SB 863 took effect in August 2014 and created new requirements. These included additional access standards based on physician specialty, a new process for obtaining physician acknowledgements, and associated penalties.

Study Goal

The goal of this study is to assess changes in the use of physician networks in the California workers' compensation system since 2000 by comparing payment data as well as other claim outcome factors across three timeframes: the PPO period spanning AY 2000 – 2002; the MPN transitional period of AY 2003 – 2008; and the full MPN period of AY 2009 – June 2011.

Data and Methods

The claim sample used for this study was obtained from CWCI's Industry Claim System database and included California work injury claims from AY 2000 through June 2011, with medical payment and bill review data on those claims compiled through June 2014. The authors bundled the claims in the sample into three categories based on the dates of injury: the PPO period (AY 2000 – AY 2002 claims); the MPN transition period (AY 2003 – AY 2008 claims), and the full-MPN period (AY 2009 – June AY 2011 claims). Multiple claim variables were extracted from the claim sample, including ICD-9 diagnosis codes, nature of injury, presence of temporary and permanent disability (indemnity) payments, attorney involvement, location of the injured worker (based on their home ZIP code) and principal medical provider associated with the claim. Additional variables and demographic data were used to adjust benefit costs in order to compensate for differences in the risk profiles of the MPN and non-MPN study populations. Medical bill review details for pharmaceuticals, including analgesic opioids, were also compiled for analysis.

Using the claim characteristic identifiers, the authors grouped the claims by principal medical provider type (network vs. non-network), presence of lost time at work (indemnity), claim closure status, attorney involvement, claims with opioid prescriptions, and region in which the injured worker resided. In addition, total medical and indemnity payments for each claim were measured at 24 months post injury. Opioid prescriptions were also counted and valued at the first, second, and third years after injury.

Results

Changes in Network Utilization Rates

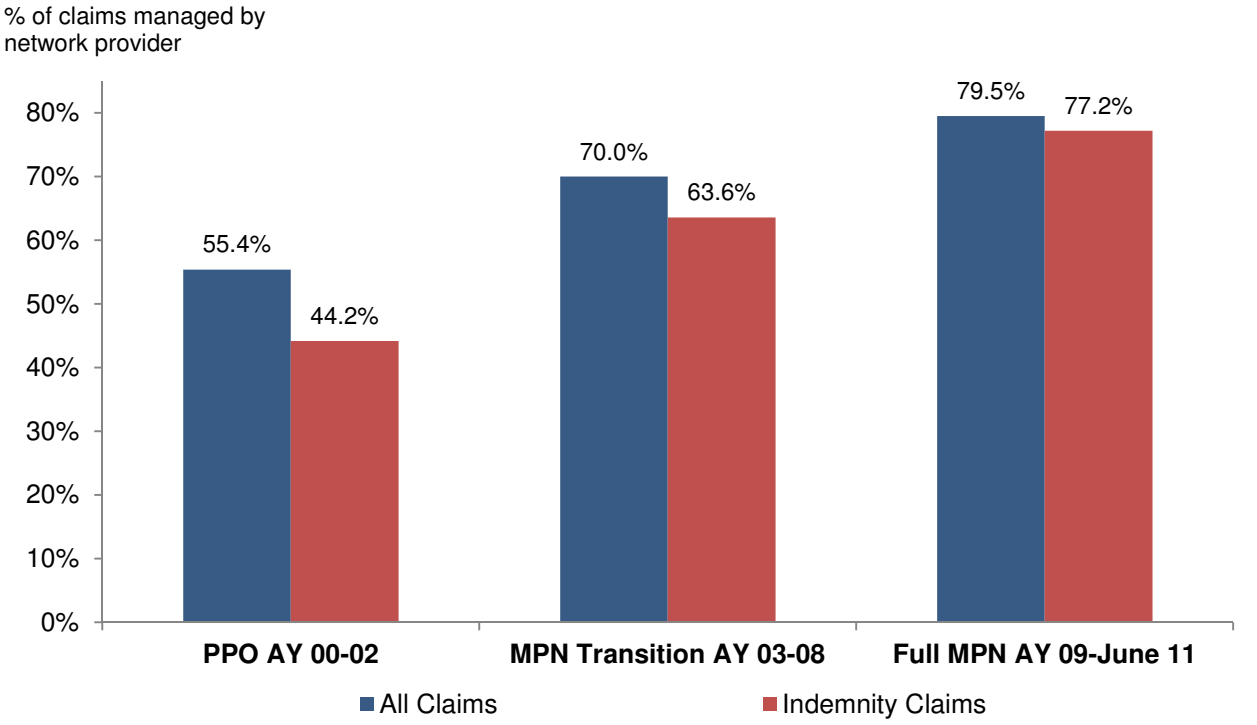
The dataset used in the study included detailed information on more than 1.8 million California workers' compensation claims for injuries that occurred between January 2000 through June 2011. The distributions of these claims across the three distinct periods within the study and by network versus non-network medical care are noted in Exhibit 1.

Exhibit 1: Study Sample Claim Distributions

Study Periods	Network	Non-Network	Total
PPO (AY 2000 – 2002 Claims)	346,052	278,801	624,853
MPN Transition (AY 2003 – 2008 Claims)	676,764	290,153	966,917
Full-MPN (AY 2009 – June 2011 Claims)	167,092	43,086	210,178
Grand Total	1,189,908	612,040	1,801,948

To estimate the network utilization rates, the authors used a proprietary algorithm to identify those claims in which a network physician was the principal provider who managed the treatment of the injured worker. Among the factors accounted for by the algorithm were the nature, timing, and duration of the medical services. Those claims in which a network physician was identified as the principal provider were then tagged as "network" claims, while the rest were tagged as non-network claims. Exhibit 2 shows the network utilization rates for all claims and for indemnity claims during each of the three periods studied.

Exhibit 2: Network Utilization Rates - All Claims vs. Indemnity Claims



Given the increased medical control afforded employers who utilize MPNs, it is not surprising that the network utilization rate jumped sharply following the introduction of MPNs in 2005. As noted in Exhibit 2, overall network penetration in California workers' compensation rose from 55.4 percent of claims in the PPO period to 70 percent of claims in the MPN transition period, and then increased to almost 80 percent in the full-MPN period.

