



Addressing Factors that Affect Health Care Costs: Recommendations for Indiana Stakeholders

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Project Leads

Nir Menachemi, PhD, MPH, is the Fairbanks Endowed Chair, Professor and Department Head of Health Policy and Management at the IU Richard M. Fairbanks School of Public Health. In addition, he is a Scientist at the Regenstrief Institute and teaches at the IU Kelley School of Business and the IU School of Medicine.

Paul Halverson, DrPH, FACHE, is the Founding Dean and Professor of the IU Richard M. Fairbanks School of Public Health. He holds additional appointments at the IU School of Medicine and the Regenstrief Institute. Halverson previously served as the State Health Officer in Arkansas and as a Division Director at the US Centers for Disease Control and Prevention.

With contributions from

Casey Balio

Justin Blackburn, PhD

Amber Blackmon, MPH

Amanda Briggs, MS

Alva O. Ferdinand, DrPH, JD

Sarah Johnson, MS

Olena Mazurenko, MD, PhD

Nadia Unruh Needleman, MS

Lindsey Sanner, MPH

Joshua R. Vest, PhD, MPH

Valerie A. Yeager, DrPH

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EXECUTIVE SUMMARY

Rising health care costs are of concern to Indiana consumers, employers, policymakers, health care providers, and other health care stakeholders, especially because of poor health outcomes in the state. Several recent analyses have elevated the discussion about the prices of hospital care in our state. However, many factors contribute to overall health care costs beyond price. Any policy interventions, based upon a limited understanding of the larger context, unnecessarily risks positioning stakeholders against each other without addressing the overall problem. This report is motivated by the need to move Indiana towards lower overall health care costs especially through concerted efforts that will improve the health of Hoosiers.

We believe that the work represented in this report is a preliminary step towards developing an Indiana strategic plan for health care. A necessary next step is to convene stakeholders for further discussion, contemplation, and activation based on consensus and known best practices. To facilitate this next step, the current report includes three main sections: (1) a characterization of the health care context in Indiana, (2) a literature synthesis of how 16 different factors could affect overall costs of care and/or population health outcomes, and (3) recommendations for stakeholder action based upon conclusions from the literature syntheses and the Indiana context. The 16 factors were derived from consultation with experts, stakeholders, and public calls for policy changes.

Characterizing the Indiana Context

In the **Figure**, we present a wide range of publicly available variables that show how Indiana compares to the national average and to each of our neighboring states on disease burden, health status, health care market, and demographic characteristics. To aid in the interpretation of these variables, we show Indiana's standing (depicted by a dot) relative to the neighboring states (depicted by a gray band) as a percentage of change from the US rate (dashed vertical line) on each measure. A gray dot for Indiana indicates no difference from the US rate. A red dot indicates Indiana is at least 10% worse than the US rate, an orange dot indicates at least 5% worse, and a green dot indicates 10% better than the US rate. The gray bands show which neighboring state have the highest and lowest

performance compared to Indiana. Key takeaways from this information include:

- Personal health care spending per capita in Indiana is in line with neighboring states and not more than 5% above national averages.
- Per capita state government spending on health care (mostly via Medicaid) is substantially lower (>10%) than the US average and lower than most neighboring states.
- In line with neighboring states, people in Indiana are more likely than other Americans to have private health insurance. Notably, the un-insurance rate in Indiana is more than 10% lower than the US overall.
- Hoosiers are more likely than Americans, and residents of neighboring states, to work for a private-sector firm that offers a self-insured health plan.
- Health insurance premiums in Indiana (single and family coverage), as well as the employee contribution to single coverage plans within the state is similar to US averages (and consistent or better than neighboring states).
- Employees in Indiana pay a smaller percentage of their total family coverage premiums than most Americans.
- The percent of income devoted to health care in Indiana is slightly below the national average and within the range of neighboring states.
- The average Hoosier is sicker and suffers from more health conditions than the average American, especially with respect to high smoking rates, mental health conditions, and cardiovascular disease. Diabetes in Indiana is also elevated relative to the national rate.
- People in Indiana have higher age-adjusted mortality from accidents, suicides, and drug overdoses.
- Infant mortality and maternal mortality are particularly high in Indiana.
- Public health investments in Indiana are consistently well below US averages and frequently below neighboring states.
- Indiana performs in the bottom tier with respect to public health preparedness.
- Indiana has comparatively very low taxes on cigarettes, and thus a lower price which motivates continued smoking.
- Indiana has particularly low vaccination rates for influenza, childhood vaccines, and adult and elderly vaccines.
- Given Indiana's low investments in public health, our state ranks below the bottom quartile in the US for

Figure: Characterizing the Indiana Context

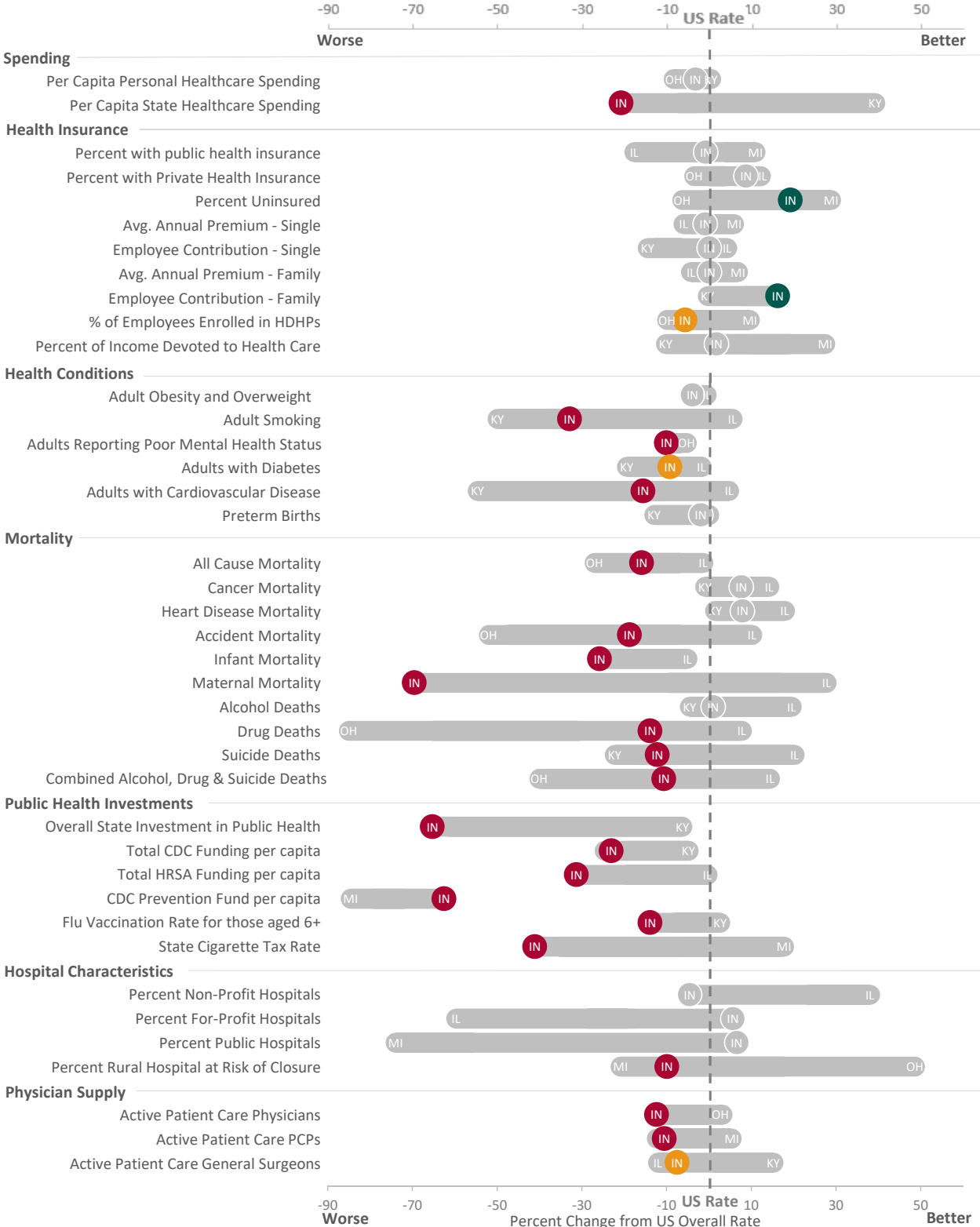
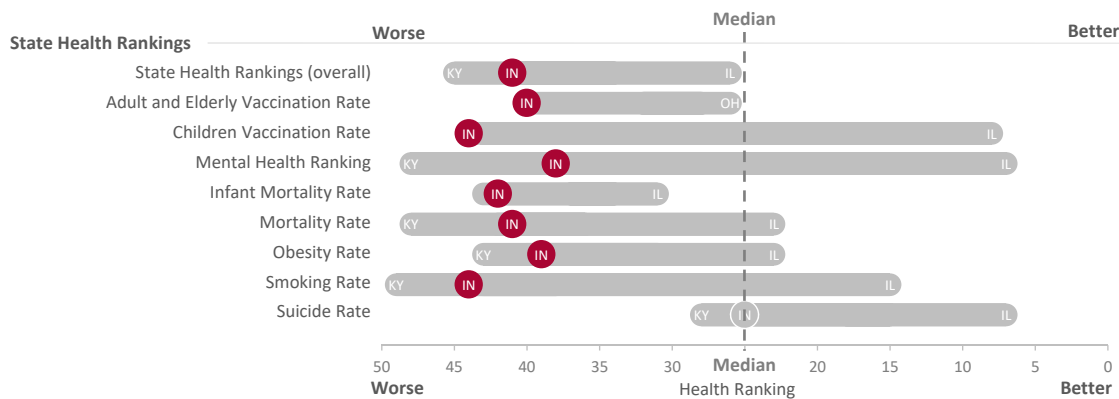


Figure: Characterizing the Indiana Context



overall health, mental health, infant mortality, overall mortality, obesity, and smoking. These health rankings are consistently worse than neighboring states.

- Compared to US trends, hospitals in Indiana are more likely to be for-profit or public especially compared to neighboring states.
- Rural hospitals in Indiana are at higher risk of closure due to financial issues than rural hospitals in the US overall.
- Indiana has fewer physicians, especially in primary care, than the US overall and most neighboring states.
- The average location in the US, and in the state of Indiana overall, has a health insurance market that is considered ‘highly concentrated’ (less competitive) based on definitions used by the Federal Trade Commission and the US Department of Justice for anti-trust enforcement. In contrast, inpatient hospital concentration categorizes Indianapolis, the largest metro area, as moderately concentrated. (See Table 7 on pages 18-19.)
- Demographically, Indiana reflects US averages more consistently than most neighboring states. However, Indiana has fewer adults with a bachelor degree than the US overall and most neighboring states. (See Table 8 on page 19.)

Literature Syntheses

We synthesize the literature regarding 16 factors that could influence both the overall costs of care and patient outcomes. Based upon the weight of evidence, as a function of the study designs used in individual articles, we describe the takeaway points from a given body of literature as: (1) convincing evidence on cause and effect, (2) promising evidence on cause and effect, and (3) correlational evidence where cause and effect should not be inferred.

Market and Local Activities

1. Provider (hospital and physician) and payer concentration

Convincing evidence suggests that provider and payer concentration each lead to higher costs. Provider and payer concentration each have mixed/inconclusive effects on quality of care and health outcomes.

2. Employer-provider direct price negotiations

Overall, employer-provider direct price negotiations have been rare and not rigorously evaluated. Limited promising evidence suggests that employers could, individually or through an alliance with other employers, successfully negotiate lower prices and/or performance guarantees that may yield desired benefits. The long-term success of such negotiations is conditional on employers’ ability to successfully maintain the alliance.

3. Use of narrow and tiered provider networks by payers

Convincing evidence suggests that the use of narrow provider networks can reduce costs with promising evidence suggesting no effects on quality. Some promising evidence suggests that tiered networks could also steer patients towards lower-cost providers.

4. Public health activities

Convincing evidence links investments in public health to a reduction in health care spending and improvements in population health. Moreover, community-based multisector partnerships can convincingly improve health outcomes.

Payment Issues

5. Accountable Care payment models

Convincing evidence shows that Accountable Care models in both Medicare and commercial payers have

reduced costs and improved the health care quality. In Massachusetts, convincing evidence suggests that commercial programs reduced both prices and service utilization. Convincing evidence from Rhode Island further suggests that Accountable Care models can reduce per capita health care spending.

6. Bundled payment models

Convincing evidence links bundled payments to reduced overall costs without adversely affecting (and frequently improving) quality of care. There is also some evidence that bundled payments improve the coordination of care.

7. All-payer rate setting (caps on prices)

Convincing evidence from the 1970s and 1980s suggests that all-payer rate caps can reduce costs but also erode quality or worsen population health. More recent, promising evidence from Maryland suggests that while rate caps can reduce costs per admission, they inadvertently can increase inpatient volumes thus negating the impact on overall costs.

8. Cost-shifting (providers charge private payers more in response to shortfalls in public payments)

Although cost-shifting was a historic act of practice, convincing contemporary evidence suggests that cost shifting is unlikely to play a large role in prices or quality; and that market forces such as provider and payer concentration appear to be more prominent determinants of prices. In addition, promising current evidence suggests that rather than cost shift, hospitals affected by reductions in governmental payments may delay technology purchases, prune unprofitable services, and/or reduce the quality of care provided.

9. Reference-based pricing (RBP)

RBP is a coverage design in which the employer or insurer pays a defined cost of a particular service charged by the provider, with the patient being required to pay the remainder. Convincing evidence has linked RBP to significant cost savings on non-emergency utilization in public, for-profit, and nonprofit employer settings. Although the evidence is limited, RBP does not appear to affect quality or population health. RBP requires that patients have access to price information and that a sufficient number of providers are available, especially below the reference price set for a given procedure, service, or product. Importantly, RBP in the US is conceptualized differently than in some other countries.

Regulatory Approaches

10. Regulations aimed at increasing competition in a market

Stricter enforcement of state and federal anti-trust laws have generally reduced provider and payer mergers but has not affected existing levels of concentration or stopped the competitive decline in most US markets. The extent to which even stricter enforcement of anti-trust laws would have an effect is unknown. Evidence suggests that Certificate of Need (CON) laws could reduce competition and at times adversely affect prices and/or quality of care. An alternative to CON laws, Certificate of Public Advantage (COPA) laws allow mergers to proceed conditional on resource intensive state regulatory oversight to assure societal benefits. The effectiveness of COPA laws in reducing costs and assuring expected benefits is unknown. Other regulations such as banning “most favored nation” or gag clauses in provider-payer contracts – which are designed to address anticompetitive behavior by payers – have an insufficient evidence base to draw conclusions.

11. Taxing the accrued profits of nonprofit hospitals to discourage price increases

Theoretically, such a tax has the potential to influence the market behavior of hospitals and other stakeholders including by affecting prices and/or quality. However, we found no empirical studies that can inform on the potential benefits or drawbacks associated with this approach.

Physician and Clinical Services

12. Physician-facing price transparency tools

Overall there is conflicting evidence on the impact of physician-facing price transparency tools on costs. However, convincing data from Indiana has shown a reduction in the number of tests ordered and lower associated costs. Such tools that target laboratory tests show promise in achieving desirable effects.

13. Increased use of end-of-life services

There is convincing evidence that the use of hospice and palliative care has benefits to patients; with promising evidence on cost reduction in some patient populations. Advanced directives and advanced care planning also show some benefits to patients; while the use of in-home services at the end of life is supported by convincing evidence regarding reduced costs.

14. Utilization of low-value and wasteful health care services

Low-value care is responsible for significant wasteful spending and is rooted in (1) a mindset that believed more care was better; and (2) a payment model that incentivized over utilization of services. Eliminating low-value care is widely embraced by many medical professional societies. Barriers to overcome include revamping the culture that believes “more is better,” continuing to change payment models to reward providers for value, educating clinicians and patients, and facilitating consistency in how to define and identify low-value services.

Consumer Focused

15. Use of high-deductible health plans (HDHPs)

Convincing evidence shows that HDHPs can reduce costs by reducing the utilization of services. Problematically, there is convincing evidence that desirable preventive care decreases for patients on a HDHP—despite being exempt from out-of-pocket costs.

16. Consumer-facing price and quality transparency tools

There is inconclusive evidence on the effects of consumer-facing price transparency tools on costs especially because patients rarely use such tools resulting in a lack of impact on overall consumer behavior. However, there is some convincing evidence that publicly available quality information can improve quality of care (but not health status or population health).

Recommendations for Stakeholder Action

Based on the literature synthesis and the Indiana context, we conclude the following:

- There is no simple ‘magic bullet’ to reduce costs and improve population health in the US overall or within any given state. Thus, it is unlikely that any one solution will achieve the desired results for Indiana.
- Achieving the desired outcomes in Indiana can be facilitated with a comprehensive portfolio of activities each of which encourages maximum collaboration among stakeholder groups. Thus, state policymakers should actively encourage, and incentivize, stakeholder cooperation.

- Although the context in Indiana has unique challenges, opportunities exist to improve health and implement change by tapping into the expertise, assets, and motivation of stakeholder coalitions who can assure the continued economic vitality of the Hoosier State.

We provide the following recommendations to facilitate collaborative input from Indiana stakeholder groups who have the capacity and knowledge to assess the feasibility (including downsides) of successfully implementing any proposed solutions to the current situation. By working together, we believe that stakeholders can craft the optimal set of solutions to pursue within a portfolio of activities that will be needed. Full justification for all of these recommendations are available in the full report in this document.