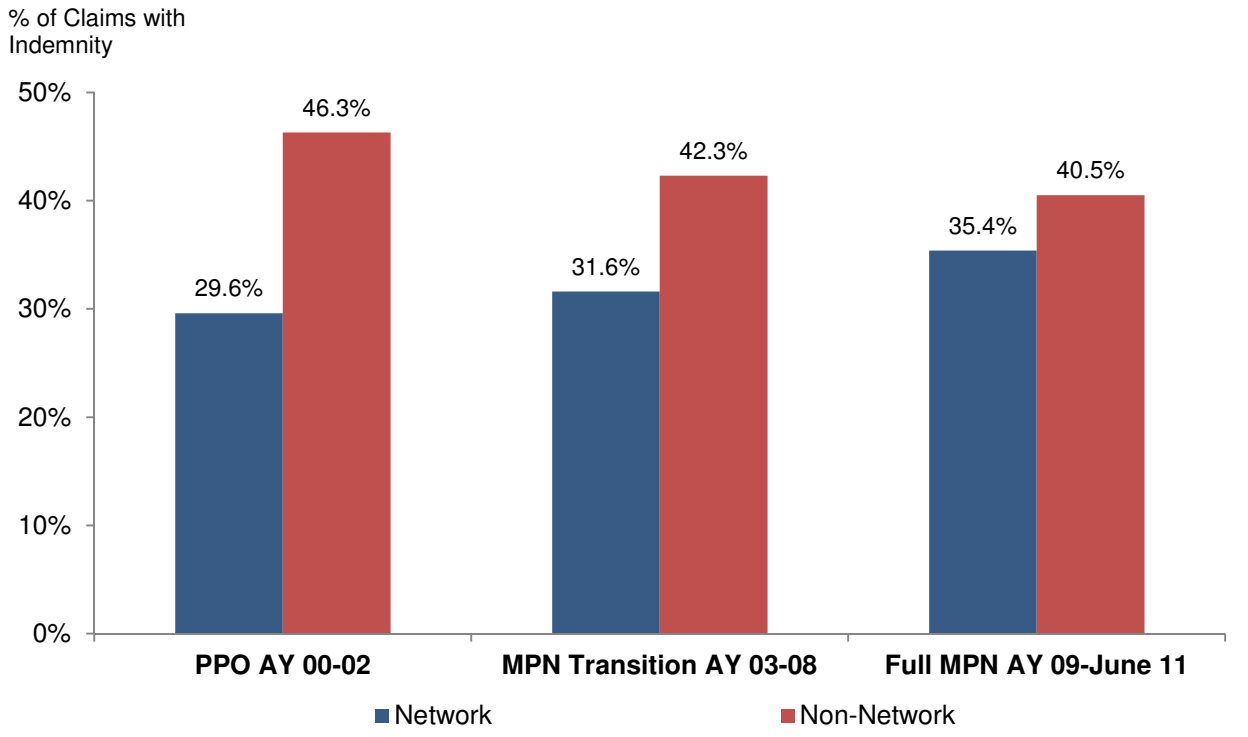
The comparison of network utilization rates for lost-time cases (indemnity claims) and for all claims (medical-only + indemnity claims) noted in Exhibit 2 reveals that the impact of MPNs was greatest on indemnity claims. In the PPO period, 44.2 percent of indemnity claims were medically managed by a network provider, compared to 55.4 percent of all claims. After MPNs were fully implemented, the network utilization rate for indemnity claims rose to 77.2 percent, nearly matching the 79.5 percent rate recorded for all claims. This suggests that there may be tension in the current workers' compensation system involving injured workers with lost time who would otherwise seek treatment outside of the employer-established network if not for the medical control allowed by MPNs

Changing Characteristics of Network and Non-Network Claims

In addition to examining changes in the network utilization rates over the 11.5 year study period, the authors also explored changing characteristics of network and non-network claims over that same time frame, focusing primarily on characteristics that have traditionally been associated with high costs.

Indemnity Claim Trends: As was noted in Exhibit 2, the network utilization rate increased sharply following the introduction of MPNs, most notably among indemnity claims. As a result, indemnity claims as a proportion of all network claims edged up from just under 30 percent in the PPO period to 31.6 percent during the MPN transition period, then increased to more than 35 percent after the MPNs were fully implemented (Exhibit 3).

Exhibit 3: Indemnity Claims as a Percent of Network & Non-Network Claims



Conversely, indemnity claims accounted for a declining share of non-network claims across this same timeframe, falling from 46.3 percent of claims managed outside of networks prior to the introduction of MPNs to 42.3 percent as the transition to MPNs occurred, then dropping to 40.5 percent after MPNs were fully implemented. Thus, over the 11.5 year study period, the proportion of network claims with indemnity payments increased by nearly 6 percentage points—a relative increase of nearly 20 percent. Because lost time is highly correlated with high-cost outcomes, a change of this magnitude would result in a significant shift in comparative claim outcomes from one period to the next. To control for the changing nature of claims managed inside and outside of medical networks, the authors applied risk adjustment factors to the two claim populations in order to isolate the impact of network status on outcomes. Additional detail on the application of the risk adjustment is provided later in this report.

Attorney Involvement Rates: Attorney involvement is another characteristic associated with high-cost claims. Litigation and attorney involvement in workers' compensation tend to result from the interplay of a number of factors and attitudes. In 1975, CWCI published a study on workers' compensation litigation that examined factors that lead workers to seek the help of an attorney. The study included a survey of injured workers who had filed applications for adjudication of their claims with the Workers' Compensation Appeals Board. The results of that survey indicated that while there was no single cause for litigation, there was a central theme: uncertainty of the injured worker, often grounded in fear or distrust.[5] In the four decades since that study was published, California workers' compensation has become increasingly complex and difficult to navigate, so it is not surprising that litigation has become endemic to the system, with attorneys involved in 38 percent of indemnity claims and more than 85 percent of claims involving permanent disability.[6]

Workers' compensation disputes and litigation often revolve around issues in which the primary treating doctor plays a central role. These include determining the cause, nature or extent of injury; the appropriate course of treatment, and who should render that care; if and when the injured worker should return to work; and the worker's level of permanent impairment.

Exhibit 4 displays attorney involvement rates for all claims, all indemnity claims, and claims with permanent disability. Overall, network claims in all three categories had lower attorney involvement rates than non-network claims. Prior to the introduction of MPNs in 2005, the "free choice model" gave injured workers the right to choose their physician if they were injured on the job, even when their employer had established a preferred network of providers and offered that network to employees. The fact that one third of all non-network claims involved an attorney during the PPO period (nearly three times the rate for network claims), and that the litigation rate for non-network claims showed little change after MPNs took effect, suggests that allowing the injured worker choice of physician did little to overcome the fear, distrust, and other factors that lead to attorney involvement. At the same time, an increase in the level of attorney involvement among network claims has coincided with the expansion of MPNs. If physician choice has little or no effect on the inclination to retain an attorney, then it is possible that the increasing attorney involvement rate among MPN claims is simply a consequence of the shifting of complex claims from non-network to network status. This is supported by the fact that among the full population of claims in the study, regardless of network affiliation, the overall attorney involvement rate remained essentially unchanged across the study periods: 21.9 percent in the PPO period, 20.0 percent in the MPN transition period, and 20.6 percent in the full MPN period.