With respect to **Market and Local Activities**, stakeholders in Indiana should:

- Implement an all-payer claims database, including self-insured employers, to enable insurers, employers, providers, policymakers, and researchers to have improved transparency.
- To mitigate the effects of a relative shortage of physicians, Indiana should examine the scope of practice laws that govern mid-level providers and determine whether policy changes could facilitate a safe increase in primary care practitioners.
- Leverage technology like telemedicine to increase competition among providers, especially in markets with a scarcity of physicians.
- Employers should explore ways to negotiate directly with providers and implement pilot projects to determine if doing so is beneficial and scalable.
- To the extent feasible, the use of narrow or tiered provider networks should be encouraged.
- Increase investments in public health services and encourage the use of community-based multisector partnerships that address, mitigate, or otherwise focus upon socioeconomic conditions that drive preventable health care utilization and exacerbate disease.

With respect to **Payment Issues**, stakeholders in Indiana should:

- Move towards greater use of value-based payment models among commercial payers, including bundled

payments and eventually accountable care with upside and downside risks recognizing that challenges exist when accountable care and bundled payments are implemented simultaneously.

- Self-insured employers and traditional insurers should experiment with reference-based pricing approaches that target cost reductions in non-emergency services and products that have wide price variation with little or no quality variation.

With respect to **Regulatory Approaches**, stakeholders in Indiana should:

- Examine ways to effectively increase competition in Indiana for payers and providers through more research. Insufficient evidence exists on policies that can increase competition.

With respect to **Physician and Clinical Services**, stakeholders in Indiana should:

- Partner to pursue rigorous research to determine if physician-facing price transparency tools, particularly focused on laboratory tests, could reduce costs of care.
- Increase the use of end-of-life services, including hospice and palliative care as well as advanced directives and in-home services.
- Launch a concerted effort to reduce low-value care by raising awareness among physicians, patients, and others; and implementing payer-initiated incentives that target a reduction of low-value services.

With respect to **Consumer-Focused Activities**, stakeholders in Indiana should:

- Work to swiftly address the issue of less preventive service utilization for patients with high-deductible health plans.

Lastly, based upon our literature syntheses and the Indiana context, the following items are **not recommended** (as justified in the full report):

- Implementing price caps and/or an all-payer rate setting approach is not recommended.
- Taxing accrued profits of nonprofit hospitals to discourage price increases is not recommended.

- No further action regarding cost-shifting is recommended. However, if stakeholders are concerned that trends in cost-shifting in Indiana might be occurring despite national evidence to the contrary, we recommend an Indiana-specific analysis of this issue to more accurately qualify this issue locally. An all-payer claims database (as recommend previously) can facilitate such an analysis.
- Expanding the use of consumer-facing price transparency tools is not recommended. However, the use of consumer-facing quality transparency tools should not be ruled out.

INTRODUCTION AND BACKGROUND

Rising overall health care costs are of concern to consumers, employers, providers, policymakers and other health care stakeholders. The US spends more per capita on health care than any other nation in the world. Despite strong health care assets and high investments, Americans frequently have poorer access and worse outcomes on a wide range of health indicators than people in other high-income countries. Indiana ranks among the bottom few states with respect to most health status indicators and invests relatively little in preventive and public health activities.

The current report is motivated by the need to move Indiana towards lower overall health care costs especially through concerted efforts that will improve the health of Hoosiers. Indiana benefits from a strong economy and a successful business-friendly ecosystem that has attracted world-class employers including, notably, in the health and life sciences sectors. However, it is increasingly being realized that our state's weak link toward further economic prosperity is the poor health of our residents.

Several recent analyses have elevated the discussion about the prices of hospital care in our state. Specifically, the RAND Corporation reported that prices paid by self-insured employers for inpatient and outpatient services at Indiana health systems were higher than expected relative to Medicare prices (White, 2017); especially when compared to other states (White & Whaley, 2019). The Indiana Hospital Association refuted several of the key conclusions and cited methodological shortcomings of the RAND reports (Daly, 2019). A report from Ball State University asserted that Indiana hospitals exhibit monopolistic behaviors that have negative implications to consumers, payers and society (Hicks, 2019). The Ball State report was criticized for significant methodological shortcomings with critics arguing that many of the conclusions were unreliable (Tabor, 2019; Arwood, 2019; Kacik, 2019, Sentel, 2019). A subsequent analysis by NERA Economic Consulting, a firm specializing in economic and financial matters, found that Indiana does not have a monopoly problem and that competition among Indiana hospitals is consistent with US norms (Wong & Ling, 2019).

These previous reports have advanced a necessary discussion about health care costs in Indiana. However,

these reports provide detailed information about a very limited piece of the overall problem. For example, whereas national data suggests that overall cost variations are approximately equally attributable to both prices paid per transaction and the quantity of services provided (Cooper et al., 2019), the recent RAND reports focused exclusively on price variation thus diminishing the view of other potentially actionable drivers of health care costs in Indiana. Also, by only considering hospital services, and excluding the rising cost trends of other prominent services and products (e.g., physician services, drugs, biologics, administrative costs), the dialogue that has ensued falls short of considering broader solutions to the larger context of our state.

Because much of the evidence presented in the RAND reports relied heavily on estimates derived from self-insurer claims, there are theoretical and market factors that impact the findings. Self-insured employers engage with traditional insurers in administrative-services-only contracts, whereby the traditional insurer receives a transaction fee (usually a percentage of total claims) for use of their billing networks and the employer remains the risk bearer for health care costs. Indiana has the 3rd highest percentage of employers offering self-insured plans across states (51.4% of firms in Indiana vs. 38.7% in the US) and as shown in this report, is substantially higher than the average of neighboring states (Fronstin, 2019). Administrative-service-only arrangements have the theoretical potential to decrease the motivation of traditional insurers to negotiate lower prices (Corlette et al., 2019) especially when a relatively large portion of their business is from self-insured employers as it is in Indiana. The proprietary nature of negotiated prices between providers and payers makes for limited available data on this issue. Analyses using all-payer claims data from Massachusetts suggests that self-insured employers pay prices that are 2.1 to 4.3% higher than traditionally insured individuals even within the same hospital and the same payer (Craig et al., 2011). If a similar, or greater, effect occurs in Indiana, some of the conclusions of the RAND Report might be explained by such factors.

Without a broader discussion of the factors that contribute to overall health care costs, any legislative or other policy interventions that address the limited issues raised in

previous reports will insufficiently address the root causes of the problem within Indiana. Any policy interventions, based upon a limited understanding of the larger context, unnecessarily risks positioning stakeholders against each other in the policymaking process. Employers, providers, payers, and others have each argued that some other stakeholder group is to blame for rising health care costs or have taken defensive postures (Rudavsky, 2017; Packnett, 2019; Burns, 2019; Leininger, 2019; Hicks, 2019; Rowley, 2019; Tabor, 2019). At a time when Indiana's economic growth and future prosperity requires stronger partnerships by these stakeholder groups, there are at least two important points that everyone appears to agree upon: (1) overall health care costs in Indiana, as in all states, are higher than desired and should be actively reduced in our state; and (2) given the poor health status of Hoosiers, Indiana should strive to improve the health of residents. We believe that a state-specific strategic plan on how to achieve the latter would help achieve the former. Any state initiative pursued ought to adopt a holistic approach and address the underlying root causes of costs and outcomes as opposed to relying heavily on select issues taken out of context.

Purpose

In order to provide context to advance Indiana toward a strategic plan for health care, the purpose of the current report is to assist stakeholders in understanding how different policies, strategies, or best practices can be used in Indiana to reduce health costs and improve the health of Hoosiers. To do so, the current report has three main components.

- In Section 1, we assemble a wide range of data to help characterize the state's context. We compare Indiana to the national average, and to each of our neighboring states on disease burden, health status, health care market, and demographic characteristics derived from publicly available sources.
- In Section 2, we conduct rapid systematic reviews of the literature and synthesize the evidence on a wide range of factors including potential policies, strategies, and practices that affect health care costs. A list of these factors (see Table 1) were derived from consultation with experts, stakeholders, and public calls for policy changes including from the above named RAND and Ball State reports. In our literature syntheses we discuss the extent to which these 16 different policies, strategies, and practices, can reduce costs and affect health status or quality of care.
- In Section 3, we prioritize the list of approaches based on

the strength of the evidence in the literature regarding the potential for cost reduction and health status improvement. For each item we provide recommendations with justification specific to the Indiana context. In addition, we discuss the individual roles that employers, providers, payers, government officials, and others in Indiana can pursue as all stakeholder groups work together to champion lower health care costs in our state.

Despite our efforts to be as comprehensive as possible, we recognize that other issues exist (not covered in the current report) that can influence the costs of care. For example, the costs of prescription drugs have recently exhibited significant increases. Researchers have noted that 48 of 49 top selling drugs had annual or biannual price increases resulting in a median 76% increase from 2012 to 2017 (Wineinger et al., 2019). Some states have attempted to address drug cost by implementing caps (Hopkins, 2019) or other policy solutions. Almost all state efforts have been challenged in the courts, frequently successfully, resulting in the loss of money, time, and political will (Gudiksen & King, 2019). Many of the policy options to address rising drug costs must be implemented at the federal level in order to be effective (Alexander et al., 2017; Gudiksen & King, 2019). Relatedly, there are many federal regulations that providers, payers, and employers believe influence their administrative overhead and thus affect the overall costs of health care. These federal regulations are not typically amenable to change by state policymakers and are not included in the current report.

Literature Synthesis

For each of the 16 policies, strategies, and practices covered in this report, we conducted reviews of the relevant literature. Given the need for timely information, we settled on an approach that combines the turnaround time of rapid reviews (Khangura et al., 2012) with the thoroughness of systematic reviews of the literature (Moher et al., 2009). For each topic we conducted scholarly and public domain database searches using relevant keywords and established search techniques. On topics that had a particularly high volume of available published information, we prioritized content from peer-reviewed systematic reviews on a given topic, work published in highest impact scientific journals, and rigorously conducted publicly available evaluations.

Table 1: List of Factors That Could Affect Health Care Costs

Category	Factors That Could Affect Health Care Costs
Market and Local Activities	<ol style="list-style-type: none"> 1. Provider (hospital and physician) and payer concentration 2. Employer-provider direct price negotiations 3. Use of narrow and tiered provider networks by payers 4. Public health activities
Payment Issues	<ol style="list-style-type: none"> 5. Accountable Care payment models 6. Bundled payment models 7. All-payer rate setting (caps on prices) 8. Cost-shifting (providers charge private payers more in response to shortfalls in public payments) 9. Reference-based pricing
Regulatory Approaches	<ol style="list-style-type: none"> 10. Regulations aimed at increasing competition in a market 11. Taxing the accrued profits of nonprofit hospitals to discourage price increases
Physician and Clinical Services	<ol style="list-style-type: none"> 12. Physician-facing price transparency tools 13. Increased use of end-of-life services 14. Utilization of low-value and wasteful health care services
Consumer Focused	<ol style="list-style-type: none"> 15. Use of high-deductible health plans 16. Consumer-facing price and quality transparency tools

Once the relevant set of articles was assembled on each topic, we categorized studies based on the level of evidence supported by their study design. This allowed us to weigh evidence based on the degree to which confounding and bias, particularly selection bias, were accounted for in a given study. Rather than critically appraising the execution of each study’s design, we instead noted (and categorized as described below) the type of design as articulated by study authors. When applicable, we comment on the generalizability of the population being studied (e.g., national, state-specific, organization-specific). Ideally, the most rigorous, reproducible, generalizable randomized trials would provide strong evidence on the impact of a given policy or strategy. Stronger evidence yet, would include meta-analyses or systematic reviews of these randomized trials. The nature of how policies and strategies are implemented in real-world settings does not allow for the experimental conditions needed to unequivocally determine cause and effect. In an effort to synthesize the evidence on each topic, we categorized individual studies based on the weight of the evidence as a function of the study design used and other related factors. For each relevant cited article, we indicate the study’s research design with a superscript as explained in the **Appendix**. Each article’s research design has important implications regarding how confidently the results could be interpreted as cause and effect. In our summaries of the literature, we drew conclusions based on the weight of each study’s design as shown in Table 2. We considered the following

three categories to describe the takeaway points from a given body of literature: (1) studies that provide convincing evidence on cause and effect, (2) studies that provide promising evidence on cause and effect, and (3) studies that provide correlational evidence where cause and effect should not be inferred.

Limitations

Our methodology has several limitations to note. With respect to characterizing the context in Indiana, we recognize that additional variables could exist that we did not include in the data tables presented in Section 1. We sought to provide a broader context than currently discussed by stakeholders. We anticipate that over time, more publicly available information could be added to further enrich the context we depict. Second, we presented the most up-to-date citable data for each variable we use to characterize the context. In some cases, the most up-to-date data was several years old. If Indiana’s status on any key variable has changed, we acknowledge that some aspects of the context we depict could be outdated.

With respect to our literature syntheses, despite using standard bibliographic search terms and strategies to identify articles for inclusion, we recognize that some articles may have been missed. This issue may be more prominent for some included topics that have variability in the terminology used to describe concepts. Moreover, when determining the weight of evidence presented

within an individual study, we did not perform a formal critical appraisal of each study. Instead, we classified study designs into three broad categories that describe the strength of the design used and not necessarily the fidelity in how that research design was executed in a given article. In addition, for some topics, there was a dearth of studies in the scientific literature. In such cases we summarized other available reports from media stories or press releases which we present as such.

Lastly, we developed recommendations based on the literature syntheses and the Indiana context as depicted. Our overall goal is to advance Indiana toward a comprehensive strategic plan that can reduce costs and improve the health of Hoosiers. Thus, we invite stakeholders to build upon our conclusions as is necessary to achieve these goals.

Table 2: Categorization of Evidence with Examples of Study Designs

Category of Evidence	Example Study Designs	Rationale	Examples of Recommended Actions
Convincing	<ul style="list-style-type: none"> • Randomized controlled trials, cluster randomized trials, step-wedge designs • Quasi-experimental studies that inherently account for some amount of selection bias (e.g., difference-in-difference, instrumental variable, regression discontinuity designs, interrupted time series with control) • Studies using two-way fixed effects (also known as generalized difference-in-difference studies) that including pre-post and temporal controls • Systematic reviews that include individual studies with the above study designs 	<p>These study designs are stronger in internal validity and thus provide the best potential evidence about cause and effect in real-world settings.</p>	<p>As an increasingly relevant number of these studies consistently provide evidence of the same conclusion, organizational and policy changes can be pursued with scientific confidence.</p> <p>If multiple studies of this type produce conflicting results, a further understanding of the context-specific nuances that could explain the lack consistency is recommended prior to taking prudent action.</p>
Promising	<ul style="list-style-type: none"> • Longitudinal designs that do not account for both selection bias and temporal trends (e.g., time-series without controls, cohort, and pre-post studies) • Propensity score designs (based on matching, adjustment, or weighting) that attempt to create a fairer control group • Systematic reviews based only on the above study designs 	<p>These study designs account for some sources of confounding and bias but are not intended for reliably determining cause and effect.</p>	<p>Studies of this type help point decision-makers in a given direction without providing solid scientific evidence regarding the potential effect of policy or organizational change.</p> <p>Recommended actions could include:</p> <ul style="list-style-type: none"> • Pursuing more rigorous research particularly if multiple existing studies have conflicting results • Implementing and rigorously studying the effects of a limited-in-scope policy change (e.g., a pilot project) particularly if there is agreement among existing studies
Correlational	<ul style="list-style-type: none"> • Cross-sectional studies • Case studies • Systematic reviews limited only to these study designs 	<p>These study designs generate useful evidence for generating hypotheses, based on simple correlations, for future rigorous testing. These studies are considered insufficient evidence to justify significant changes to policy or practice.</p>	<p>If there is consistency in conclusions among these types of studies, more research, especially using more rigorous methods, is recommended prior to policy or organizational change.</p> <p>If there is a lack of consistency among existing studies, more research and theoretical development is needed to generate alternative hypotheses for further study.</p>



SECTION 1: CHARACTERIZING THE CONTEXT

We present a wide range of publicly available data in an effort to characterize the context of the cost of care in Indiana. We assemble and report on variables that compare Indiana to the national average and to each of our neighboring states. These variables include disease burden, health status, health care market, and demographic characteristics. We use color shading to aid in the interpretation of this information. Red indicates that a given state is at least 10% worse than the national average, orange indicates at least 5% worse, and green indicates at least 10% better.

In **Table 3**, we present the health conditions and disease burden in Indiana, neighboring states, and the US overall. The average Hoosier is sicker and suffers from more health conditions than the average American. Smoking rates, mental health conditions, and cardiovascular disease occur at rates that are more than 10% over US rates. Diabetes in Indiana is also elevated by more than 5% over national rates. Indiana is burdened with health conditions or diseases similar to or worse than neighboring states. Illinois, in particular, has less overall disease burden; and Kentucky has greater disease burden.

Data in **Table 4** illustrate that people in Indiana have higher age-adjusted mortality rates than the country overall. Hoosiers are more likely to die from accidents, suicides, and drug overdoses at rates greater than 10% higher than other Americans. Infant mortality and maternal mortality is particularly high in Indiana. Mortality rates in Indiana are within the range of neighboring states all of whom, except for Illinois, are frequently worse than the US overall.