5. "Litigation in Workers' Compensation: *A Report to the Industry*." CWCI, 1975.
6. Young, B. "Attorney Involvement in AY 2005 – 2010 California Workers' Compensation Claims, CWCI, 2014.

Exhibit 4: Attorney Involvement Rates

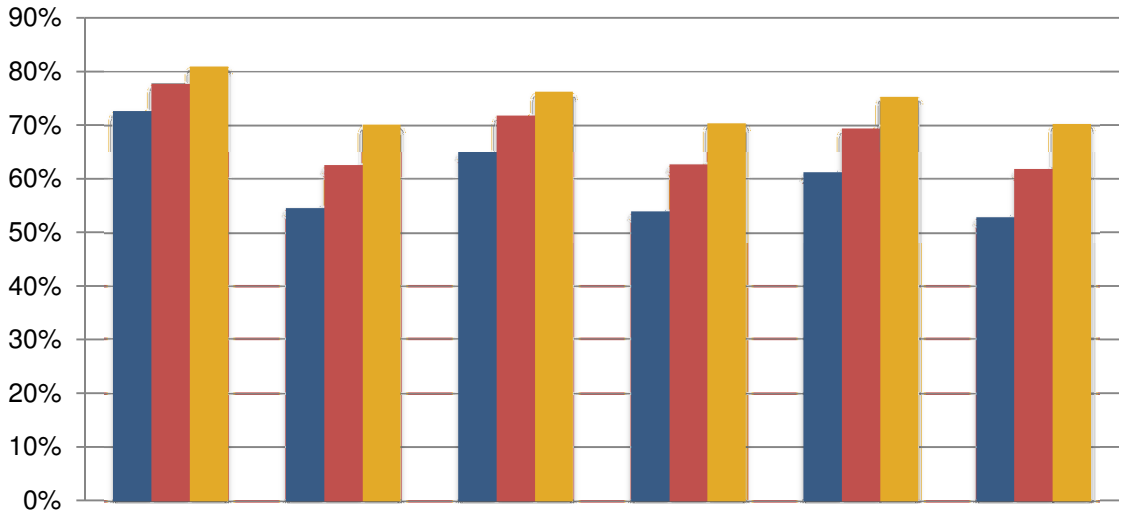
	All Claims		Indemnity Claims		PD Claims	
	Network	Non-Network	Network	Non-Network	Network	Non-Network
PPO	12.2%	33.9%	38.1%	66.0%	85.7%	93.9%
MPN Transition	15.2%	31.3%	44.3%	63.9%	85.1%	93.1%
Full-MPN	17.4%	32.9%	44.6%	63.2%	77.7%	89.3%

Attorney involvement rates among network claims increased from 12.2 percent in the PPO period to 17.4 percent in the full MPN period.[7] Although the attorney involvement rate among all non-network managed claims remained relatively constant over the same period, the exertion of medical control by employers through MPNs greatly reduced the proportion of injured workers treated outside of established networks, as noted in Exhibit 2. Breaking the results out for indemnity claims shows there were also significant differences in the level of attorney involvement between network and non-network lost-time cases, and the increase in the attorney involvement rate among indemnity claims over the 11.5 year study period was similar to that noted for all claims. The attorney involvement rates among network indemnity claims increased from 38.1 percent in the PPO period to 44.6 percent in the full MPN period, while the rate among non-network indemnity claims was relatively flat, decreasing from 66.0% in the PPO period to 63.2% in the full MPN period. On the other hand, the level of attorney involvement among permanent disability claims appears to have been unaffected by the maturation of the MPN program, with the decrease in the attorney involvement rate during the full MPN period likely impacted more by the relatively young claim development in the most recent study period.

Claim Closure Rates: A third characteristic that is strongly correlated with higher costs is the claim closure rate. The likelihood that a claim will close increases as it ages, so the authors measured claim closure rates at three benchmark levels: 12, 24, and 36 months post injury. By measuring the closure rates of claims from each of the three study periods at the same levels of development, the authors controlled for the effects exerted by different levels of claim maturation, and produced comparable data for assessing any changes in claim status that occurred between the PPO, MPN transition, and full MPN periods.

7. This increase occurred even though claims in the PPO period are more mature and have had more time for an attorney to become involved.

Exhibit 5: Claim Closure Rates at 1, 2, and 3 Years Post Injury

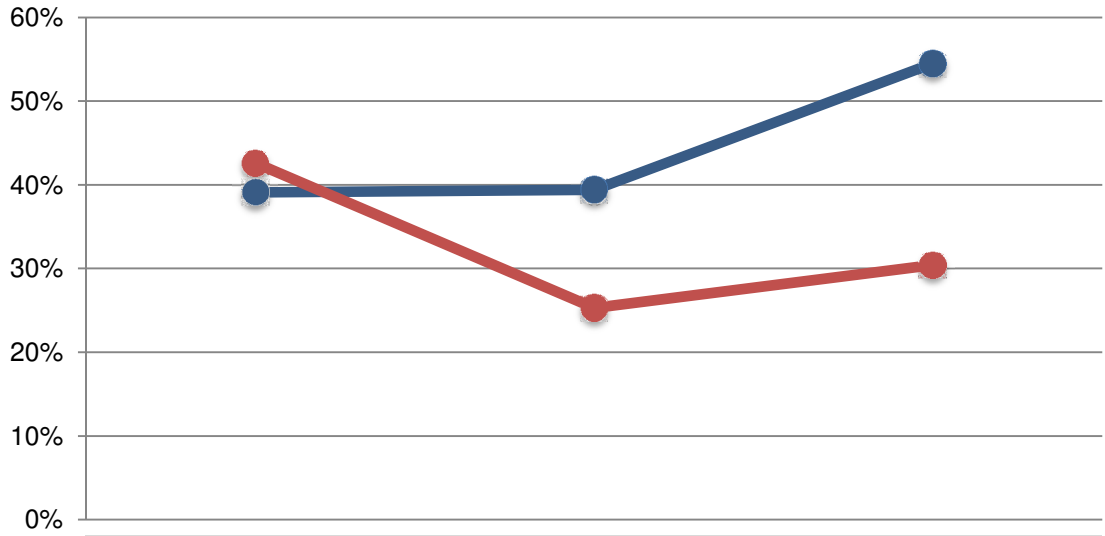


	Network PPO Period	Non-Network PPO Period	Network MPN Transition	Non-Network MPN Transition	Network Full MPN	Non-Network Full MPN
Year 1	72.7%	54.7%	65.0%	54.0%	61.2%	53.0%
Year 2	77.8%	62.5%	71.9%	62.7%	69.5%	61.8%
Year 3	81.0%	70.2%	76.3%	70.5%	75.4%	70.4%