As can be seen in **Table 5**, public health investments in Indiana are consistently below US averages and frequently below neighboring states. Indiana's investment in public health is very low. It is less than half of what neighboring states (with the exception of Ohio) and the US invest in public health. Federal funding per capita from the Centers for Disease Control and Prevention (CDC) as well as the Health Resources & Services Administration (HRSA) are particularly low in Indiana especially compared

to neighboring states. Indiana has particularly low vaccination rates for influenza, childhood vaccines, and adult and elderly vaccines. Indiana also performs in the bottom tier with respect of public health preparedness and has very low taxes on cigarettes.

Given Indiana's low investments in public health, **Table 6** presents data showing how Indiana ranks in the bottom quartile among states for overall health, mental health, infant mortality, overall mortality, obesity, and smoking. These health rankings are consistently worse than neighboring states.

Table 7 displays a wide range of health care market characteristics. Compared to the US overall, hospitals in Indiana are more likely to be for-profit or public especially compared to neighboring states. Rural hospitals in Indiana are at a higher risk of closure due to financial issues than rural hospitals in the US overall. However, several neighboring states have similar risks of rural hospital closure.

Indiana has fewer overall physicians per capita and in particular those practicing primary care. Physician supply in Indiana is generally worse than in neighboring states.

In line with neighboring states, people in Indiana are more likely than other Americans to have private health insurance. Notably, the un-insurance rate in Indiana is more than 10% lower than the US overall. Hoosiers are more likely than Americans, and residents of neighboring states, to work for a private-sector firm that offers a self-insured health plan. Health insurance premiums in Indiana (single and family coverage), as well as the employee contribution to single coverage plans within the state is similar to US averages, and consistent or better than neighboring states. Employees in Indiana pay a smaller percentage of their total family coverage premiums than most Americans. The percent of income devoted to health care in Indiana is slightly below the national average and within the range of neighboring states.

Whereas personal health care spending per capita in Indiana is in line with neighboring states and not

more than 5% above national averages, per capita state government spending on health care (mostly via Medicaid) is more than 10% lower than the US average and lower than most neighboring states.

The average location in the US, and the state of Indiana overall, has a health insurance market that is considered as 'highly concentrated' based on definitions used by the Federal Trade Commission and the US Department of

Justice for anti-trust enforcement. In contrast, inpatient hospital concentration categorizes Indianapolis, the largest metro area, as moderately concentrated.

Table 8 provides information characterizing the population. Demographically, Indiana reflects US averages more consistently than most neighboring states. However, Indiana has fewer adults with a bachelor's degree than the US overall and most neighboring states.

Key for All Tables

	Red indicates at least 10% worse than national average (or neighboring states if national average was inapplicable or unavailable). For variables expressed as ranking, Red indicated both 12 states.
	Orange indicates at least 5% worse than national average
	Green indicates at least 10% better than national average (or neighboring states if national average was inapplicable or unavailable). For variables expressed as ranking, Green indicates top 12 states.
*indicates color scheme was not applied to variables that do not measure performance (e.g., organizational or payer characteristics).	



SECTION 1: CHARACTERIZING THE CONTEXT

Table 3: Health Conditions and Disease Burden

Measure	US	Indiana	Illinois	Kentucky	Michigan	Ohio
Adult Obesity and Overweight Rate (adult), 2017	65.4%	68.0%	65.8%	67.8%	67.2%	68.0%
Adult Smoking Rate, 2017	16.4%	21.8%	15.5%	24.6%	19.3%	21.1%
Percent of Adults Reporting Poor Mental Health Status	35.6%	39.2%	38.0%	38.4%	39.0%	37.5%
Percent Adults with Diabetes, 2017	10.8%	11.8%	11.0%	12.9%	11.0%	11.3%
Percent Adults with Cardiovascular Disease, 2017	6.4%	7.4%	6.1%	9.9%	8.0%	7.6%
Percent Preterm Births (<37 weeks completed)	10	10.2	10.7	11.3	10	10.3

Sources: *Center for Disease Control and Prevention, Behavioral Risk Factor Surveillance System, 2017*
Kaiser Family Foundation, 2017
March of Dimes Report, 2019

Table 4: Mortality Rates

Measure	US	Indiana	Illinois	Kentucky	Michigan	Ohio
All-Cause Mortality per 100K pop. (Age Adjusted) 2017	731.9	848.6	742.2	929.9	783.5	849.7
Cancer Mortality per 100K pop. (Age Adjusted) 2017	183.9	170	157.9	185.7	161.3	171.2
Heart Disease Mortality per 100K pop. (Age Adjusted) 2017	198.8	183.2	163.3	195.9	196.1	186.2
Accident Mortality per 100K (Age Adjusted) 2017	49.4	58.7	44.4	72.9	53	75.1
Infant Mortality Rate per 1K Live Births, 2017	5.8	7.3	6.1	6.5	6.8	7.2
Maternal Mortality in pregnancy or within 1 year per 100K, 2019	29.6	50.2	21.4	32.4	27.6	24.7
Alcohol deaths per 100K pop. 2016	10.8	10.7	8.7	11.3	10.4	9.9
Drug Deaths per 100K pop. 2016	20.8	23.7	19.2	34.4	27.2	38.5
Suicide Deaths per 100K pop. 2016	13.9	15.6	11.1	17	13.7	14.7
Combined Alcohol, Drug, and Suicide Deaths per 100K pop. 2016	43.9	48.6	37.6	61.4	49.6	61.5

Sources: *Center for Disease Control and Prevention, National Vital Statistics Reports, 2017*
Center for Disease Control and Prevention, National Center for Health Statistics, 2019
United Health Foundations, Health of Women and Children
Trust for America's Health, Pain in the Nation Update, 2018

SECTION 1: CHARACTERIZING THE CONTEXT

Table 5: Public Health Investments

Measure	US	Indiana	Illinois	Kentucky	Michigan	Ohio
Overall State Investment in Public Health FY15	\$35.77	\$12.40	\$25.30	\$33.50	\$24.20	\$13.80
Total CDC Funding per capita FY16	\$22.26	\$17.11	\$16.76	\$21.17	\$18.80	\$17.90
Total HRSA Funding per capita FY15	\$27.03	\$18.56	\$26.92	\$24.93	\$22.86	\$21.83
CDC Prevention Fund per capita allocation FY16	\$3.26	\$1.22	\$0.67	\$0.91	\$0.50	\$1.19
Flu Vaccination Rate for those aged 6+ FY2018	43.0%	37.0%	39.9%	44.1%	39.5%	42.8%
State Public Health Preparedness overall performance	N/A	Bottom Tier	Middle Tier	Bottom Tier	Middle Tier	Bottom Tier
State Cigarette Tax Rate, 2018	\$1.70	\$1.00	\$1.98	\$1.10	\$2.00	\$1.60
Children Vaccination Rates 2017 – Ranking	N/A	44	8	39	26	43
Adult and Elderly Vaccination Rates 2017 – Ranking	N/A	40	39	28	32	26

Sources: *Trust for America's Health, Investing in America's Health, 2016*
Trust for America's Health, A Funding Crisis for Public Health and Safety, 2017
Center for Disease Control and Prevention, Map of Funding – Appropriations/Grants Total Per Capita
Trust for America's Health, Ready or Not: Protecting the Public's Health from Diseases, Disasters and Bioterrorism, 2019
Trust for America's Health, Promoting Health and Cost Control in States, 2019
WalletHub, States that Vaccinate the Most, 2019

Table 6: Public Health Rankings

Measure	US	Indiana	Illinois	Kentucky	Michigan	Ohio
State Health Rankings (overall) 2019	25 is median	41	26	43	32	38
Mental Health Ranking 2016	25 is median	38	7	48	40	35
Low Infant Mortality Rate 2016	25 is median	42	31	37	34	43
Low Mortality Rate 2017	25 is median	41	23	48	36	42
Low Obesity Rate 2017	25 is median	39	23	43	31	40
Low Smoking Rate 2017	25 is median	44	15	49	38	43
Low Suicide Rate 2017	25 is median	25	7	28	15	18

Sources: *United Health Foundations, America's Health Rankings Annual Report, 2019*
US News, Public Health Rankings



SECTION 1: CHARACTERIZING THE CONTEXT

Table 7: Health Care Market Characteristics

Measure	U.S.	Indiana	Illinois	Kentucky	Michigan	Ohio
Hospital Characteristics						
Percent Non-Profit Hospitals, 2017*	56.4%	53.8%	77.8%	69.7%	77.2%	71.2%
Percent For-Profit Hospitals, 2017*	25.1%	26.5%	10.1%	20.2%	17.9%	20.7%
Percent Public Hospitals, 2017*	18.5%	19.7%	12.2%	10.1%	4.8%	8.1%
Percent of Rural Hospital at Risk of Closure, 2018	21.0%	23.1%	17.3%	24.6%	25.4%	10.8%
Physician Supply						
Active Patient Care Physicians per 100K pop., 2019	242.1	212	240.5	214.6	249.7	248.6
Active Patient Care PCPs per 100K pop., 2019	83.2	74.4	87.2	72.9	87.6	83.7
Active Patient Care Gen. Surgeons per 100K pop., 2019	6.6	6.1	5.8	7.6	6.7	7.1
Health Insurance						
Percent with Public Health Insurance, 2018*	36.7%	36.4%	30.2%	N/A	40.7%	35.2%
Percent with Private Health Insurance, 2018*	62.3%	67.7%	69.9%	N/A	64.6%	64.5%
Percent Uninsured, 2018	9.4%	7.6%	7.7%	N/A	6.7%	10.0%
Percent of Private Firms Offering Self-Insured Plans, 2018*	38.7%	51.4%	35.7%	45.4%	38.9%	49.5%
Percent Private-Sector Employees in Self-Insured Plans, 2018*	58.7%	62.2%	58.7%	69.0%	59.9%	72.0%
Avg. Annual Premium – SINGLE coverage, 2018	\$6,715	\$6,778	\$7,123	\$6,690	\$6,322	\$6,804
Employee contribution for SINGLE coverage, 2018	21.3%	21.3%	20.4%	24.4%	22.7%	24.0%
Avg. Annual Premium – FAMILY coverage, 2018	\$19,565	\$19,551	\$20,407	\$19,277	\$18,242	\$19,640
Employee contribution for FAMILY coverage, 2018	27.8%	23.3%	26.4%	27.9%	23.5%	25.5%
% of Employees Enrolled in HDHPs, 2018	49.1%	51.9%	48.1%	53.2%	44.4%	54.0%
Percent of Income Devoted to Health Care (before full coverage kicks in) 2017	11.7%	11.5%	9.5%	12.9%	8.5%	10.6%

SECTION 1: CHARACTERIZING THE CONTEXT

Measure	U.S.	Indiana	Illinois	Kentucky	Michigan	Ohio
Spending						
Per Capita Personal Health care Spending, 2014	\$8,045	\$8,300	\$8,262	\$8,004	\$8,055	\$8,712
Per Capita State Government Health care Spending, 2015	\$1,880	\$1,491	\$1,482	\$2,618	\$1,743	\$1,820
Concentration						
Payer HHI, 2018, (>2500 is highly concentrated per Federal Trade Commission)	3504	3479	3850	4121	4648	2111
Market Share of Largest Insurer, 2018		55%	58%	61%	67%	32%
Inpatient HHI of Largest Metro Area in State 2016 (but for MI, only Kalamazoo available)		0.1993	0.1338	0.3651	0.2454	0.152
Category of Inpatient HHI for above variable		Moderate	Unconcentrated	Moderate	Moderate	Unconcentrated

Sources: Kaiser Family Foundation, *American Hospital Association Annual Survey, 2017*
 Navigant, *Rural Hospital Sustainability, 2019*
 Association of American Medical Colleges, *State Physician Workforce Data Report, 2019*
 Center for Disease Control and Prevention, *National Health Interview Survey Early Release Program, 2018*
 Employee Benefit Research Institute, *Self-Insured Health Plans: Recent Trends by Firm Size, 1996-2018*
 State Health Access Data Assistance Center, *Employer Sponsored Insurance Premiums, 2018*
 Business Insider, *Commonwealth Fund Analysis, 2017*
 Health Affairs, *Health Spending By State 1991-2014: Measuring Per Capita Spending By Payers and Programs, 2017*
 USA Today, *What State Spends the Most on its Residents' Health Care? 2018*
 American Medical Association, *Competition in Health Insurance, A Comprehensive study of U.S. Markets, 2019*
 Health Care Cost Institute, *Healthy Marketplace Index, 2019*

Table 8: Population Demographics

Measure	US	Indiana	Illinois	Kentucky	Michigan	Ohio
Birth Rate (births per 1,000 women aged 15-44), 2017	11.8	12.3	11.7	12.3	11.2	11.7
No High School Diploma (over 25 years old), 2018	11.7%	11.0%	10.5%	13.2%	9.0%	9.3%
Has Bachelor's Degree (over 25 years old), 2018	20.0%	17.3%	21.1%	14.5%	18.0%	17.8%
Percent of Total Population on Medicare, 2017	14.0%	14.0%	13.0%	15.0%	15.0%	15.0%
Percent of Total Population on Medicaid & CHIP, 2017	22.4%	21.6%	23.3%	27.8%	23.6%	23.3%
Poverty Rate, 2017	11.0%	11.0%	11.0%	15.0%	12.0%	11.0%
Unemployment Rate, 2018	3.7%	3.5%	4.1%	4.5%	4.0%	4.6%

Sources: Center for Disease Control and Prevention, *National Vital Statistics Reports, 2018*
 Census Bureau's *American Community Survey, 2018*
 Kaiser Family Foundation, *Census Bureau's American Community Survey, 2017*
 Kaiser Family Foundation, *Bureau of Labor Statistics, 2018*



PROVIDER AND PAYER MARKET CONCENTRATION

Why are provider and payer market concentration believed to affect costs or population health?

Market concentration is the extent to which a single (or small number of firms) account for a large percentage of total market share. In health care, when provider or payer markets are highly concentrated, they are considered less competitive. In recent years, both provider and payer markets have become less competitive. This lack of competition results in stronger bargaining power for providers or payers affecting the negotiated prices for clinical services.

Provider concentration increases through vertical and horizontal integration. Vertical integration occurs when organizations that provide different types of clinical care establish a formal relationship through ownership, contracts, and partnerships. For example, when a hospital acquires a physician practice. Horizontal integration occurs when two similar organizations merge or one is acquired by another – when two hospitals merge. Provider consolidation has increased due to a move toward value-based reimbursements. Supported by US policy, these consolidations are necessary to be successful with accountable care and bundled payments (Tsai & Jha, 2014; Gaynor & Town, 2012; Dafny, 2014). In 2016, 90.1% of metropolitan statistical areas (MSAs) were considered highly or super concentrated in terms of provider organizations (Fulton et al., 2018).

Payer markets have historically been less concentrated than provider markets, although this varies by insurance type. Federal policy has attempted to promote competition in payer markets through the creation of marketplaces in which eligible individuals can search for and compare insurance plans in their area. The approach to foster competition is also present in the Medicare Advantage markets and in California where similar policies have been implemented. It is believed that increasing competition among payers could decrease health insurance premiums for individuals. In 2016, 60% of MSAs were considered highly or super concentrated (Fulton et al., 2018). From 2011-2017, over 90% of Medicare Advantage markets were considered highly concentrated

(Adrian, 2019). Commercial insurance markets have been dominated by five major insurers, with several mergers being proposed (Frank & McGuire, 2017; Schoen & Collins, 2017). In 2017, proposed mergers between Anthem and Cigna and separately Aetna and Humana were rejected because of the potential negative implications to competition (Schoen & Collins, 2017; Nakagawa et al., 2018). Taken together, as many as 55.6% of US markets are highly concentrated in terms of both providers and payers (Fulton et al., 2018).

What are the benefits and/or drawbacks associated with provider and payer concentration?

Economic theory provides numerous explanations for how and why concentration of providers or payers within a market may affect costs, prices, quality, and health outcomes. These theories often hypothesize opposing anticipated effects from either payer or provider concentration because greater concentration that may benefit one stakeholder (payer or provider) could adversely affect the other. Greater market share by providers is expected to increase prices by strengthening provider bargaining power in price negotiations with payers (Baker et al., 2014a; Baker et al., 2014b). Separately, it is believed that larger more vertically or horizontally integrated provider organizations, in theory, could benefit from economies of scale which could reduce their transaction costs and allow for higher quality of care. In contrast, greater competition (e.g., lower provider concentration) is expected to reduce prices and encourage innovation (Sage, 2014).

Great concentration in payer markets is expected to result in higher premiums. As such, policymakers have sought to increase competition among payers. 'Managed competition' is when prices are externally regulated, and competition is promoted to produce benefits for consumers. Managed competition is the underlying concept applied to the Medicare Advantage markets, the ACA's Marketplaces, and select insurance markets in California (Frank & McGuire, 2017; Enthoven & Baker, 2018). Most studies in the literature examine either the effects of provider or payer concentration. We will first discuss the bulk of

empirical evidence on the effects of provider concentration and payer concentration separately. A small body of evidence examines the interaction of payer and provider concentrations—which we also discuss below.

Hospital Provider Concentration

In a narrative review of the literature which included over 40 individual studies that focused on the effects of hospital consolidations that occurred in the 1990s, researchers estimated that hospital mergers caused a 5% increase in inpatient hospital prices and an improvement in hospital efficiency (Vogt & Town, 2006)⁸. However, a more recent study found that post consolidation improvement in hospital efficiencies were not sustained (Harrison, 2011)¹¹. In an updated review of the literature, researchers reported further evidence that greater hospital concentration could lead to higher prices (Gaynor & Town, 2012)⁸.