The claim closure rate for network claims is higher than for non-network claims across all categories and time frames. That said, proportion of network claims closed at the one-year benchmark did decline over the 11.5 year study period, decreasing from 72.7 percent to 65.0 percent between the PPO period and the MPN transition period, then falling to 61.2 percent in the full MPN period. At the same one-year valuation point, non-network claim closure rates showed very little change, decreasing from 54.7 percent in the PPO period to 54.0 percent in the MPN transition period and 53.0 percent in the full MPN period. This pattern of declining claim closure rates among network claims and relatively stable claim closure rates among the non-network claims was also observed at the two- and three-year valuations, as shown in Exhibit 5. This finding is consistent with the growth in indemnity claims as a percentage of network claims (Exhibit 3) and the increasing attorney involvement rates among network claims (Exhibit 4), suggesting that the severity of claims managed by network medical providers increased dramatically from the PPO period to the full MPN period.

Presence of Opioids: Prior research has shown that the presence of opioids on a claim is correlated with increased severity,[8] so to further explore the issue of rising claim severity among network claims since 2000, the authors also measured changes in the proportion of indemnity claims with an opioid prescription.

Exhibit 6: Percent of Indemnity Claims with at Least One Opioid Prescription



	PPO	MPN Transition	Full MPN
Network	39.1%	39.4%	54.5%
Non-Network	42.6%	25.3%	30.4%

The results again show a significant increase in the proportion of claims that involved a characteristic that has been associated with high levels of claim severity and cost. As noted in Exhibit 6, the prevalence of opioid prescriptions in indemnity claims managed by a network provider showed little change between the PPO period and the transition period, but after MPNs were fully implemented, that percentage jumped from 39.4 percent to 54.5 percent. In contrast, the proportion of opioid prescriptions among the non-network indemnity claims decreased from 42.6 percent in the PPO period (similar to the rate noted among network claims from that period) to 25.3 percent in the transition period, then began to climb again, rising to 30.4 percent after MPNs were fully implemented.

8. Swedlow, A., Gardner, L., Ireland, J., Genovese, E. "Pain Management and the Use of Opioids in the Treatment of Back Conditions in the California Workers' Compensation System." *Report to the Industry*. CWCI. June 2008

Regional Variations: There is reason to expect that it is difficult for employers and claims administrators to uniformly implement all aspects of a successful MPN program across different parts of the state, which makes it challenging for them to fulfill the promise of improved medical treatment and return to work. Physician networks in rural areas serve populations that are geographically dispersed, and the available physician population in these areas is typically low compared to more densely populated urban or suburban areas. Therefore, the authors felt it was important to examine differences among various regions of the state. To do so, they divided California into eight regions defined primarily by geographic boundaries.[9]

Exhibit 7: Network Utilization Rates by California Region

	All Claims			Indemnity Claims		
Region	**PPO**	**Transition**	**Full MPN**	**PPO**	**Transition**	**Full MPN**
Bay Area	61.6%	75.0%	83.5%	52.9%	71.6%	83.1%
Central Coast	48.9%	67.0%	78.5%	40.5%	62.0%	79.7%
Inland Empire/Orange	58.2%	70.2%	77.9%	42.3%	61.4%	74.9%
Los Angeles	50.3%	66.5%	78.5%	34.2%	54.0%	70.7%
North Counties	45.8%	62.1%	71.6%	38.8%	61.2%	73.4%
San Diego	57.3%	72.9%	86.3%	50.8%	71.1%	85.7%
Sierras	51.1%	70.4%	76.1%	45.6%	68.1%	76.6%
Valleys	57.5%	72.4%	81.7%	48.6%	68.9%	83.2%
California	55.4%	70.0%	79.5%	44.2%	63.6%	77.2%

Exhibit 7 shows that certain areas of the state were early adopters of provider networks. For example, prior to the introduction of MPNs in January 2005, more than 61 percent of all claims in the Bay Area – and almost 53 percent of indemnity claims – involved treatment by a network provider. Other parts of the state, particularly those in rural areas such as the North Counties and the Central Coast, were slower to adopt provider networks – or perhaps provider networks were less likely to extend into less populated areas of the state. Los Angeles County also showed a relatively low network utilization rate in the PPO period, particularly among indemnity claims, perhaps reflecting the historically litigious nature of the workers' compensation environment in that region.

Among California regions, the Central Coast showed the greatest increase in network penetration over the three study periods, as network utilization among all claims grew from 48.9 percent in the PPO period to 78.5 percent in the full MPN period, and from 40.5 percent to 79.7 percent among indemnity claims. The Inland Empire/Orange County region registered the smallest increase among all claims, as network utilization grew from 58.2 percent in the PPO period to 77.9 percent in the full MPN period, though that increase of nearly 20 percentage points was still significant. The Bay Area showed the smallest growth in network use among indemnity claims, as the network utilization rate for lost-time cases in the nine-county region climbed from 52.9 percent to 83.1 percent – though this relatively small increase was primarily due to the Bay Area's relatively high level of network penetration prior to the introduction of MPNs. Additional regional detail is in Appendix 1.

9. For example, all counties in the San Joaquin and Sacramento Valleys were grouped into one region called "Valleys," mountainous counties were grouped in the "Sierras" region and the coastal area from south of the Bay Area to north of Los Angeles was identified as the "Central Coast." Los Angeles and San Diego Counties were each defined as their own regions.

Network and Non-Network Claim Cost

Employers and claims administrators use provider networks to achieve cost savings and enhance the quality of care. It is generally believed that network providers contain costs by offering discounts from the Official Medical Fee Schedule, and assure quality care by adhering to the evidence-based guidelines outlined by the Medical Treatment Utilization Schedule (MTUS) and other evidence-based guidelines where applicable. However, many factors that affect costs – including claimant characteristics, type of injury, and administrative requirements – are beyond the control of network providers and claims organizations.

To isolate the impact of provider networks on claim costs, the authors adjusted the payment data from the study sample to account for these characteristics ("risk factors") by calculating the relative risk score of each claimant, then dividing the amount paid by the risk score. The resulting risk-adjusted payments represent the amount that would have been expected to be paid if all claims in both the network and non-network populations had a comparable risk score of 1.0, which is the average risk across each of three combinations of payment type and claimant population modeled:

- Medical Payments on Indemnity (Lost Time) Claims
- Medical Payments on Medical Only Claims
- Indemnity Payments on Indemnity Claims

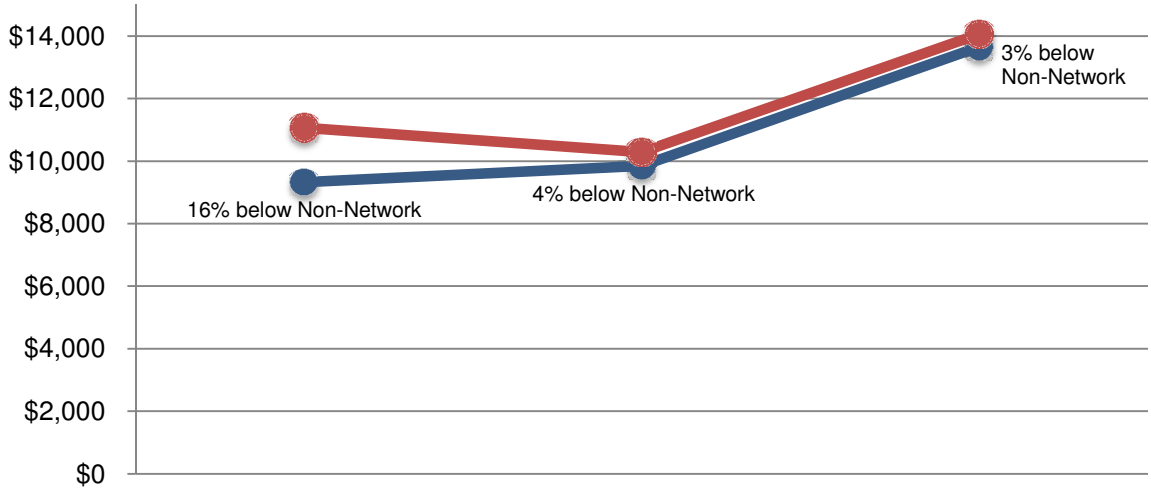
The authors used multiple regression to estimate the independent effect of each risk factor in predicting the medical and indemnity payments ("dependent variables") listed above. Because there are different relationships among the risk factors and the type of payment they predict, separate risk adjustment models were developed and applied to each payment category.[10]

10. The risk factors ("independent variables") used by the models are listed in Appendix 2. The regression coefficients associated with each risk factor were estimated from the claims data of workers with injury dates between AY 2000 and June AY 2011. Insignificant variables were identified using stepwise regression and were dropped from the models.

Risk-Adjusted Results: Network vs. Non-Network Average Medical Payments

Exhibit 8 compares risk-adjusted average medical payments at 24 months post injury for indemnity claims during the PPO, MPN transition and full MPN periods, and shows the network penetration rates for each of these periods. During the PPO period, average medical payments to networks were 16 percent below the average paid to non-network providers. As the use of MPNs increased from 44 percent to 77 percent in the full MPN period, however, the savings associated with the use of networks decreased to 3 percent.

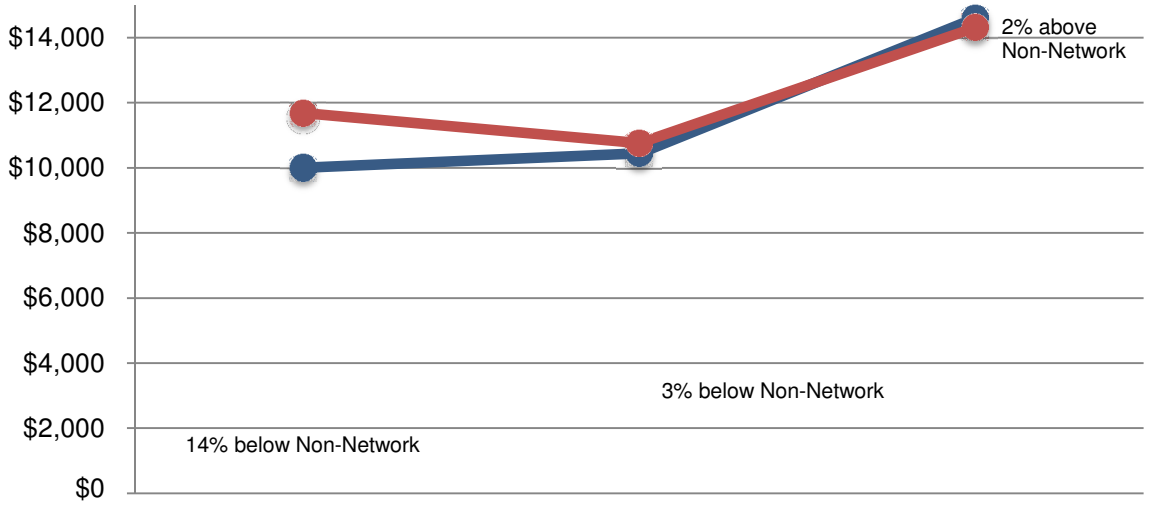
Exhibit 8: Risk-Adjusted Average Medical Payments at 24 Months Post Injury – Indemnity Claims



	PPO	MPN Transition	Full MPN
Percent Network	44%	64%	77%
Network	$9,321	$9,843	$13,654
Non-Network	$11,065	$10,290	$14,061

Exhibit 9 shows the risk-adjusted medical payments at 24 months post injury for indemnity claims of injured workers who were represented by an attorney.