More recent evidence is available for procedure specific contexts. In a national study of laryngectomies, researchers observed paradoxically higher costs in markets with greater competition (Gourin et al., 2019)¹⁸. In a separate national study of four major surgical procedures, researchers identified a paradoxical inverse relationship between concentration and inpatient costs, the greatest of which was a \$4,876 difference in costs for liver resection between the highest and lowest tertile markets for hospital concentration (Cerullo et al., 2018)¹⁸.

Several studies also find a positive relationship between concentration of hospital markets and insurance premiums. One study found higher employer-sponsored premiums associated with more concentrated hospital markets (Trish & Herring, 2015)¹² and another study of two state-run Marketplaces estimated higher premium growth for Marketplace plans but no significant relationship for medical group concentration (Scheffler et al., 2016)⁴. In contrast, a study of 35 states with federally run Marketplaces found no association between hospital concentration and Marketplace premiums but slightly higher premiums associated with physician-hospital vertical integration (Parys, 2018)¹⁸.

Physician Provider Concentration

In a study that examined prices paid across a variety of common procedures, researchers found that there was a significant positive correlation between physician practice concentration and prices for 11 of the 15 procedures studied.

Compared with the counties with the most physician competition, prices were 8-26% higher in the least competitive counties (Austin & Baker, 2015)¹⁸. Researchers found that among US urban counties, prices for several common office-based procedures were significantly higher for practices with the least competition (Baker et al., 2014)¹⁸.

Some researchers specifically examined physician fees within specific specialties. Physician fees were higher in markets with less competition for total knee arthroplasty (+\$168 between highest and lowest quartile) (Sun & Baker, 2015)⁴, cardiology care for first time AMI patients presenting in emergency settings (14-30% higher between highest and lowest decile) (Dunn & Shapiro, 2014, 2018)^{all 3}, and general cardiology care (Dunn & Shapiro, 2014, 2018; Koch et al., 2018)^{3,5}. While these few studies are consistent in terms of the direction of effect, a study of anesthesia payments from private insurers found no significant relationship between anesthesiology group concentration and private insurance payments for five commonly used anesthesia codes (Sun et al., 2015)⁴.

Provider Concentration Following Vertical Integration

Several studies have reported that physician-hospital integration leads to increased prices. For example, a study of hospitals in three states from 1994-1998 reported greater prices associated with integration, mixed implications for quality depending on quality measure and integration type, and no association between integration and hospital cost efficiency (Cuellar & Gertler, 2006)⁵. A national study of privately insured individuals from 2001-2007 identified greater hospital spending and prices for fully integrated hospitals, but no effects on prices from less formal integration models (Baker et al., 2014)⁵. A separate study estimated that markets that experienced the highest rates of physician-hospital integration had an average increase of \$75 in per-enrollee outpatient spending annually (no changes in inpatient spending) driven by price increases and not changes in utilization (Neprash et al., 2015)⁵. A multistate study of medical practice acquisitions by hospitals (Capps et al., 2017)⁴ and a study of the acquisition of multispecialty clinics by an integrated delivery system in Minnesota (Carlin et al., 2017)⁴ found that prices increased between 14.1% in the multistate study to 32-47% in the Minnesota study after acquisition.

Despite the studies that generally report an increase in prices following physician-hospital integration, a synthesis of early evidence identified mixed results on cost and quality which may be a function of differing forms of integration (Burns et al., 2008). Researchers studying integration in California reported inconclusive impacts of physician-hospital integration on prices (Ciliberto & Dranove, 2006)⁵. Many authors noted that the lack of effects of integration might be due to the failure to functionally integrate disparate providers even after vertical or horizontal integration (Burns & Muller, 2008; Gaynor & Town, 2012).

Payer Concentration

Within Medicare Advantage markets, researchers reported that greater market concentration was associated with higher premiums and a statistical, but not practically meaningful, higher summary quality ratings and consumer satisfaction (Adrion, 2019)¹⁴. On average, Medicare Advantage premiums ranged from \$31.25 in highly competitive markets compared to \$65.54 in less competitive markets, and \$77.12 in monopoly markets.

Studies of payer concentration in the Marketplaces show that premiums are higher in less competitive markets (Parys, 2018; Jacobs et al., 2015)^{18,4}. In the first two years of the ACA Marketplaces, researchers reported that each additional insurer entering a market was associated with a 1.2-3.5% decrease in premiums depending on plan type, however this effect began to diminish after several entrants (Jacobs et al., 2015)⁴. A separate national study of the Marketplaces estimated that premiums in monopoly markets were 50% higher than those with more than two competing insurers (Parys, 2018)¹⁸. A study of the Marketplace in the State of New York found that a higher concentration of payers (e.g., less competition) was associated with increases in premium. However, a study of the Marketplace in California found paradoxically the opposite effect (Scheffler et al., 2016)⁴.

Within commercial markets, greater payer competition was generally associated with lower premiums (Gaynor et al., 2015; Trish & Herring, 2015)^{12,8}. Researchers also used data from California to simulate the impacts of small and large insurers existing from the market on changes in premium. They reported an increase in premiums with the exit of any insurers from a market regardless of insurer size (Ho & Lee, 2017)¹⁶. In a related national study,

researchers reported that higher insurer concentrations were associated with lower hospital prices (Melnick et al., 2011)¹². A national study estimated that prices for office-based services were 20% lower in markets for insurers with greater market share than for those with relatively small of market share (Roberts et al., 2017)¹⁸.

Interaction of Provider & Payer Concentration

Within highly concentrated hospital markets, hospital prices were lower for those markets that had high commercial insurer concentration compared to low insurer concentration (Scheffler & Arnold, 2017)⁵. This pattern held specifically for prices of cardiology, radiology, and hematology/oncology services, but not for primary care or orthopedists. Another study considering the interaction between provider and payer market concentration reported that the impact on prices of increased concentration of these two markets may counteract each other (Melnick et al., 2011)¹². Collectively, these studies highlight the importance of market factors in price negotiations between payers and providers.

What role does market concentration have in quality improvement and/or improvements of health status?

Provider Concentration

Many studies identify a positive relationship between competition and quality, but several studies report no effect or a paradoxical inverse effect (Gaynor, 2006)⁸. In a narrative review of the literature, researchers reported inconsistent effects of provider consolidation on quality given that some studies identified decreases in quality associated with greater concentration while other studies found increases or no effects on quality (Vogt & Town, 2006). A more recent review of the literature reported more consistent evidence that increased competition is associated with better quality of care (Gaynor & Town, 2012).

Researchers noted that the impact of provider competition may differentially affect Medicare patients because Medicare externally sets prices. Nevertheless, most, but not all, studies of Medicare find that quality improved with higher competition (Gaynor, 2006; Gaynor & Town, 2012)^{11,8}. In studies that focused on specific conditions in the Medicare population, researchers report mixed findings. When decreased concentration was associated with improved quality of care for AMI (although at

slightly higher spending), there were marginal decreases in quality for knee replacement and dementia care while no effect for hip replacements (Colla et al., 2016)³. When considering physician market concentration and quality, evidence from the study of cardiology markets found mixed results with instances of improved, reduced, and no effect on quality with greater market concentration. In a study of emergency AMI encounters, researchers found no association between increasing concentration and mortality but noted that increasing concentration was associated with fewer readmissions and improved use of beta blocker medications (Dunn & Shapiro, 2014, 2018)^{all}³. Separately, a study of cardiologist market concentration and patient outcomes identified an inverse relationship where greater concentration was generally associated with worse quality and health outcomes as well as higher utilization and expenditures (Koch et al., 2018)⁵.

A handful of studies examined the impacts of provider integration on quality. Researchers found that hospital-physician integration resulted in significant improvements in quality for only two of 29 measures examined. (Short & Ho, 2019)⁵. Similarly, greater physician-hospital integration was associated with improvement in only one of 13 quality measures considered (Scott et al., 2017)⁴. Lastly, a study of multispecialty clinic acquisitions by an integrated delivery system identified improvements in some cancer screenings and appropriate use of the emergency department but decreases or no effects on other measures of quality (Carlin et al., 2015)⁴.

Payer Concentration

Researchers found that greater concentration in the Medicare Advantage market was associated with improved patient satisfaction (Adrion, 2019)⁴. A multiyear study of patient satisfaction that considered both payer and provider concentration identified a positive association between insurance market concentration and patient satisfaction, but a negative association between hospital market concentration and patient satisfaction (Hanson et al., 2019)⁵.

Summary of the Evidence on the Impact of Provider and Payer Market Concentration

Hospital Provider Concentration

There is **convincing** evidence that greater hospital concentration is generally associated with increased

prices and **promising** evidence that greater hospital concentration is associated with higher insurance premiums. However, there is also a limited but **promising** body of evidence that suggests hospital consolidation results in cost efficiencies, at least temporarily. The relationship between hospital concentration and quality is more nuanced with **mixed findings** that suggest either **convincingly** improved or worsened quality depending on other market conditions, outcome measures studied, and other factors. Overall, the evidence suggests that greater competition may spur quality improvements, and a lack of competition may inhibit quality.

Physician Provider Concentration

The relationship between physician concentration and prices is generally consistent with that of hospital concentration in that less competition among physicians is associated with higher prices, however, much of this evidence is **correlational**. The limited but **convincing** evidence of the relationship between physician concentration and prices often comes from medical specialties (e.g. surgery, cardiology) and has mostly supported the correlational findings. In contrast, evidence of the relationship between physician concentration and quality is highly mixed and stems from specialty contexts.

Provider Concentration Following Vertical Integration

There is **convincing** evidence that vertical integration is associated with higher prices. However, there are also **convincing** studies that find no effects of integration on prices. The variation in these findings is typically explained by differences in study setting or context and the degree or type of integration. The literature of evidence regarding vertical integration's relationship to quality is **mixed**. There are examples of **convincing** studies that identify improvements, decreases, or no effects on quality.

Payer Concentration

Across payer types, there is **convincing** evidence of a positive relationship between payer concentration and higher premiums (e.g., less competition results in higher premiums). Conversely, **promising** evidence suggests that prices are lower in more concentrated payer markets as payers with greater market share are able to negotiate lower prices. There is limited and inconclusive evidence about the relationship between payer concentration and quality of care.

EMPLOYER-PROVIDER DIRECT PRICE NEGOTIATIONS

Why are employer-provider direct price negotiations believed to affect costs or population health?

Rather than purchase traditional health insurance for their employees, many US employers find it financially beneficial to remain self-insured. Self-insured employers directly pay for their employee's health service utilization which can be lucrative by avoiding the overhead costs and profits that are built into premiums charged by insurance companies. These employers remain financially at risk for the overall use of services by their employees—and typically pay a fee to use traditional insurers' billing and provider networks. By using insurers' provider networks, self-insured employers benefit from the negotiated prices that insurers have secured with providers. However, if employers are dissatisfied with the rising costs of health care, they could in theory negotiate directly with providers if desired.

Employers, whether self-insured or otherwise, have been actively taking a role in influencing the cost and quality of health care in the US for almost two decades. Founded in 2000, The Leapfrog Group is national nonprofit organization comprised of large US employers, representing a significant proportion of insured Americans, striving to affect health care by reducing costs and/or improving quality. Using their market influence, The Leapfrog Group has implemented provider incentives and transparency tools to influence provider and consumer behavior. Researchers have identified instances, including in Indiana, where employers are considering direct negotiations with providers and/or working directly with local health systems on a joint venture to provide on-site primary care (Corlette et al., 2019). We focus on summarizing the literature on the effects of direct negotiations between employers and providers.

What are the benefits and/or drawbacks associated with employer-provider direct price negotiations?

In the mid-1990s, a California-based group of employers negotiated directly with providers to implement 'performance guarantees' with 13 different integrated

delivery systems (Schauffler et al., 1999). A total of 2% of medical costs – amounting to \$8.39 million – was at risk based on provider performance on a range of measures including patient and physician satisfaction, utilization rates of cesarean sections, mammography, Pap smear, childhood immunizations, and prenatal care. Researchers reported that the majority of providers met their targets for all measures; but 8 of 13 provider systems missed their target for childhood immunizations and refunded almost \$2 million (23% of at-risk dollars) to employers (Schauffler et al., 1999). For reasons not documented in literature, the California alliance eventually floundered (Corlette et al., 2019).

In Minnesota, an employer coalition similarly banned together to negotiate with providers directly. After two years, researchers reported that hospital costs decreased, ambulatory care costs rose modestly, and pharmacy costs increased substantially resulting in a slowdown in overall cost increases (Lyles et al., 2002)⁹. Despite these effects, quality indicators were unchanged or improved. The Minnesota coalition experienced several setbacks in maintaining the commitment of its employer members, struggles in securing sufficient operating capital, and resistance from local hospitals (Christianson & Feldman, 2002; Christianson & Feldman, 2005).

More recently, a Colorado county along with local employers and residents formed an alliance and negotiated directly with the local health system for price discounts. Although the impact of this alliance was not formally evaluated, self-reported estimates suggest a reduction in premiums of 11–15% (Ingold, 2019). Colorado officials plan to expand similar direct contracting approaches to other parts of the state but have not yet successfully done so (Corlette et al., 2019).

Drawbacks

Small employers may not have the purchasing power to successfully negotiate unless they form alliances with other employers or groups to increase the number of patients being represented (Schauffler et al., 1999; Ingold, 2019). Forming an alliance similar to the experience in Colorado is only potentially viable

in markets where a single provider has a significant market share making this approach less applicable to urban locations (Appleby, 2019). This approach is difficult without transparent price information, as facilitated by a state all-payer claims database, like the one that was available in Colorado. Most of the attempts to form employer coalitions to negotiate directly with providers have either floundered or evolved into another approach that is unique to the local market.

Researchers reported that the stability of such coalitions are challenging to maintain for several reasons including: (1) when local corporations are acquired by larger entities, health care decisions may be made outside the local community; (2) personnel turnover among employers could result in the loss a champion for the alliance; and (3) differences in opinion among employers participating in the alliance can result in firms dropping out (Christianson et al., 1999).

What role do employer-provider direct price negotiations have in quality improvement and/or improvements of health status?

The employer alliance from California that implemented performance guarantees with providers also focused upon a reduction in tobacco use by expanding health insurance coverage to include pharmacotherapy, over the counter or prescription products, and behavioral interventions for smoking cessation. Researchers argued that such an approach is cost effective and could provide a positive return on investment (Harris et al., 2001).

Summary of the evidence on the effectiveness of employer-provider direct price negotiations

Overall, employer-provider direct price negotiations have been rare and not rigorously evaluated. **Limited promising evidence** suggests that employers could, individually or through an alliance with other employers, successfully negotiate lower prices and/or performance guarantees that may yield desired benefits. The long-term success of such negotiations is conditional on employers' ability to successfully maintain the alliance.

USE OF NARROW AND TIERED PROVIDER NETWORKS

Why are narrow and tiered provider networks believed to affect costs or population health?

Many health insurers selectively contract with providers by forming narrow provider networks that typically include fewer than a third of eligible clinicians or hospitals in an area (Hall & Fronstin, 2016; Jacobson et al., 2016; Jacobson et al., 2017; McKinsey & Company, 2014; Polsky et al., 2017). Narrow provider networks allow health insurers to negotiate lower prices in exchange for higher patient volume with selected high-performing, low-cost providers. Due to the anticipated savings from lower prices, insurers can offer more competitive premiums to patients which makes narrow provider networks a key component of the insurer's business model and value-added service.

Narrow provider networks grew in popularity in the 1980s when such tactics were among the strategies employed by Health Maintenance Organizations (HMOs). A decade later, in the 1990s, a backlash against HMOs resulted in the abandonment of many cost saving strategies as HMOs evolved into Preferred Provider Organizations (PPOs). PPOs by definition retain the concept of narrow networks given strong evidence that selective contracting resulted in lower prices (Wickizer & Feldstein, 1995; Melnick et al., 1992; Wholey et al., 1995; Zwanziger et al., 2000). Narrow provider networks further gained renewed attention with the passage of the 2010 Affordable Care Act (ACA) given that approximately half of first year Marketplace insurers used narrow provider networks to offer competitive premiums (Howard, 2014). Although the prevalence of plans on the ACA Marketplace with narrow provider networks declined to 21% in 2017, the use of narrow networks is prevalent in other markets. For example, 33% of Medicare beneficiaries were enrolled in Medicare Advantage plans that limit provider choices in 2017, with further projected increases (Feyman et al., 2019). Approximately 15% of employers had narrow networks in 2016, and several others considered adopting this approach (Hall & Fronstin, 2016).

In response to complaints from providers and consumers, several state and federal guidelines were

issued governing how payers can construct their narrow provider networks (Howard, 2014). Some insurers introduced an alternative to narrow networks known as tiered provider networks. In a tiered provider network, the insurer organizes providers into tiers based on their cost, and in some cases their quality, relative to other providers (Sinaiko, 2014). Low-cost, high-quality providers are placed in the preferred tier. Patients incur lower out-of-pocket costs if they choose to utilize providers from the preferred tier. The prevalence of tiered networks varies throughout the country, but approximately one in five employers offered a tiered network in 2015 (KFF, 2016).

What are the benefits and/or drawbacks associated with narrow and tiered provider networks?

Researchers have studied the impact of narrow and tiered provider networks on cost and quality by insurer type. We summarize the available literature that examined narrow or tiered networks within (1) employer-sponsored health insurance, (2) the ACA Marketplace, and (3) Medicare Advantage plans.

Narrow networks and cost

Studies examining data from **employer-sponsored health insurance** found that narrow networks are associated with lower costs. Massachusetts state and municipal employees enrolled in narrow network plans spent considerably less on medical care (-40%) and used less emergency department and specialist care compared to employees enrolled in plans with broader networks (Gruber & McKnight, 2016)⁴. Small firm employees enrolled in narrow networks experienced a reduction in medical spending (-25%) relative to employees with less restrictive plans. Employees in the narrow network plans used less specialist care (-2.8%) relative to employees in broader network plans (Atwood & Sasso, 2016)¹. Simulation studies using data from California's public employee's retirement system showed that selective contracting with hospitals could lower health care prices for the insurer (average of -12%) compared to contracting with all hospitals in 12 geographic markets (where a reduction of -30% in some markets is possible). These simulation studies reported

that some portion of the lower price could be passed on to patients in the form of lower premiums leading to approximately \$20–\$28 in consumer savings per year (Ho & Lee, 2017; Ho & Lee, 2019)¹⁴.

The majority of studies examining plans offered in the **ACA Marketplace** found that narrow networks were associated with lower premiums. Several studies of silver-tier health plans offered across multiple states in the Marketplace reported that plans with narrow networks had lower premiums (ranging from -16% to -6.7%) than broader network plans (Dafny et al., 2015; Dafny et al., 2017; Polsky et al., 2016)^{all 18}. One study that examined individuals continuously enrolled in narrow network plans in the southeastern US experienced no change in out-of-pocket expenditures compared to enrollees in plans with broader networks (Gillen et al., 2017)⁴.

Narrow networks and quality

Evidence on how narrow networks affect the quality of care among those with **employer-sponsored insurance** is more limited. Several studies reported that quality of care did not differ for individuals in plans with narrow networks. An analysis of claims data from Massachusetts from the mid-1990s found no difference in mortality or hospital readmission rates for heart disease among patients in HMOs with a narrow network compared to traditional plans (Cutler et al., 2000)³. Furthermore, an analysis of state and municipal employees in Massachusetts who were enrolled in narrow networks found no evidence of adverse health outcomes (avoidable hospitalizations, mortality) compared to employees enrolled in plans with broader networks (Gruber & McKnight, 2016)⁴.

The majority of studies examining how narrow networks in plans available through the **ACA Marketplace** examined access to care, as a substitute for quality of care. These studies found that narrow network plans were more likely to exclude certified/designated cancer centers (Kehl et al., 2017; Schlesinger et al., 2016; Yasaitis et al., 2017)^{all 18} or lacked in-network specialty providers for mental health (Dorner et al., 2015; Zhu et al., 2017)^{all 18} thus theoretically diminishing access to potentially needed services. Researchers found that patient travel time to hospitals was similar for patients

with narrow network plans versus commercial plans (suggesting similar access to care). But average hospital and physician quality (measured through 12 indicators) was better among narrow network plans (as opposed to traditional plans) available in the state's ACA Marketplace (Haeder et al., 2015)¹⁸.

A handful of researchers also examined quality in the context of **Medicare Advantage** plans who use narrow networks. In a national comparison, researchers reported that quality of care, measured as receipt of breast cancer screening, appropriate diabetes care, and cholesterol testing for cardiovascular disease was consistently better for patients in Medicare Advantage compared to their counterparts in traditional Medicare (Ayanian et al., 2013)¹⁴. Researchers reported that while urban patients with a Medicare Advantage plan in California had similar access to high-quality cardiologists, endocrinologists, and gynecologists when compared to traditional Medicare enrollees, rural patients with Medicare Advantage plans may face challenges with access to care (Haeder, 2019)¹⁴.

Tiered provider networks and cost/quality

A growing body of evidence suggests that tiered provider networks are useful in steering patients towards lower-cost providers and can reduce overall costs. An analysis of commercial claims data from Massachusetts found that tiered networks were associated with increased use of hospitals on the preferred or middle tiers relative to hospitals on the nonpreferred tier who experienced up to a 7.6% drop in volume (Frank et al., 2015)¹⁰. Other studies from Massachusetts found that physicians in the least-preferred tiers had the lowest market share of new patients compared to those with more desirable tier rankings (Sinaiko & Rosenthal, 2014)⁴; and that privately insured patients chose preferred tier-hospitals due to lower copays (Prager, 2017)¹⁴. A tiered network in a Massachusetts commercial plan was associated with lower total adjusted medical spending per member per quarter compared to traditional plans (-\$43.36), and decreased inpatient spending, outpatient spending, and outpatient radiology spending (-5%) (Sinaiko & Rosenthal, 2014)⁴.

Researchers have identified potential challenges that patients in either narrow or tiered networks may face

which include (Haeder et al., 2015; Howard, 2014; Mehrotra et al., 2018):

1. Delays in receiving appropriate care due to a limited choice of providers in a geographic area.
2. Significant travel time to receive care, which may adversely affect more vulnerable populations.
3. High out-of-pocket expenses if they seek care from an out-of-network provider.
4. Surprise bills when a patient seeks care at an in-network provider and unknowingly receives services by an out-of-network practitioner. This issue is a particular nuisance for patients because of their inability to prevent out-of-network bills generated from practitioners at in-network facilities.
5. Confusion over balance billing charges which occur when a patient is responsible for the difference between the provider's charge and what the insurer has agreed to pay.
6. Difficulties in seeking care at prominent hospitals or medical centers when the organization is excluded from the network.
7. Limited ability to make informed decisions due to insufficient information and transparency about the insurers' network designs and the financial consequences of switching from one provider to another.

Tiered networks were criticized on the methodology used to place providers in the tiers. For instance, physicians were placed in tiers based on total spending, not cost of care, and the reliability of those measures is questionable (Adams et al., 2010).

What role do narrow and tiered provider networks have in quality improvement and/or improvements of health status?

Several studies reported that quality of care did not differ between narrow network and traditional plans (Ayanian et al., 2013; Cutler, 2000; Gruber, 2016; Haeder, 2015; Haeder, 2019)^{14, 3, 4, 18, 20}. Nevertheless, some studies reported that narrow networks may limit access to high-quality providers, causing a downstream negative effect on the overall quality of care (Haeder et al., 2015; Dorner et al., 2015; Kehl et al., 2017; Schlesinger et al., 2016; Zhu et al., 2017; Yasaitis et al., 2017)^{all 18}. We found no studies that examined how tiered provider networks affect quality of care.

Summary of the evidence on the effectiveness of narrow and tiered provider networks

Convincing evidence shows that narrow provider networks are associated with lower costs. **Promising** and **correlational evidence** suggests that narrow networks do not negatively affect the quality of care.

Promising evidence shows that tiered networks are effective mechanisms for steering patients towards lower-cost providers; but no studies have examined the effect of tiered networks on overall quality or population health outcomes.

PUBLIC HEALTH ACTIVITIES

Why is public health spending and related activities believed to affect costs or population health?

Public health is credited with adding 25 of the 30 years of life expectancy gained in the past century (CDC, 1999). This progress has been the result of focusing on the conditions in which people are born, live, work, and age—collectively known as social determinants of health. There is an improved understanding and consensus among experts that social determinants of health are drivers of health care utilization and overall health outcomes.

The US public health system is responsible for preventing disease and injury in the overall population in part by assuring that the quality of air, water, food, and other conditions are optimal for supporting health. The public health system is funded by a combination of federal, state, and local sources resulting in wide variability in community-specific governmental public health expenditures across the country. The public health system relies on public-private partnerships with a wide range of organizations including health care delivery systems, nonprofits, and community organizations. It is helpful to think about public health activities (broadly) as opposed to governmental public health expenditures only. Given the need for effective partnerships for successful population health initiatives, there is high variability in terms of the breadth and depth of collaborative public health activities across geographic areas in the US (Mays et al., 2016).

Preventable health conditions are responsible for more than 75% of annual health care expenditures in the US (Mays & Mamaril, 2017). However, governmental public health expenditures which focus on preventing and controlling diseases and health conditions (as opposed to treating them once they occur) constitute less than 3% of national health spending (Martin et al., 2017). Local public health expenditures frequently focus on clinical services (e.g., child and adult immunizations, screening and treatment for infectious diseases, WIC services) and population-based programs (e.g., disease surveillance, environmental monitoring, health education,

food services inspections, chronic disease programs). Given the variability described above, local public health expenditures in the top 20% of US localities are 13 times greater than similar expenditures in the bottom 20% of US localities (Mays & Smith, 2009); and these expenditures are linked to a wide range of population health outcomes.

What are the benefits and/or drawbacks associated with public health activities?

The documented benefits of public health activities include an examination of:

1. How governmental public health investments are associated with population health outcomes
2. How governmental social service (non-health specific) investments are associated with population health outcomes
3. How partnerships across health and non-health sectors; and/or across public-private sectors (known as multi-sector partnerships) are associated with population health outcomes

Governmental public health investments, most frequently in the form of county-level health department expenditures, have been associated with a wide range of outcomes including a reduction in the incidence of diseases, a reduction in overall and disease-specific mortality, and improvements in health status. While it is implied that reducing the incidence of disease likely reduced overall health care costs by averting the need for medical services; at least one study found that public health spending can also reduce health care spending by payers.

Using national data from 1993 to 2005, researchers found that a \$10 per capita increase in local health department expenditures was associated with significant reductions in infectious disease incidence (−7.4%) and in years of potential life lost (−1.5%) (Erwin et al., 2012)⁴. In a separate study using the same data sources, a 10% increase in local public health spending was associated with a reduction in infant mortality (−6.9%) and deaths

from cardiovascular disease (−3.2%), diabetes (−1.4%), and cancer (−1.1%) (Mays & Smith, 2011)^{1,3}. The authors further noted that for the average metropolitan area, a 10% increase in local public health expenditures amounted to \$312,274 and yielded the same mortality reduction that would require 27 new primary care doctors in the same community. The findings about a reduction in infectious disease and cardiovascular deaths was also observed in a study that used national data from 1997 to 2005 (Erwin et al., 2011)⁴.

Using data from California health departments from 2001 to 2009, researchers found that an additional \$10 per capita in county health department expenditures reduced 9.1 deaths per 100,000 population (Brown, 2014)^{1,3}; and resulted in approximately 24,000 additional people reporting their health status in the “good, very good, or excellent” health category as opposed to the “poor” or “fair” category (Brown et al., 2014)^{1,3}. This series of studies further concluded that at current levels of public health investments in the state, California county health departments prevented approximately 27,000 deaths annually and assured that 207,000 individuals remained in “good, very good, or excellent” health (Brown, 2014; Brown et al., 2014).

In a national study of US counties from 1993 to 2013, researchers found that a 10% increase in local public health spending per capita was associated with a 0.8% reduction in adjusted Medicare expenditures per person after 1 year and a reduction of 1.1% of spending after 5 years (Mays & Mamaril, 2017)^{3,4}. The same authors reported that a 10% increase in per capita funding was equivalent to \$594,291 additional outlays in an average US community whereas the savings to Medicare was \$515,114 after 1 year and \$656,449 after five years. This suggest that Medicare alone could recover \$1.10 for every \$1 invested in public health over a five-year period—and the overall societal returns (e.g., to Medicaid, other payers) could be even greater.

Governmental Investments in Specific Public Health Programs

Whereas the previous studies describe the impact of overall governmental public health spending, there are also studies that examine how governmental public health investments in specific programs can result

in improved population health outcomes. Using data from the states of Washington and New York, increases in food and sanitation expenditures by county health departments was associated with a significant reduction in incidence of the food borne illness salmonellosis (Bekemeier et al., 2015)⁶. In a similar study using county data from Washington state and Florida, local health departments that increased targeted investments in maternal and child health services experienced county improvements in low birth weight rates with the greatest improvements occurring in the poorest counties (Bekemeier et al., 2014)⁶.

Beyond traditional governmental public health spending, there is evidence that community health workers can affect outcomes. These health workers are trained to address social issues that impede optimal health. The Arkansas Medicaid program reimbursed community health workers to proactively identify and connect vulnerable people at risk for needing nursing home services to home and community-based care in a 2005 demonstration program focused on the most vulnerable rural, minority, and low-income area of the state. The program was associated with an increased number of referrals to non-nursing home services and a corresponding reduction in overall Medicaid spending equal to almost \$3 saved for every \$1 invested (Felix et al., 2011)⁴.

Governmental social services (non-health specific) investments have been linked to improved population health outcomes in both studies that considered the investments in isolation and studies that considered local public health expenditures.

Using county-level information from Texas from 2002 to 2012, researchers found that counties that increased their investments in social services and health (via spending on fire and ambulance, community health care, public health, housing and community development, and libraries) experienced improvements in health outcomes. Each additional one-time investment of \$15 per capita was associated with a one-spot improvement in statewide county health rankings within four years (McCullough & Leider, 2019)⁴. Using national data from 2012 to 2016, researchers found that governmental investments in health, social services, and education

were positively correlated with key health outcomes but mainly in counties with one or more hospitals present (McCullough et al., 2019)¹⁴. The same analysis found that hospitals' provision of community health services was also beneficially associated with health outcomes.

Using national data from 1972 to 2012, researchers found that as US counties increased either governmental spending on social services or on nonhospital health activities, there was an associated decline in overall and/or specific mortality (Leider et al., 2018)⁴. Using more recent data on US counties from 2012 to 2015, governmental spending on health (including community health care and public health) as well as spending on non-health sectors (including fire protection, parks and recreation, sewerage, and libraries) were both associated with improvements in county-level population health rankings (McCullough & Leider, 2016)¹⁴.

Because there is a strong correlation between county wealth and overall health ranking, researchers examined how wealth, governmental spending, and health rankings are related (McCullough & Leider, 2017)¹⁴. They found that while communities that were wealthier performed better on the county health rankings, more than 800 counties nationally exist that overperformed their levels of wealth by ranking in a higher quartile than their wealth alone would predict. They found that each additional one percentage point of total public spending (including both health and social spending) increased the odds of being an overperformer by 3.7%.

Multisector partnerships have also been linked to improvements in population health. Using a national cohort of US communities from 2004 to 2016, researchers found that preventable death rates fell, especially for cardiovascular disease, diabetes, and influenza, where communities expanded health activities through partnerships and networks spanning multiple governmental and private sectors (Mays et al., 2016)¹.

There have also been several published cases of improvements in population health in specific locales where multisector partnerships have occurred. In Louisville, Kentucky, a technology company, a nonprofit institute and the local government equipped residents with asthma with electronic inhalers that tracked

places throughout the city that resulted in high rescue inhaler use. This information was shared with public health officials who deployed air abatement strategies including tree removal mitigation, pollution emission buffers, and enhanced tree canopies to ultimately reduce rescue inhaler use (–78%) and improve the number of reported days that were symptom free (+48%) (Barrett et al., 2018).

In Dallas, Texas, a health system partnered with the local Park and Recreation Department to create a primary care clinic integrating wellness and prevention programs in a city recreational center. Patients utilizing the clinic had a reduction in both emergency department use (–21.4%) and use of inpatient care (–36.7%) with average cost reductions of 34.5% and 54.4% respectively (Wesson et al., 2018).

Drawbacks

We found little or no convincing evidence on the drawbacks of public health activities. Nevertheless, there are some limitations to the existing body of knowledge on the topic. First, most studies are limited to select data sources, notably a periodic survey of local health departments and/or census data, to estimate public health expenditures. Ideally, additional data sources would allow for triangulation of results and could further enrich current conclusions. Second, little or no studies have examined how increased public health spending can affect health disparities. Lastly, one drawback that should be considered is the perceived alignment between public health investments and specific political and economic factors.

In a systematic review of published reviews of the literature, researchers found that certain political, economic, and social policies were associated with improved health (McCartney et al., 2019) suggesting that the political economy is a determinant of population health outcomes. In a similar analysis that spanned the international literature, researchers found a consistent relationship between the implementation of certain political ideologies (including welfare state generosity and left-of-center political tradition) and positive population health (Barnish et al., 2018)¹. The same systematic review also found that globalization may be negatively associated with population health but

the results were less conclusive based on the available published evidence.

To the extent that public health activities are viewed as “political,” the Robert Wood Johnson Foundation has developed a guide that provides best practices for framing the social determinants of health that can garner buy in for people across a wide range of political ideologies (RWJF et al., 2010)

What role do public health activities have in quality improvement and/or improvements of health status?

The vast majority of the cost reductions documented in the literature that follow investments in public health are the result of improvements of health status including a reduction in mortality, prevention of disease, and prevention of disease progression. Less evidence exists that examines how public health activities affect the quality of medical care because such activities do not primarily or typically focus on affecting clinical behavior.

Summary of the evidence on the effectiveness of public health activities

Governmental Public Health Investments

The literature is filled with **convincing** studies that causally link investments in public health activities with desirable population health outcomes. **Convincing** evidence has linked increases in local health department spending to reductions in overall deaths and deaths from cardiovascular disease, diabetes, cancer and infant mortality. **Convincing** evidence suggest that increases in local public health spending reduces Medicare expenditures for people living within those counties. Thus, local public health spending might have both a substitution and cumulative effect with medical spending.

Local health department spending **holds promise** in reducing infectious diseases; and when focused on either food/sanitation or maternal and child health services holds promise in reducing foodborne illness and low birth weight babies.

Reimbursing community health workers via Medicaid has

convincing evidence linking it to a reduction in Medicaid spending. Importantly, the Indiana Medicaid program began reimbursing community health workers in 2018 (IHCP, 2018); but a formal evaluation of that policy has not yet been published.

Governmental Investments in Social Services

The literature has **convincing** evidence linking local investments in social services to a reduction in overall and disease specific mortality. In addition, there is **promising** evidence that investments in social services can affect county health rankings. This suggests, as noted by experts, that investments in upstream social services that could have downstream effects on health may play a role in improving population health whether or not the upstream investments primarily target health (McCullough & Leider, 2016).