Exhibit 9: Risk-Adjusted Average Medical Benefits Paid at 24 Months Post Injury – Indemnity Claims with Attorney Involvement

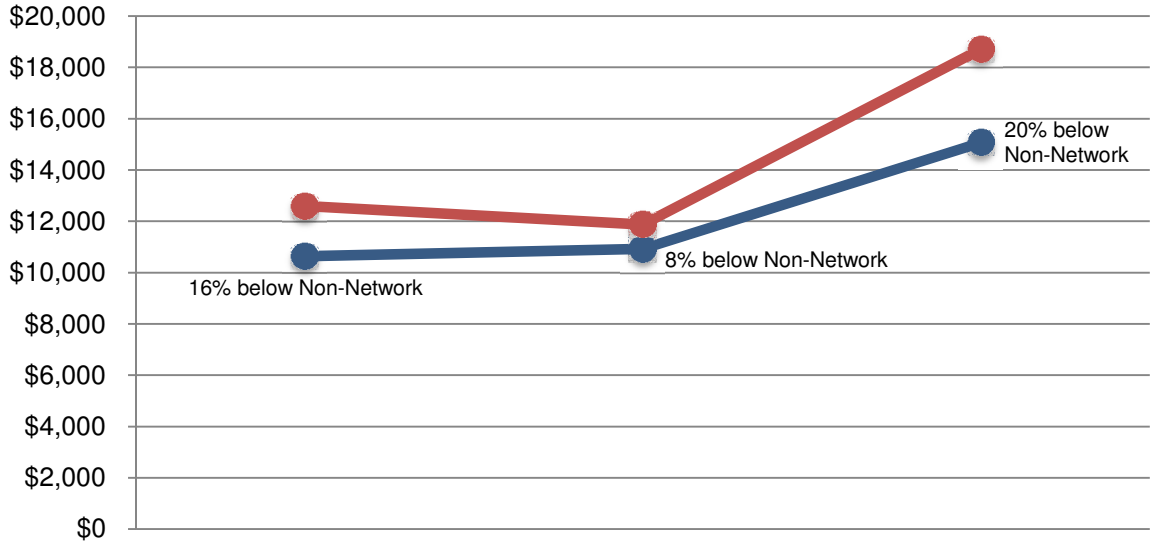


	PPO	MPN Transition	Full MPN
Percent Network	31%	55%	71%
Network	$10,005	$10,448	$14,599
Non-Network	$11,688	$10,765	$14,306

During the PPO period, paid medical benefits for network claims with attorney involvement averaged 14 percent less than those of non-network claims that involved attorneys. However, after MPNs were fully implemented, the situation reversed, as average medical payments for network claims with attorneys exceeded those of non-network attorney involvement claims by 2 percent. Thus, in situations where the injured worker had an attorney, network providers were no longer more effective than non-network providers in controlling medical costs.

Exhibit 10 compares risk-adjusted average medical payments for network and non-network indemnity claims with at least one opioid prescription for each of the three study periods.

Exhibit 10: Risk-Adjusted Average Medical Benefits Paid at 24 Months Post Injury – Indemnity Claims with Opioid Prescription



	PPO	MPN Transition	Full MPN
Percent Network	42%	68%	86%
Network	$10,633	$10,926	$15,066
Non-Network	$12,596	$11,876	$18,707

During the PPO period, average paid medical benefits at 24 months post injury for claims with opioids were 16 percent less for network claims than for non-network claims, but by the full MPN period, paid medical losses on the opioid prescription claims were 20 percent less when medical care was managed by a network. Between the PPO and the full MPN periods, the network utilization rate for claims involving opioids increased from 42 percent to 86 percent. Thus, on the claims where injured workers were prescribed opioids, network providers treated a much larger proportion of the injured worker population, and they were more effective than the non-network providers in controlling medical costs.

Network vs. Non-Network Average Medical Payments by Region

During the PPO period, network utilization rates varied significantly by geographic region. As was noted in Exhibit 7, prior to the introduction of MPNs, the network utilization rate ranged from a low of 45.8 percent in the rural Northern Counties to a high of 61.6 percent in the Bay Area; while the relative increase in network penetration after MPNs were fully implemented varied from 35.6 percent in the Bay Area (from 61.6 percent to 83.5 percent) to 60.5 percent in the Central Coast (from 48.9 percent to 78.5 percent). This suggests that the impact of MPNs on medical treatment and associated payments varied across the state, as it reflected both the PPO network penetration in each region and the ultimate network utilization rate in that region after MPNs were fully implemented.

A review of the statewide impact of MPNs on risk-adjusted medical payments at 24 months shows diminishing savings, as the spread between the average amount paid on network vs. non-network claims declined from a 16 percent advantage for network claims during the PPO period to a 3 percent advantage

during the full MPN period (Exhibit 8). To see if this trend was consistent across all areas of the state, the authors calculated the average risk-adjusted medical payment at 24 months of development for the PPO, MPN transition, and full MPN periods in each of the eight regions identified in the study (Exhibit 11).

Exhibit 11: Average Risk-Adjusted Paid Medical at 24 Months Post Injury by Region – Indemnity Claims

Region / Network Status	PPO	MPN Transition	Full MPN
Bay Area			
Network	$8,494	$9,904	$14,410
Non-Network	$10,248	$11,014	$16,892
% Difference	-17%	-10%	-15%
Central Coast			
Network	$8,908	$9,460	$13,393
Non-Network	$10,245	$10,062	$16,187
% Difference	-13%	-6%	-17%
Inland Empire/Orange			
Network	$9,987	$10,208	$14,339
Non-Network	$12,073	$10,269	$14,896
% Difference	-17%	-1%	-4%
Los Angeles			
Network	$10,258	$9,877	$13,728
Non-Network	$11,631	$10,042	$13,680
% Difference	-12%	-2%	0%
Northern Counties			
Network	$8,003	$9,150	$12,984
Non-Network	$9,480	$9,276	$12,999
% Difference	-16%	-1%	0%
San Diego			
Network	$9,465	$9,781	$12,964
Non-Network	$12,382	$11,192	$16,181
% Difference	-24%	-13%	-20%
Sierras			
Network	$8,568	$10,101	$15,705
Non-Network	$10,139	$10,768	$16,632
% Difference	-16%	-6%	-6%
Valleys			
Network	$9,132	$9,860	$13,957
Non-Network	$10,284	$10,581	$16,360
% Difference	-11%	-7%	-15%
Other/Unknown			
Network	$10,718	$8,366	$8,308
Non-Network	$10,450	$9,017	$6,327
% Difference	3%	-7%	31%

This analysis found that during the PPO period, average risk-adjusted medical payments at 24 months on network claims were less than those of non-network claims in every region of the state (excluding Other/Unknown), with the savings associated with networks ranging from 11 percent in the Valleys to 24 percent in San Diego. Furthermore, in four regions, average medical payments on network claims continued to be substantially lower than on non-network claims through the MPN transition period and into the full MPN period. In the Bay Area, the spread between network and non-network payments edged down from 17 percent in the PPO period to 15 percent after MPNs were fully implemented, while in San Diego the spread decreased from 24 percent to 20 percent. So, even though the gap between network and non-network payments narrowed slightly in these two regions, networks continued to generate significant savings. At the same time, the savings associated with networks grew significantly in the Central Coast and in the Valleys, as the difference between network and non-network payments increased from 13 percent to 17 percent in the Central Coast, and from 11 percent to 15 percent in the Valleys.