Multisector Partnerships

There is **convincing** evidence that increased multisectoral partnerships in communities reduces preventable deaths especially from cardiovascular, diabetes, and influenza. There are inspiring anecdotes regarding how creative public-private and for-profit and nonprofit partnerships can target the health needs of communities to improve population health.

For some public health activities to be fully implemented, there may be a need to overcome economic and political forces that have been linked to the successful implementation of such programs.

ACCOUNTABLE CARE PAYMENT MODELS

Why are accountable care payment models believed to affect costs or population health?

Health care services in the US have historically been paid for on a fee-for-service (FFS) basis whereby a payer reimburses a provider for services delivered to patients. Under FFS, providers increase revenue by increasing the supply of services which could lead to providing services of questionable benefit to patients. Given that surgical and procedure-based services have historically generated more generous reimbursements than preventive care, providers under FFS are implicitly incentivized to focus away from providing services that can prolong or maintain health (e.g., health promotion, counseling, preventive care). The inherent provider incentives under FFS could be contrary to the interests of insurers whose business model and actuarial calculations require that only necessary care is covered.

When the US established Medicare and Medicaid in 1965, the issue of misaligned incentives under FFS became of intense interest to public stakeholders. New payment models designed to mitigate the misaligned incentives were developed to control costs by focusing on prevention and the maintenance of health. Value-based contracts, an alternative to FFS payment models, seek to incentivize better health outcomes and lower costs by holding providers accountable for their performance. US policy has supported the growth of value-based models since the 1970s and recently received further bipartisan support for Medicare to move away from FFS and implement value-based payment models. Recently, Medicare and other payers have required that providers form an Accountable Care Organization (ACO) to participate in value-based contracts.

ACOs are providers that form an integrated delivery system to care for patients under contract with payers, with the assumption that the ACO will be financially at risk for their ability to reduce per capita costs and/or improve their quality of care. There are various mechanisms to hold providers increasingly “at risk.” Contracts that reward ACOs for achieving targeted improvements to costs and/or quality are known as

having an “upside risk” to providers. Contracts with a “downside risk” also impose penalties to ACO providers for failing to perform as expected on costs and/or quality. Both private and public payers have developed value-based contracts with provider ACOs. Starting in 2012, Medicare encouraged provider ACOs to voluntarily participate in one of several value-based programs including the Medicare Shared Savings Program (MSSP) and the Pioneer ACO model. Both programs allowed ACOs to contract for upside risk; and over time moved ACOs towards more downside risk approaches. Medicare has updated various aspects of their value-based programs with the December 2018 announcement of a major overhaul called Pathways to Success.

Commercial payers in some states have also contracted with ACOs through value-based programs. Blue Cross Blue Shield of Massachusetts implemented the Alternative Quality Contract program in 2009 that introduced global payment and pay for performance that is similar to two-sided risk models that Medicare uses in its ACO program. To date, this is one of the longest running contemporary value-based payment programs in the US. The State of Maryland also implemented a similar program that voluntarily offered rural hospitals the ability to receive capitated contracts. Capitation is an alternative payment model whereby providers agree to receive a single annual payment (typically disbursed monthly) for each patient they are assigned by the payer. Under this model, providers assume full financial risk for any necessary care that is ultimately delivered to patients.

Lastly, the Office of the Health Insurance Commissioner in Rhode Island implemented affordability standards for all commercial insurers that introduced price controls via inflation caps for hospital services and deliberate increases in reimbursement for primary care and coordination services over time. Although not directly an ACO model, the Rhode Island experience represents an alternative value-based model that will also be discussed in this section.

Overall, the number of participating ACOs, and the corresponding number of covered lives under value-based contracts, has increased between 2010 and 2019. By the second half of 2019, there were approximately 995 active

ACOs covering over 44 million people that included a total of 1,588 contracts with private, Medicare, and Medicaid payers (Muhlestein et al., 2019). It is important to note that other variations on value-based payment models exist including Accountable Care Communities (Alley et al., 2016) and Primary Care First Models (which will be implemented in 2021) (CMS, 2019) which have not yet been extensively studied. Lastly, related payment models, including bundled payments, that incentivize coordination of care (which can also improve outcomes and lower costs), are discussed in a different section of this report.

What are the benefits and/or drawbacks associated with accountable care payment models?

Medicare ACOs

There was originally some controversy in how evaluators determined the impact of an ACO participating in the Medicare MSSP. The Centers for Medicare and Medicaid Services (CMS) evaluated whether participating ACOs reduced costs and improved outcomes relative to prior years' performance. Doing so involved studying how ACO participants performed relative to pre-determined benchmarks based on historical performance. This approach was criticized because a more scientifically valid approach is to examine whether ACO participation is associated with greater improvements in performance relative to a fair control group during the same time period (Chernew et al., 2017). This preferred approach is the gold standard method for determining the impact of policies because it compares the performance of participants to their prior performance relative to the performance of a control group that accounts for temporal trends. In this section, we summarize the studies that used more preferred scientific approaches.

Results of a study that evaluated the first-year performance of ACOs in the MSSP found that the modest observed spending reductions were offset by bonus payments to providers resulting in a net loss to Medicare (McWilliams, 2016)⁴. A separate study found that first year participants in the MSSP had significantly improved patient experience scores relative to a control group especially for costly patients with multiple chronic conditions (McWilliams et al., 2014)⁴. In a follow up study of overall costs, researchers determined that by the third year of the program, ACOs generated Medicare cost savings

that exceeded their bonus payments. As a result, the net savings to Medicare was a statistically significant \$287 million or -\$67 (or -0.7%) per ACO-attributable Medicare beneficiary (McWilliams et al., 2017)⁴. A separate study estimated that ACOs in the MSSP generated a savings of \$1.84 billion in total from 2013 to 2015; and after accounting for shared-saving bonuses there was a net total savings of \$541.7 million (Dobson et al., 2018)⁴.

It was noted that physician-led ACOs performed better than hospital-led ACOs with respect to net savings to Medicare; and that in the early years of the program (2012 to 2015) only physician-led ACOs generated a saving for Medicare that exceed their bonus payments (McWilliams et al., 2018)⁴. This prompted researchers to examine whether ACO participants in the MSSP were able to generate greater savings as they remained in the program over time. Findings indicated that ACOs improved their ability to decrease costs with longer participation in the program for both physician-led and hospital-led ACOs (McWilliams et al., 2018)⁴. Further, some evidence suggests that adverse selection (where increasingly sicker patients switch to more specialized hospital-based facilities) might have played a role in the poorer cost savings achieved by hospital-based ACOs (Jaffery et al., 2019). Researchers also determined that ACO participation in the MSSP was associated with a 9% significant reduction in post-acute skilled nursing costs (-\$106 per capita); and while these reductions also grew with longer ACO participation, later ACO entrants required more time to achieve reductions (McWilliams et al., 2017)⁴.

Other than overall costs, researchers also examined the service patterns that ACOs were able to affect. In one study, researchers found that the first-year cohort of ACOs were able to reduce low-value services at a rate greater than a control group despite having similar baseline levels of low-value services. ACOs reduced both the relative quantity (-1.9%) and spending (-4.5%) on multiple types of low-value services (Schwartz et al., 2015)⁴. ACOs with comparatively higher baseline levels of low-value service use experienced greater service reductions than ACOs whose baseline rates were comparatively lower (Schwartz et al., 2015)⁴. Researchers found that hospitals participating as ACOs had improved patient satisfaction scores, especially with nursing and doctor communication, compared to a control group of hospitals that did not participate in the ACO program (Diana et

al., 2019)⁴. Improvement in patient satisfaction was not observed in hospitals with historically poor performance on these satisfaction measures.

In a systematic review that summarized the findings of 27 individual rigorous studies that examined the impact of ACOs, the most consistent improvement in outcomes included reduced inpatient and emergency utilization, improved adult preventive care, and improved adult chronic disease management (Kaufman et al., 2019). Based on seven studies that evaluated the patient experience or clinical outcomes, the same systematic review concluded that there was no evidence that ACOs worsened outcomes of care. Researchers found that ACO participation modestly impacted end-of-life care with some changes in utilization patterns that suggest less aggressive care; but no systematic improvements in hospice utilization (Gilstrap et al., 2018)⁴. Researchers also found that despite being able to lower spending on mental health hospital admissions, at first, Pioneer ACOs were otherwise not observed to change mental health spending or readmissions, outpatient follow-up after mental health admissions, rates of depression diagnosis, or mental health status (Busch et al., 2016)⁴.

CMS estimates that in 2018 the MSSP generated \$739.4 million in total net savings across 548 ACOs with organizations that took on downside risk having greater savings than those with only upside risk (Verma, 2018).

Commercial ACOs

In Massachusetts, where a commercial ACO program was implemented in 2009, researchers have been able to assess the impact of the program on costs and outcomes over a longer time horizon. At first, researchers found that after one year, the ACO program was associated with a modest slowing of the spending growth and some improvements to chronic disease management (Song et al., 2011)⁴. By the fourth year of the program, quality of care continued to improve, especially among enrollees with lower socioeconomic status (Song et al., 2014)⁴ and the ACO model in Massachusetts generated savings of 6–9% in overall spending growth relative to similar control populations (Song et al., 2014)⁴. By year eight of the program, cost savings were estimated at 11.7% (or –\$461 per capita) in Massachusetts ACOs compared to health systems in control states (Song et al., 2019)⁴. The

cost savings were driven by lower prices in the early years and lower utilization of services (e.g., lab testing, certain imaging tests, and emergency visits) in later years. In Massachusetts, provider ACOs were able to annually earn bonuses based on their performance. As participating ACO cohorts persisted in the program, their costs savings exceeded their bonus payments resulting in a net savings to the payer typically within a few years (Song et al., 2019)⁴.

Capitation is an alternative payment whereby providers assume full financial risk for the care delivered to patients. Researchers used microsimulation models to estimate the level of capitation needed to generate cost savings from various innovative strategies that reduce costs (team-meetings and non-visit-based care) in US primary care practices. Under FFS, these strategies were associated with financial losses. However, under capitation scenarios, these strategies produced financial gains in 95% of cases if more than 63% of annual payments were capitated (Basu et al., 2017)¹⁶.

In Rhode Island, price controls and increases in primary care payments that encourage coordination were associated with a \$55 per capita annual health spending savings achieved by greater coordination and less overall utilization (Baum et al., 2019)⁴.

Drawbacks

The state of Maryland experimented with value-based models by implementing capitated payments for rural hospitals. Researchers found that capitation resulted in a reduction in hospital inpatient and outpatient services as well as emergency and ambulatory surgeries (Baum et al., 2019)⁴. However most of this service reduction did not result in savings to the payer because there was evidence that patients sought care in other facilities unaffected by the capitated payment models. The authors of that study concluded that capitation models that do not universally include all providers require strong oversight to ensure that cost shifting does not occur.

Another drawback of accountable care is that it takes three to five years to realize benefits. Several researchers further noted that the lack of ability to detect changes in some outcomes (e.g., hospice utilization or mental health care) may have been due to the extensive time it takes to educate providers, change practice patterns, and institutionalize

policies in provider organizations that influence the costs and quality of care (Gilstrap et al., 2018; Busch et al., 2016). A survey of clinical directors in Massachusetts, a state with heavy ACO activity, reported (1) that the majority of physicians were not familiar with accountable care goals, (2) challenges remained in coordinating care for emergency patients, and (3) many physician practices had no financial incentives that are aligned with the overall goals of the ACO (Ali et al., 2017). The leadership, coordination, and other activities needed to successfully implement alternative payment models at scale are significant.

What role do accountable care payment models have in quality improvement and/or improvements of health status?

As mentioned above, ACO participation was associated with improved patient satisfaction scores (Diana et al., 2019)⁴, improved adult preventive care, improved adult chronic disease management (Kaufman et al., 2019), and changes in practice patterns that suggest less aggressive end-of-life care (Gilstrap et al., 2018)⁴. ACOs reduced the provision of low-value services (Schwartz et al., 2015)⁴. Nevertheless, a limited number of studies have specifically examined whether participation in the ACO impacted other quality of care or population health outcomes.

One group of researchers found that despite being associated with lower post-acute care costs, participation in the MSSP was not associated with differential changes in mortality, 30-day readmissions, or the proportion of patients discharged to four- or five-star skilled nursing facilities (SNFs) (McWilliams et al., 2017)⁴. One group of researchers examined whether ACO participation improves the quality of primary care. They examined ambulatory care sensitive hospitalizations which include a range of conditions that should not result in an inpatient stay with an adequately performing primary care system. These researchers found that MSSP participation reduced some ambulatory care sensitive hospitalizations among patients of the first cohort of ACOs; but paradoxically increased such hospitalizations among other ACOs. Whereas first cohort ACOs were able to reduce the proportion of patients hospitalized for chronic obstructive pulmonary disease or asthma (−0.05 percentage points, or 4.8 percent of the pre-contract

mean), other ACOs experienced modest but significant increases in hospitalizations for congestive heart failure hospitalizations (0.05 percentage points, or 3.6 percent) and cardiovascular disease or diabetes (0.07 percentage points, or 3.5 percent) (McWilliams et al., 2017)⁴. The authors hypothesized that this paradoxical increase in ambulatory sensitive hospitalized might be a result of greater vigilance among ACOs rather than a degradation of quality performance.

Summary of the evidence on the effectiveness of accountable care payment models

There is **convincing** evidence that, over time, Medicare provider incentives through accountable care payment models can achieve both a cost savings and some improvements in quality of care. These benefits have accrued in the form of improved patient satisfaction including improved preventive care and chronic disease management, and a reduction in the use of low-value, inpatient, and emergency department services. Nevertheless, physician-led ACOs appear to out perform hospital-led ACOs; and downside risks might be necessary in order to optimally incentivize changes in care patterns.

There is also **convincing** evidence that, over time, a commercial ACO program in Massachusetts was able to eventually reduce costs by lowering prices and reducing the utilization of services. The experience in Massachusetts also suggests that improvements in care are possible especially for enrollees with low socioeconomic status. There is also **convincing** evidence from Rhode Island to support the potential of price controls and deliberate incentives directed towards primary care can reduce per capita health care spending. Little or no evidence exists to suggest that accountable care payment models worsen outcomes of care. However, the experience of using capitation in Maryland rural hospitals suggest that regulatory oversight is necessary to prevent cost shifting when such payment models do not include all providers.

BUNDLED PAYMENTS

Why are bundled payment models believed to affect costs or population health?

Under the fee-for-service reimbursement model, providers are paid based on the number of services provided and may be disincentivized to focus on coordination of care (Novikov et al., 2008). Some evidence suggests that under fee-for-service, providers who attempted to improve outcomes by actively coordinating care experienced reductions in revenue in part because improvements in care resulted in fewer complications, which resulted in fewer services and procedures (Preskitt, 2008).

In an effort to contain costs and improve coordination of care, policymakers and payers have implemented alternative reimbursement models including bundled payments, which are sometimes also referred to as “episode-based payment” (Greenwald et al., 2016; Hussey et al., 2012). In the bundled payment model, a single payment is rendered for all services related to a specific episode of treatment that usually includes a hospitalization, and can potentially span multiple providers in multiple settings (Kerwin et al., 2018; RAND, 2019). Providers assume financial risk for all treatments for a given episode of care or condition and take financial responsibility for costs associated with any preventable outcomes (RAND, 2019). The bundled payment model was first implemented in 1984 at the Texas Heart Institute in Houston, where the goal was to create a comprehensive reimbursement package for cardiovascular surgery (Froimson et al., 2013; Novikov et al., 2018). An evaluation of this first bundled payment suggested that costs were reduced, patient access was increased, and payers were better able to forecast and simplify expenses, billing, and collections (Froimson et al., 2013).

In recent years, various bundled payment approaches have been implemented for a number of procedures such as hip and knee arthroplasty, and chronic medical conditions, such as cancer (Aviki et al., 2018; de Brantes et al., 2009; Murphy et al., 2019). The Centers for Medicare and Medicaid Services (CMS) has employed bundled

payments as a central strategy toward cost reduction and care improvement (Glickman et al., 2018). Bundled payment schemes now include a myriad of procedures and medical conditions in more than 1,000 institutions across the US, and cover hundreds of thousands of health care episodes annually (Glickman et al., 2018).

What are the benefits and/or drawbacks associated with bundled payment models?

Researchers have examined whether bundled payment models have affected overall costs; and whether disease specific bundled payments have reduced costs and/or improved outcomes. We provide a synthesis of the literature by presenting studies concerned with overall costs, and then by reviewing the evidence on bundled payments in terms of specific procedures, diseases, or contexts.

Studies Focused on Cost Savings

In a national study, researchers report that bundled payments for lower extremity joint replacement episodes were associated with a 4% reduction in costs largely driven by a reduction in post-acute care without a negative effect on quality (Dummit et al., 2016)⁴. In another study, researchers used CMS data and determined that expenditures for patients covered under bundled payments were lower than they were for patients whose care was not reimbursed under bundled payments. (Curtin et al., 2017)⁶. Yet another study showed that reimbursement under the bundled payment system was lower following implementation of a CMS bundled payment initiative known as BCPI (Gani et al., 2016)⁶. Using Medicare data from 2013 through 2015, researchers found that BCPI participation was associated with reductions in spending and increases in cost savings (Joynt Maddox et al., 2019)⁴.

Researchers have explored the difference in outcomes under bundled payments depending on whether an episode was initiated by a physician group practice versus a hospital. In a study using data on all Medicare primary elective total hip arthroplasties in the US (except those from Maryland) between 2013 and 2016, researchers reported that the decrease in payments of

physician group practice-initiated episodes was greater than hospital-initiated episodes (-4.81% versus -4.04%) (Murphy et al., 2019)⁶.

Conversely, a group of researchers who evaluated Medicare's Acute Care Episode (ACE) Demonstration Program, reported that bundled payment did not result in lower costs for orthopedic or cardiac surgery (Chen et al., 2015)⁴. In a single institution study of an academic medical center in New York, researchers found that bundled payments decreased costs for the entire episode of care for some procedures, but not all (Jubelt et al., 2017)⁴. There is a need to understand the impact of bundled payments by stratifying findings by disease or condition.

Disease-Specific Bundled Payments

Lower Extremity Total Joint Arthroplasty (Hip Replacement, Knee Replacement)

Bundled payments have been linked to lower costs in lower extremity total joint arthroplasty (-16.7% to -18.5% per episode) due to a reduction in utilization of post-acute services where the savings were driven by decreased discharges to institutional post-acute care, decreased readmissions, and decreased length of stay (Alfonso et al., 2017)¹⁹. In a national study of more than 60,000 lower extremity joint replacements, bundled payments were associated with significant reductions in average Medicare payments per episode (-\$1,166) with no adverse impact on unplanned readmissions, emergency visits, or post-discharge mortality (Dummit et al., 2016)⁴. Within a specific health care system, bundled payments were associated with cost reductions among high-volume (-11.1%) and low-volume (-8.3%) facilities (McAsey et al., 2019)⁹. In at least one study focused on lower extremity joint replacement, researchers reported that bundled payments had no effect on overall costs of care (Finkelstein et al., 2018)³.

Oncology

In a study of two for-profit providers in Arizona and Florida, researchers reported that external-beam radiation therapy bundled payments were associated with enhanced guideline adherence among patients with prostate cancer and bone metastases, but not among patients with skin, lung, or breast cancers (Aviki et al., 2018)⁷. In a separate study using data from a commercial payer, researchers reported that bundled payments for

breast, colon, and lung cancers were associated with a 34% reduction of total medical costs driven by decreases in hospitalization and use of therapeutic radiology (Newcomer et al., 2014)¹⁴.

Chronic Obstructive Pulmonary Disease

Researchers compared 78 patients receiving care under a Medicare bundled payment program to 109 control patients and determined that the payment model was not associated with overall costs or hospital readmission rates. However, those under bundled payments received more regular follow-up phone calls, home health care, pulmonary rehabilitation, and durable medical equipment (Bhatt et al., 2017)⁹. This study suggests that despite no impact on costs, patients in the bundled payment group benefited from additional coordinated services.

Dermatology

Using US commercial claims data from 2010 to 2012, researchers conducted a nationally representative examination of the effect of bundled payment models on the cost of actinic keratosis management, i.e. care for rough, scaly skin patches that can eventually become skin cancer (Kirby et al., 2016)⁶. The researchers explored eight theoretical bundled payments and found that costs for actinic keratosis under the bundled models were equal to or in excess of actual costs. Cost savings were not realized under any of the bundled payments models.

Spine

In a systematic review of spinal surgery bundled payments, a wide range of reimbursement was noted from \$11,880 to \$107,642 (Dietz et al., 2019)⁷. This range was largely due to divergent complications, malignancies, and the number of levels fused in spine surgery. The authors emphasized that unlike other kinds of surgeries (e.g. total joint arthroplasties and cardiovascular procedures), cost savings were not realized under bundled payments for spine surgery. A study published in 2016 found that increasing disease severity and procedural complexity were associated with higher cost variation, making the bundled payment strategy for spinal surgery a risky proposition for providers unless patients are clustered into more harmonized groups of potential resource use (Wright et al., 2016)¹⁴.

Previous research has noted that post-acute care

expenditures for single-level lumbar discectomy/decompression account for a smaller proportion of bundled payments for than for total joint arthroplasty or hip fracture repairs (Jain et al., 2018)⁶. This finding indicates that in order to realize cost savings in bundled payments for spinal procedures, a more robust focus should be placed on care that occurs after spinal surgery discharge.

The Effect of Institutional Partnerships on Bundled Payments

Skilled Nursing Facilities (SNFs)

The extent to which institutional partnerships between hospitals and SNFs lower 90-day post-discharge costs under bundled payments was explored using 615 elective, primary hip and knee arthroplasty subjects discharged to non-partners, agreement-based partners, and institution-owned partners (Behery et al., 2018)⁶. The researchers found that total 90-day costs and total SNF costs were lowest in institution-owned SNFs. Patients treated in institution-owned SNFs had the shortest length of stay without increased risk of readmissions.

Drawbacks

Drawbacks of bundled payments, as described in the literature, include the potential for already efficient facilities, including high-volume hospitals, to be inadvertently penalized despite their improved cost performance because payment rates are determined based on historic reimbursement amounts per episode of care (McAsey et al., 2019)⁹. Some high-volume (and presumably more efficient) hospitals have opted to withdraw from the voluntary Medicare bundled payment initiative after experience in the program.

Commentators have noted a concern that bundled payments require that clinicians receive education regarding how to practice when their organization is at risk financially for clinical decisions. This extra time and effort could inadvertently stifle innovation by taking the focus away from quality improvement (Bronson et al., 2019).

There is concern that bundled payments may incentivize patient discrimination (Glickman et al., 2018) because providers may be interested in improving their performance measures by avoiding high-risk patients. This risk selection could substantially reduce access to care based on sociodemographic and demographic factors.

Many conditions may not lend themselves to bundled payments because of the wide variability in patient profiles receiving care. One study examined the viability of bundled payments with respect to costs associated with trauma care (Kerwin et al., 2018)¹⁹. Data from a single Level 1 Trauma Center in Florida over a two-year period was used to conduct the study. The authors posited that injuries were too inconsistent and disparate to be predictably bundled in an alternative payment model. They noted that among the 5,813 patients treated for traumatic injuries during the study period, 858 distinct injury profiles were generated, indicating high variation in injury profiles. This high level of variation renders bundled payments for trauma care significantly challenging and perhaps unrealistic.

What role do bundled payments have in quality improvement and/or improvements of health status?

Main Outcomes Associated with Coordination of Care

Readmission

Several studies have examined the extent to which readmissions are associated with bundled payments. Many found no difference in 30- or 90-day readmission rates under a bundled payment system (Bhatt et al., 2017; Bronson et al., 2019; Dummit et al., 2016; Jubelt et al., 2017; Murphy et al., 2019; Lott et al., 2019)^{9,6,4,4,6,9}. A few studies have found a reduction (e.g., improvements) in readmission rates under bundled payments (Navathe et al., 2017; Kee et al., 2017; McAsey et al., 2019; Gray et al., 2019; Alfonso et al., 2017)^{6,6,9,14,19}.

Mortality

Researchers have largely found that bundled payments are not correlated with mortality. National studies of Medicare spending found that no significant changes in 30- or 90-day mortality were detected (Haas et al., 2019; Dummit et al., 2016; Chen et al., 2018; Joynt Maddox et al., 2018)^{all 4}. In the aforementioned study exploring the differences between physician group practice and hospital-initiated bundled payments, no changes in mortality were found in either group (Murphy et al., 2019)⁶. The same was true in a study that explored bundled payments at one urban academic hospital in Pennsylvania (Fang et al., 2018)⁶.

Length of Stay

Several studies have examined how bundled payments are associated with length of stay. At one hospital participating in a bundled payment initiative, prolonged length of stay decreased by 67% (Navathe et al., 2017)⁶ and in another study, the bundled group had a shorter than average length of stay than the non-bundled group (4.02 days versus 5.27 days) (Courtney et al., 2016)⁹. However, in two additional studies at single medical institutions, no changes in length of stay were found due to bundled payments (Jubelt et al., 2017; Kee et al., 2017)^{4,6}. Similarly, no changes in length of stay were shown in nationally representative studies (Haas et al., 2019; Joynt Maddox et al., 2019)^{all 4}.

Emergency Department Visits

One study found that emergency department (ED) visits declined under bundled payments, though this decline was not statistically significant (Navathe et al., 2017)⁶. Notably, this study was specific to one health system. In a nationally representative study, no significant changes in ED visits were noted following bundled payments for lower extremity joint replacement episodes and for several chronic conditions (Dummit et al., 2016)⁴. Similar findings were noted by another group of researchers using data from 492 hospitals in the US (Joynt Maddox et al., 2018)⁴. The researchers reported no statistically significant difference in ED visits for a wide range of diseases between hospitals with bundled payments and a control group.

General Health Outcomes

While the literature on the effects of bundled payments has largely centered on cost savings, some studies have explored general health outcomes under bundled payments such as comorbidities, complications, and the use of preventive measures. Using data from all states except Maryland, researchers found that there were no changes in comorbidities for patients covered under bundled payments (Murphy et al., 2019)⁶. With respect to post-surgical complications, researchers also noted no significant differences for patients covered under bundled payments (Barnett et al., 2019)⁴. However, one study that examined outcomes among patients with chronic obstructive pulmonary disease found that patients whose care was covered by bundled payments were more likely to receive coordinated care, i.e.

pneumococcal and influenza vaccines, regular follow-up calls, home health care, durable medical equipment, pulmonary rehabilitation, and to attend a pulmonary clinic (Bhatt et al., 2017)⁹.

Summary of the Evidence on the Effectiveness of Bundled Payments

There is **convincing** evidence that bundled payments can reduce overall costs without adversely – and frequently improving – quality of care. There is also some evidence that bundled payments improve the coordination of care.

There is **convincing** or **promising** evidence that bundled payments reduce costs from hip and knee replacements as well as cancer care. Bundled payments have **convincingly** reduced hospital readmissions and length of hospital stays with **convincing** or **promising** evidence of no undesirable effects on mortality, emergency visits, or overall health status. Based on **promising** evidence, bundled payments were also associated with improved quality in some cancer care including for prostate and bone malignancies. However, **promising** evidence suggests bundled payments are not effective in reducing costs in dermatological or spine care.

The literature contains **promising** evidence that bundled payments improve coordination of care in chronic obstructive pulmonary disease and in transitioning patients to skilled nursing facilities, especially when formal relationships between institutions exist. There is also **correlational** evidence of improvements in orthopedic care coordination.

Some drawbacks to bundled payments include the: (1) potential to penalize already efficient facilities; (2) need to educate physicians and align their incentives with that of their institutions; (3) potential to inadvertently incentivize the avoidance of sicker patients when adequate risk-adjustment is not used; and (4) caution needed before applying this payment model to diseases or conditions to which they are not amenable.

ALL-PAYER RATE SETTING (CAPS ON PRICES)

Why is all-payer rate setting believed to affect costs or population health?

Under fee-for-service reimbursement models, the overall cost of care paid by insurers is a function of the prices paid and the quantity of services consumed by patients. One approach to address the cost of care is to focus on setting a cap on prices paid by all payers. Competition among commercial payers and/or providers within markets affect the negotiated prices agreed upon by payers and providers. In markets with fewer competing payers where one payer is a dominating entity (e.g., higher payer concentration), payers are able to negotiate lower prices with providers (Cooper et al., 2019). Likewise, in markets with few or no meaningful competitors among providers (e.g., higher provider concentration), providers are able to negotiate higher prices for services from payers (Cooper et al., 2019).

Setting a price cap on services that providers can charge and [commercial] payers can pay, stems from the belief there is a need to address market failures that have resulted in increased cost of care. A prominent approach to implementing price caps is known as “all-payer rate setting” whereby all insurers jointly negotiate with all providers to set one specific price for each procedure. This approach can reduce costs in two ways: (1) lowering administrative overhead by eliminating billing/coding specialists and rate negotiators, and (2) by equalizing the bargaining power of providers and payers.

Several countries utilize all-payer rate setting approaches. Japan and the Netherlands have used a unilateral administrative approach where the government sets prices for all health services via a universal fee schedule (Flanagan, 2017). Japan has reported positive impacts on cost control (Ikegami & Anderson, 2012)¹³; and the Netherlands has moved away from an all-payer rate setting approach (Halbersma et al., 2011). Germany and Switzerland, on the other hand, utilize a less unilateral approach by allowing associations of insurers and associations of providers to negotiate prices either for the country at large or for large regions of the country.

In the US, the state of Maryland is the only remaining state that uses a full all-payer rate setting approach. As many as 30 states have previously experimented with some aspects of this approach but discontinued doing so due to the growth of managed care capitation and/or regulatory failures (McDonough, 1997). Recently, several states have considered or have implemented modified or limited versions of price caps. Rhode Island limited future hospital price increases to the Consumer Price Index growth rate; and Montana implemented price caps for those insured via the state’s public employee health program (Appleby, 2018). We were unable to find formal evaluations of these programs; however, experts have noted that these policies have frequently resulted in vigorous legislative and media responses (Koller & Khullar, 2019).

Maryland began regulating hospital rates in the early 1970s at the request of the state’s hospital association as a means of addressing a growth in uncompensated care (Murray, 2009). While Maryland’s approach has evolved over time, the main feature of their program involves a commission led by volunteer gubernatorial appointees, the majority of which cannot be affiliated with health care providers. The commission reviews audited data on costs, patient volumes, and the financial conditions of hospitals before setting risk-adjusted, service-specific rates for all inpatient, hospital outpatient, and emergency services in hospitals operating in Maryland (Murray, 2009). The commission has also obtained a waiver from the federal government to require that state Medicare and Medicaid payments abide by the prices set by the commission. Medicare, therefore, pays higher prices in Maryland than in other states (Pauly & Town, 2012). All insurers in Maryland pay the same risk-adjusted prices for a given service at any hospital within the state (CMS, 2019) with the caveat that safety net providers receive slightly increased payments (Kastor & Adashi, 2011). The commission has strived to reduce costs without capping hospital profits and has worked with industry to use incentives for hospitals to improve efficiency and quality so that innovation can result in financial rewards (Murray, 2009).

What are the benefits and/or drawbacks associated with all-payer rate setting?

We will focus on the evidence regarding the benefits and drawbacks of all-payer rate setting in the US (as opposed to internationally). Given the historic utilization of all-payer rate setting across multiple states, there is data from the 1970s and 1980s regarding the impact of this approach. Studying the early effects of all-payer rate setting in six states including Connecticut, Maryland, Massachusetts, New Jersey, New York, and Washington, researchers found evidence that this approach was associated with significant reductions (-15.9%) in per capita hospital expenditures (Lanning et al., 1991)^{1,3}. However, the authors raised the possibility that this savings came as a result of lower quality of care. Using data from 45 states, researchers found that higher stringency in approaches to state-level hospital rate setting was associated with an increase in inpatient mortality (Shortell & Hughes, 1988)¹⁴. An additional study found that rate-setting was associated with an increase in mortality, but this increase was not correlated with the magnitude of cost savings achieved by states (Gaumer et al., 1989)¹. The authors expressed concerns to policymakers that rate setting might affect quality of patient care in ways not fully understood.

In Maryland, commentators frequently describe how health care spending slowed following the decision to rate set hospitals. Multiple authors cite that in 1976, the adjusted cost per admission in Maryland hospitals was 26% higher than the national average; but since then, Maryland hospitals were observed to have the lowest cumulative increase in cost per adjusted admission when compared to their counterparts in all states (Kastor & Adashi, 2011; Murray, 2009)^{all 6}. This trend might have been subject to “regression to the mean” (Pauly & Town, 2012) which describes the statistical tendency for extreme measures to become more average over time. Researchers have pointed out that despite decreases in hospital costs per inpatient stay, Maryland had higher overall per capita hospital costs and higher total personal health spending than other states. This can be attributed to higher observed inpatient volume and no caps on physician services. (Pauly & Town, 2012).

In 2014 Maryland applied for a new waiver from the Centers for Medicare and Medicaid Services (CMS) to convert to an all-payer global budget in an effort to limit the overall per capita hospital cost growth rate and Medicare per capita hospital costs (CMS, 2019). Under the new waiver, Maryland must limit per capita hospital cost growth for both Medicare and all payers and generate \$330 million in Medicare savings over five years—or risk being forced to transition to back to national Medicare rates (CMS, 2019). The most recent available evaluation of Maryland’s new waiver focuses on year three (2017), newer data was not available as of November 2019. The third-year Maryland waiver evaluation found (Haber et al., 2018)⁴ that compared to a control group, Maryland’s all-payer global budget model reduced hospital and overall expenditures for Medicare beneficiaries but not for commercial patients, which includes the following:

- Reduced hospital outpatient expenditures drove the Medicare hospital cost savings.
- Inpatient admissions were reduced, but without savings, for both Medicare and commercial patients. Hospitals might have reduced inpatient admissions in part by reducing avoidable utilization, but the evidence was mixed and inconclusive.
- Coordination between hospitals and community providers was not improved in Maryland and got slightly worse for Medicare patients, but not for commercial ones.
- Patient satisfaction in Maryland was rated lower than comparison hospitals but the new all-payer model did not affect patient experiences.

Intangible benefits, based on the Maryland experience, include favorable support from hospitals and payers (Kastor & Adashi, 2011). It was reported that hospitals favor the transparency and equity in the rate-setting process, the improved reimbursement rates from public payers (Medicare pays higher rates in Maryland due to the waiver), and the lack of needing to onerously negotiate periodically with every payer. Payers favor parity in how hospitals rates are established and the assurance that cost shifting is eliminated. Cost shifting occurs when providers charge private payers greater prices to make up for insufficient payments from public payers.

Commentators also noted that Maryland's relatively small size (only 46 acute care hospitals) and politically liberal leanings were important factors that have contributed to the state's experience (Kastor & Adashi, 2011).