In other regions of the state, however, the story was different, as the spread in average medical payments between network and non-network claims narrowed substantially. In the Inland Empire/Orange County region, the difference between network and non-network payments decreased from 17 percent in the PPO period to 4 percent in the full MPN period; in the Sierras the differential fell from 16 percent to 6 percent; and in the Northern Counties, the gap narrowed from 16 percent to no difference. While these reductions were all significant and affected the statewide trend, the most notable and impactful reduction in the payment differential between network and non-network claims was in Los Angeles County, which accounts for 24 percent of all workers' compensation claims in the state. As noted in Exhibit 11, in Los Angeles County the savings associated with network care completely evaporated in recent years, with the spread between the average medical payments for network and non-network claims declining from 12 percent in the PPO period to no difference after MPNs were fully implemented.

Discussion

After a work-related injury occurs, employers and injured workers have aligned incentives to return to healthy status and productive activity as soon as possible. However, it is not always easy to agree on the best path to attain these goals. Employers have an added incentive to adhere to the rules and regulations of applying medical treatment guidelines to maintain the quality of care and keep medical costs as low as possible, while injured workers have many difficult choices among sometimes divergent medical treatment plans. MPNs are intended to balance these sometimes conflicting positions by allowing employers to channel injured workers to networks of medical providers who utilize evidence-based medical treatment guidelines while offering injured workers a wide selection of primary treating physicians, as well as the option to change physicians as often as requested.

This study demonstrates that the use of networks to medically manage treatment of work-related injuries has fulfilled the legislative intent to encourage network use, which has increased from 55 percent of work injuries prior to MPN implementation to 80 percent in the fully implemented MPN period. Network claims are also associated with lower rates of attorney involvement and higher rates of claim closure. It is also apparent, however, that MPNs have not sustained their ability to significantly lower the cost of medical care even after adjusting for these differences. This study's analysis of risk-adjusted payment data on indemnity claims shows that the 16 percent cost advantage when injured workers treated with a network provider in the PPO period has eroded to a 3 percent advantage in the full MPN era. And, for the first time, average medical payments on MPN claims with attorney involvement now average 2 percent more than non-MPN claims that involve attorneys.

There are potential contributing factors for this savings deterioration. Networks now manage almost 80 percent of all claims and have increased in size to conform to regulatory access standards. It is possible that these simultaneous factors have led to networks of physicians that mirror the general population of all physicians in the state. At the same time, data limitations make it difficult for payors to fully evaluate the practice patterns of providers. In addition, the perceived risk of litigation by some providers against payors for lack of access to or removal from a network has made it more difficult to administer networks.

The authors wish to stress that this study's findings should not be interpreted as a system-wide failure of medical provider networks. While the study's overall findings show deterioration in average cost differences between network and non-network managed claims, there was considerable variation across the individual provider networks present in the data sample. In fact, for the full MPN cohort of claims, an analysis of network-to-network outcomes showed that just as many networks had lower cost per claim outcomes as higher cost per claim outcomes.[11] Clearly, the clinical and regulatory complexity of providing treatment for occupational injuries requires greater network vigilance than ever before. Active data collection and evaluation, with its known imperfections, is still the best strategy for assembling and maintaining a network that provides both high quality and cost-effective care. Many payors reward physicians and medical groups who demonstrate high levels of adherence to treatment guidelines with "pre-authorization" status, exempting them from all or parts of utilization review oversight of their treatment decisions. Regardless, provider networks will continue to evolve and remain an integral component of the California workers' compensation medical care system.

11. Confidentially agreements with data contributors prevent identifying any specific payor or network outcome.

Appendix 1: Regional Differences

Percentage of Claims with Indemnity Payments by Region

	Network			Non-Network		
Region	**PPO**	**MPN Transition**	**Full MPN**	**PPO**	**MPN Transition**	**Full MPN**
Bay Area	33.1%	34.5%	35.4%	47.2%	41.3%	36.5%
Central Coast	31.7%	33.5%	34.9%	44.7%	41.7%	32.4%
Inland Empire/Orange	27.0%	29.6%	35.3%	51.3%	43.9%	41.7%
Los Angeles	25.3%	29.1%	34.9%	49.2%	49.4%	52.6%
North Counties	31.2%	34.4%	37.4%	41.5%	35.8%	34.2%
San Diego	30.0%	30.7%	31.0%	39.1%	33.7%	32.8%
Sierras	35.1%	35.3%	38.0%	43.8%	39.3%	37.1%
Valleys	30.7%	32.3%	36.1%	43.8%	38.3%	32.5%
California	29.6%	31.6%	35.1%	46.3%	42.3%	39.9%

Attorney Involvement Rates by Region

	Network			Non-Network		
Region	**PPO**	**MPN Transition**	**Full MPN**	**PPO**	**MPN Transition**	**Full MPN**
Bay Area	11.9%	14.7%	14.0%	30.6%	25.5%	20.3%
Central Coast	14.4%	16.8%	17.0%	31.8%	27.4%	19.0%
Inland Empire/Orange	12.3%	15.6%	19.4%	42.1%	35.9%	37.8%
Los Angeles	11.4%	16.1%	20.4%	42.0%	44.1%	53.5%
North Counties	13.1%	15.5%	14.1%	24.0%	17.7%	15.1%
San Diego	13.5%	15.6%	15.0%	26.2%	21.7%	21.6%
Sierras	14.5%	13.8%	13.1%	25.7%	20.6%	16.2%
Valleys	11.5%	13.4%	15.3%	28.5%	23.6%	19.4%
California	**12.2%**	**15.2%**	**17.4%**	**33.9%**	**31.3%**	**32.9%**

Percentage of Claims with Rx Opioids by Region						
	Network			Non-Network		
Region	**PPO**	**MPN Transition**	**Full MPN**	**PPO**	**MPN Transition**	**Full MPN**
Bay Area	31.9%	35.1%	47.2%	30.4%	18.7%	20.6%
Central Coast	44.2%	45.0%	56.4%	47.3%	25.2%	35.9%
Inland Empire/Orange	41.5%	42.1%	58.1%	48.5%	28.0%	29.9%
Los Angeles	36.6%	39.0%	51.2%	45.2%	26.3%	26.6%
North Counties	44.6%	40.3%	60.3%	41.1%	25.8%	45.2%
San Diego	37.3%	35.3%	50.6%	38.8%	20.6%	29.4%
Sierras	40.0%	33.7%	53.9%	37.4%	21.7%	38.9%
Valleys	44.3%	41.0%	59.5%	44.7%	27.6%	36.4%
California	**39.1%**	**39.4%**	**54.5%**	**42.6%**	**25.3%**	**30.4%**

Appendix 2: Descriptions of Risk Adjustment Measures	
Risk Factor	**Description**
Worker Related	
Age/Gender	Eight categorical variables representing males or females in each of four age ranges (<21, 21-44, 44-64, and 65+) were used. Age is the age of the injured worker at the time when the injury occurred.
Industry	Categorical variables representing the primary industry of the worker's employer, such as construction, as defined by the Workers' Compensation Insurance Rating Bureau of California.
Tenure	Five categorical variables representing the elapsed time between the worker's hire date and injury date.
Premium Size	Seven categorical variables representing the amount of premium paid annually, ranging from less than $1,000 to over $1,000,000. These measures are proxy measures for company size.
Comorbidities	Six binary variables (0, 1) indicating the presence or absence of each of the following comorbidities: inflammation (e.g., nerve), mental illness, metabolic disorder, obesity, substance abuse, and circulatory disorder.
Claim Type	Three categorical variables representing the type of payments made on the claim: medical only, temporary disability, or permanent disability.
Injury Related	
Cause of Injury	Categorical variables representing the cause of the injury or accident, such as lifting or fall/slip, as defined by the Workers' Compensation Insurance Rating Bureau (WCIRB) of California.
Nature of Injury	Categorical variables representing the nature of the injury, such as strain/sprain, as defined by the Workers' Compensation Insurance Rating Bureau (WCIRB) of California.
Body Part	Categorical variables representing the part of the worker's body that was injured, such as low back, as defined by the Workers' Compensation Insurance Rating Bureau (WCIRB) of California.
Diagnosis	Categorical variables representing diagnosis categories assigned to the overall claim (using a ranking algorithm) based on the primary ICD-9 diagnoses codes of the medical services.
Inpatient Stay	A binary variable indicating whether or not the claimant was hospitalized.
Administrative Process Related	
Days from Injury to First Medical Service	Seven categorical variables representing the elapsed time between the injury date and the date of the first medical service.
Days from Injury to Carrier Notification	Seven categorical variables representing the elapsed time between the injury date and when the insurance carrier was notified of the accident or injury.
Attorney Involvement	A binary variable indicating whether or not the claimant was represented by an attorney.
Claim Status	A binary variable indicating whether or not the claim has been closed or remains open as of 06/30/2014.

Appendix 3: Average Risk-Adjusted Paid Medical at 24 Months Post Injury by Region – All Claims			
Region / Network Status	**PPO**	**MPN Transition**	**Full MPN**
Bay Area			
Network	$3,446	$4,025	$5,830
Non-Network	$4,160	$4,430	$6,695
% Difference	-17%	-9%	-13%
Central Coast			
Network	$3,591	$3,842	$5,403
Non-Network	$4,134	$4,038	$6,317
% Difference	-13%	-5%	-15%
Inland Empire/Orange			
Network	$3,993	$4,156	$5,799
Non-Network	$4,833	$4,132	$5,878
% Difference	-17%	1%	-1%
Los Angeles			
Network	$4,131	$4,063	$5,599
Non-Network	$4,674	$4,050	$5,459
% Difference	-12%	0%	3%
Northern Counties			
Network	$3,245	$3,672	$5,216
Non-Network	$3,820	$3,729	$5,195
% Difference	-15%	-2%	0%
San Diego			
Network	$3,821	$4,028	$5,285
Non-Network	$4,899	$4,477	$6,338
% Difference	-22%	-10%	-17%
Sierras			
Network	$3,454	$4,052	$6,239
Non-Network	$4,084	$4,315	$6,484
% Difference	-15%	-6%	-4%
Valleys			
Network	$3,655	$3,978	$5,599
Non-Network	$4,136	$4,225	$6,396
% Difference	-12%	-6%	-13%
Other/Unknown			
Network	$4,165	$3,428	$3,477
Non-Network	$4,181	$3,499	$2,573
% Difference	0%	-2%	35%

Appendix 4: Average Risk-Adjusted Paid Indemnity at 24 Months Post Injury by Region – Indemnity Claims			
Region / Network Status	**PPO**	**MPN Transition**	**Full MPN**
Bay Area			
Network	$10,142	$11,845	$15,234
Non-Network	$11,420	$12,054	$17,052
% Difference	-11%	-2%	-11%
Central Coast			
Network	$9,552	$10,563	$13,205
Non-Network	$11,207	$11,121	$14,631
% Difference	-15%	-5%	-10%
Inland Empire/Orange			
Network	$9,527	$10,637	$13,620
Non-Network	$11,140	$9,881	$11,584
% Difference	-15%	8%	18%
Los Angeles			
Network	$9,463	$9,828	$12,802
Non-Network	$10,729	$9,022	$10,162
% Difference	-12%	9%	26%
Northern Counties			
Network	$9,062	$9,639	$12,185
Non-Network	$10,219	$10,315	$12,458
% Difference	-11%	-7%	-2%
San Diego			
Network	$9,655	$10,333	$12,426
Non-Network	$10,690	$9,925	$11,635
% Difference	-10%	4%	7%
Sierras			
Network	$10,332	$11,962	$14,378
Non-Network	$11,256	$11,714	$17,246
% Difference	-8%	2%	-17%
Valleys			
Network	$9,584	$10,467	$13,196
Non-Network	$10,576	$10,822	$13,554
% Difference	-9%	-3%	-3%
Other/Unknown			
Network	$10,762	$8,875	$7,460
Non-Network	$11,588	$8,925	$5,708
% Difference	-7%	-1%	31%

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California Workers' Compensation Institute

The California Workers' Compensation Institute, incorporated in 1964, is a private, nonprofit organization of insurers and self-insured employers conducting and communicating research and analyses to improve the California workers' compensation system. Institute members include insurers that collectively write more than 70 percent of California workers' compensation direct written premium, as well as many of the largest public and private self-insured employers in the state. Additional information about CWCI research and activities is available on the Institute's web site (http://www.cwci.org).