Several commentators noted additional drawbacks associated with all-payer rate setting. Theoretically, such an approach could reduce provider motivation to innovate because improvement in quality do not allow the provider to negotiate for higher payments (Pauly & Town, 2012). The two studies mentioned reported increases in inpatient mortality might serve as indirect evidence of this point (Shortell & Hughes, 1988; Gaumer et al., 1989)^{14,1}.

What role does all-payer rate setting have in quality improvement and/or improvements of health status?

No study has examined the effect of all-payer rate setting on population health status. Early researchers linked all-payer rate setting in the 1970s and 1980s with higher inpatient mortality.

Summary of the evidence on the effectiveness of all-payer rate setting

From the early time period of the 1970s and 1980s, there is **convincing** evidence that all-payer rate setting resulted in lower hospitals costs. However, there were concerns raised, based on some **convincing** and **correlational** evidence, that quality care (measured as mortality) worsened after all-payer rate setting was implemented in some states.

The most contemporary evidence from the US comes from the experience in Maryland. **Promising** evidence suggests that costs per inpatient hospitalization in Maryland grew at a slower rate than other states following implementation of all-payer rate setting. Because

Maryland started with very high relative costs, experts noted that this trend might have been due to expected regression to the mean. Irrespective of this criticism, hospital volume in Maryland increased at the same time period which ultimately undermined the ability to keep overall hospitals costs down. Maryland eventually received CMS approval to evolve their approach to an all-payer global budget system. To date, the third year evaluation of this waiver (the most recent available), based upon **convincing** data, reported mixed overall findings with more benefits and savings to Medicare than to commercial payers and their patients. According to the third year evaluation, hospitals were able to maintain their positive operating margins likely due to receiving more generous Medicare payments than other states given the CMS waiver that is in place (Haber, 2018).

The Maryland experience has been characterized as having strong stakeholder support but described as “a difficult-to-replicate anomaly rather than a model that can be readily adopted by other states” (Pauly & Town, 2012). Maryland did not engage in rate setting for physician services nor other medical products and services—potentially weakening the impact on cost containment. As noted by experts discussing the requirements for successful all-payer rate setting, unless the political environment can be assured to put into place a regulatory structure that can make evidence-based decisions based on accurate data and free from political and financial pressures, the all-payer rate setting approach is unlikely to yield the desired benefits (Pauly & Town, 2012).

COST SHIFTING

Why is cost shifting believed to be related to prices or population health?

Cost shifting is the idea that hospitals and/or physicians must charge private insurers higher prices to either (1) offset shortcomings in payments from governmental payers and/or (2) offset their expenses stemming from providing uncompensated care (Frakt, 2011; Kirby & Cohen, 2018). The cost shifting model assumes a “dollar for dollar” approach such that a one dollar lost in governmental reimbursements will result in a one dollar increase in prices charged to private insured patients. Policymakers and industry experts have been concerned about the implications of cost shifting for several decades (Frakt, 2011). Importantly, concerns about cost shifting intensified following permanent reductions in Medicare payments as part of the shift to value-based care (Frakt, 2014). Industry experts argued that cuts in Medicare payments would result in increased premiums for privately insured individuals due to the need among hospitals and physicians to cost shift their anticipated losses in revenue.

What are the benefits and/or drawbacks associated with cost shifting?

Most of the literature examining cost shifting separately studies hospitals or physicians. As such, we summarize the evidence for hospitals followed by physicians.

Cost shifting by hospitals

Research has shown that hospitals have used cost shifting in the past. For example, a national analysis found that cost shifting occurred in the 1980s when hospitals offset reduced Medicare payments by increasing prices to private insurers on a dollar for dollar basis (Cutler, 1998). Nevertheless, a 2011 systematic review of the literature reported that cost shifting is a far less pervasive and less prominent phenomenon in recent years compared to the 1980s. The systematic review concluded that if cost shifting currently occurs at all, it happens at a relatively low rate (Frakt, 2011)¹.

Studies conducted after the systematic review also found no evidence of cost shifting (Dranove et al., 2013; McClintock et al., 2019). Specifically, hospitals across the country did not engage in cost shifting in response to

the sharp reductions in their endowment revenue due to the 2008 stock market collapse (Dranove et al., 2013)⁴. Importantly, a subset of high-quality hospitals (<10% of all patients in the sample) did raise private payer prices, likely by leveraging their untapped market power (Dranove et al., 2015). Similarly, safety-net hospitals, despite potentially serving more poorly reimbursed Medicaid patients, did not increase charges to private payers for eight urologic surgery procedures following Medicaid expansion under the Affordable Care Act (McClintock et al., 2019)⁴. As an exception, one study using data from three large health insurance firms found that underperforming hospitals (based on the ACA's pay-for-performance metrics) passed nearly 70% of their pay-for-performance penalties onto private payers (Darden et al., 2018)⁴.

Contrary to the cost shifting theory, recent evidence has shown that reductions in Medicare payments have led to lower private prices. Researchers believed that hospitals likely had to lower private prices (but still keep them above the Medicare rates) in response to government cuts in order to attract more lucrative privately insured patients. For example, in a national analysis of private claims data and Medicare hospital cost reports (1995-2009), researchers reported that Medicare payment cuts were associated with reductions (-3 to -8%) in private insurance payment rates (White, 2013)³. Similarly, an analysis of hospital outpatient surgical procedures in Florida from 1997-2008 found that Medicare cuts were associated with an increase in volume of privately insured patients (He & Mellor, 2012)⁴. Moreover, a national analysis of hospitals using data from 1996-2009 found that a \$1 reduction in Medicare inpatient revenue was associated with an even more significant reduction (\$1.55) in total hospital revenue; but nearly all the reductions in total revenue were offset by lower operating expenses (White, 2013)³.

Less conclusive evidence exists on whether hospitals cost shift to offset losses from uncompensated care. Researchers hypothesized that if hospitals pass along losses from providing uncompensated care to private insurers, they should not see a difference in their profit margins when faced with an increase in uncompensated

care. Nevertheless, a national analysis (1984-2011) found that increases in the uninsured population lead to a decline in hospital patient-care profit margins (Dranove et al., 2015)¹⁴. The authors of this study concluded that if hospitals cost shift at all, they cannot pass all uncompensated care expenses onto private payers. On the other hand, patients with private insurance living in a county with a high percentage of uninsured residents are likely to have more expensive emergency department visits (mean +\$20), suggesting that some of the costs are passed onto private payers (Kirby & Cohen, 2018)¹⁸.

Cost shifting by physicians

A handful of studies examined whether physicians cost shift to offset reductions in payments from governmental programs and have generally concluded that they do not. Instead, researchers found evidence that physicians increased the volume of services provided for both Medicare and privately insured patients to recoup losses stemming from reduced governmental reimbursements (Nguyen & Derrick, 1997; Rice et al., 1996; Yip, 1998)^{3,6,4}. Furthermore, similarly to the evidence from the hospital literature, researchers have observed that reductions in Medicare payments led to lower physician payments from private insurers (Clemens & Gottlieb, 2013)³. However, the relationship between Medicare prices and private prices was weaker in highly concentrated markets.

Cost shifting and quality

Overall, there is a dearth of evidence on the effects of cost shifting on quality of care or population health. Nevertheless, studies have shown that quality of hospital care worsens following reductions in governmental reimbursements. For instance, hospitals that experienced large endowment losses in the 2008 recession did not cost shift but instead delayed purchasing health information technology and unprofitable services including trauma care, emergency psychiatric care, and substance use treatment (Dranove et al., 2013)⁴. Furthermore, 30-day mortality rates for surgical patients who developed complications increased more rapidly at hospitals more affected by the Balanced Budget Amendment (BBA) cuts of 2002 (Seshamani et al., 2006)¹⁶. Similarly, hospitals affected by the cuts following the BBA experiencing worsened outcomes for cardiac patients (Lindrooth et al., 2013; Wu & Shen, 2014)^{4,3}. Researchers ultimately concluded that hospitals

reduced staffing levels and operating costs in response to BBA cuts, which likely led to lower quality of care (Wu & Shen, 2014)^{3,4}.

Experts who have discussed cost shifting in the literature have pointed out several alternative explanations regarding changes in hospital and physician prices (Frakt, 2014; Reinhardt, 2011) including:

1. Providers (hospitals; physicians) can raise prices for private payers due to their market power. Once providers exhaust their market power, they no longer able to shift costs; thus, they have to cut costs.
2. Provider costs may be influenced by a host of other factors including the medical arms race which is characterized as competing for patients and physicians by offering more technological advanced (and thus expensive) treatments.
3. In recent time periods, insurers likely possess market power that offsets any pressures that hospitals might exploit to raise prices.

What role does cost shifting have in quality improvement and/or improvements of health status?

Researchers ultimately believe that if cost shifting is occurring, at all, it is likely occurring at minimal rates. Nevertheless, there is no direct evidence on how cost shifting may affect quality of care and/or population health measures. Nevertheless, as mentioned above, researchers have reported that quality of care worsens following public payer cuts to reimbursement.

Summary of the evidence on the effectiveness of cost shifting

Convincing evidence suggests that cost shifting is unlikely to play a large role in prices or quality; and that market forces including provider and payer concentration appear to be more prominent determinants of prices. In addition, **promising** evidence suggests that rather than cost shift, hospitals affected by reductions in governmental payments may delay technology purchases, prune unprofitable services, and/or reduce the quality of care provided.

REFERENCE-BASED PRICING

Why is reference-based pricing believed to affect costs or population health?

Reference-based pricing (RBP), also known as reference-based benefit, is a coverage design in which the employer or insurer pays a defined cost of a particular service charged by the provider, with the patient being required to pay the remainder (Robinson & MacPherson, 2012). It is an alternative cost sharing structure that encourages patients to be more aware of price differences across service providers. The patient can use any provider but has the burden of paying the full difference between the allowable charges of high-cost providers and the reference price limit. The employer or insurer has the responsibility of making sure there are sufficient number of providers available with prices below the limit, but also low enough to restrict reimbursement to high-cost providers. RBP is best used for services that has substantial price variability within the market, but very little variability in quality such as laboratory tests, scheduled outpatient surgery, diagnostic radiology procedures, etc. (Robinson & MacPherson, 2012). RBP requires that price information is available to patients to help support their decision-making and to encourage the use of lower-cost providers (Robinson, 2013). Reference based pricing can be a strong incentive because it assigns to the patient 100% of the extra provider fee to be paid, rather than conventional sharing structures (Robinson, 2012).

RBP has had only limited presence in the U.S. health insurance market, which still relies largely on deductibles, copayments, and coinsurance as patient incentives. The contemporary leaders in RBP are large, self-insured employers that are exempt from many state and federal insurance regulations (Robinson, 2013). While more employers are becoming aware of RBP, use of the benefit design has been limited. A 2019 survey of more than 1,300 US employers found that 2 percent of respondents currently use RBP for targeted care services. Outside of the US, RBP has been conceptualized differently and used most commonly in Europe for pharmaceuticals, with insurers grouping drugs into therapeutic classes and limiting payment to the average or lowest price in the class (Robinson, 2013).

What are the benefits and/or drawbacks associated with reference-based pricing?

In the US, the California Public Employees' Retirement System (CalPERS) began using RBP for hip and knee replacements in 2011 and now use it for 12 inpatient procedures. Similarly, the Safeway grocery store chain incorporated RBP for colonoscopies, as well as tests and imaging that include 492 procedures and services (Robinson et al, 2012, 2013, 2016). These tests and procedures are all commonly occurring non-emergency services with wide variation in prices thus making them shoppable by patients.

Lowering overall cost

After CalPERS implemented RBP for hip and knee replacement, arthroscopic surgery, and cataract surgery among the 450,000 members enrolled in their insurance plan, researchers reported that members increased the use of lower priced hospitals (21.2%)⁴. This change in member choices generated significant savings with no impact on quality of care; and some evidence that high priced facilities and providers lowered their prices. After 2 years, CalPERS saved \$6.4 million in total costs from these surgeries (BCHT, 2019)⁴. Analysis of CalPERS claims data for patients undergoing colonoscopy found that the RBP plan was associated with reduced spending (–21%) and no change in quality of care as measured by serious gastrointestinal, cardiovascular, or other complications. The utilization of low-priced facilities by CalPERS members increased by 17.6 percentage points (Robinson et al., 2015)⁴.

RBP and price information

Price data and actionable information for consumers are key to the RBP approach. When combining price information and RBP, researchers determined that Safeway was able to shift individuals' choice of facility, resulting in a reduction in the average price paid per laboratory tests (–27%) and in price paid per imaging test (–13%) (Whaley et al., 2019).

Drug Selection

As previously mentioned, RBP has been used in

Europe to control drug costs, resulting in a reduction in drug prices (–11.5%) as well as a decrease in insurer expenditures (–14%) (Robinson et al., 2015). In the US, drug spending has increased in recent years, with new and well-established drug costs both increasing (Wineinger et al., 2019). Thus, there is an increasing potential for competition and cost reduction if patients could be incentivized to make selections based on price. The RETA Trust, a national association of 55 Catholic organizations that purchases health care for clergy, school teachers, and other religious employees implemented the use of RBP with drug prices. Researchers reported that RBP was associated with a greater use of the lowest-priced drugs within therapeutic classes (+7%), a lower average price paid per prescriptions (–13.9%) and a higher rate of copayment by patients (+5.2%) (Robinson, 2017)⁴.

Drawbacks

RBP has limited potential to reduce overall cost growth in health care because it is only applicable to products and procedures that can be easily priced and compared. Thus, many medical procedures are not amenable to the RBP approach. For example, it is not easily applicable to emergency procedures, chronic conditions including diabetes which require many different services, or to procedures where there is a large and unmeasured variation in case-mix severity (Robinson et al., 2015). In addition, RBP requires extensive communication with enrollees about the financial advantages of using preferred providers. Communication is essential for RBP because consumers must understand that if they use high-priced facilities, they cannot expect reimbursement for the amount over the reference price limit (Robinson & MacPherson, 2012).

Furthermore, RBP works best for services that have a wide variation in prices but only small differences in quality. Otherwise, patients may become concerned that low price signals low quality despite evidence to contrary (Hussey et al., 2013).

What role does reference based pricing have in quality improvement and/or improvements of health status?

Studies on the impact of RBP have focused on utilization and costs and not necessarily quality of care. While some evidence suggests that RBP did not affect the quality of care (Robinson & MacPherson, 2012; Robinson 2013, 2016), there is no consistent relationship between price and quality across providers of similar health care services.

Reference pricing is designed to direct patients to lower-priced providers, but it does not address whether the treatment in question is appropriate or necessary.

Summary of the evidence on the effectiveness of reference-based pricing

Convincing evidence has linked RBP to significant cost savings on non-emergency procedures in California's public employee retirement system. Similarly, **convincing** evidence from a commercial employer that implemented RBP has shown a reduction in average prices paid for laboratory tests. Lastly, **convincing** evidence from a religious-based nonprofit trust suggests that RBP is associated with a greater use of lowest priced drugs within multiple therapeutic classes, a lower average price paid per prescription, and a higher rate of copayments by patients. Importantly, RBP requires that patients have access to price information and that a sufficient number of providers are available especially below the reference price set for a given procedure, service, or product.

POLICIES AIMED AT INCREASING MARKET COMPETITION

Why are policies aimed at increasing market competition believed to affect prices or population health?

Competition among health care providers and/or among health insurers has the potential to play a key role in cost containment and quality improvement. Competition is believed to spur innovation as organizations strive to attract customers. Such innovation could be in the form of efficiencies that result in lower prices or improvements in effectiveness including higher quality of care (Gaynor et al., 2015). Over the past decade, competition in US health care markets has decreased (Fulton, 2017) as new reimbursement models have encouraged the formation of integrated delivery systems. Between 2010 and 2016, hospital and physician practices have vertically integrated resulting in fewer organizations and less provider competition overall. Despite the efforts of the Affordable Care Act to spur competition among insurers, various factors, including mergers, have led to less competition among payers in many markets (Adrian, 2019; Schoen & Collins, 2017; Nakagawa et al., 2018).

Policymakers have experimented with influencing competition by either encouraging new market entrants and/or reducing barriers to market entry in the provider and payer markets. Policymakers can relax or repeal previous policies that were purposefully established to restrict market entry, such as Certificate of Need (CON) laws. CON laws are state-level policies enacted in response to a 1974 federal mandate that all states have an approval process for the building of a new hospital or nursing home or the purchase of a high-cost medical device. CON laws originally assumed that the overbuilding of health care facilities or the high acquisition of expensive technology would cause increases in health care costs. Existing CON laws typically restrict the number of acute-care hospitals or long-term care nursing home beds within a market by giving state agencies regulatory oversight over these markets. Although the mandate was repealed in 1987, 35 states currently maintain some form of CON laws, many of which are specific to outpatient and long-term care facilities and/or acute cardiac care (NCSL, 2019; Ho & Ku-Goto, 2013). Indiana repealed the CON law affecting acute care hospitals in the 1990s (Russel, 2018). However, effective

July 2019, Indiana established a three-year moratorium on skilled nursing facilities via a new CON law restricting the construction of new skilled nursing facilities or the addition of beds to an existing facility (IHCA INCAL, 2018).

Because dominating providers or payers in each market have the leverage to negotiate higher or lower prices, it can be challenging for new competitors to establish themselves. An additional strategy to enhance competition is more strictly enforcing existing federal anti-trust laws. Anti-trust laws attempt to limit monopolies that may reduce competition within markets. This includes prohibiting mergers that create a new dominating entity. As an alternative to stricter federal antitrust enforcement, Certificate of Public Advantage (COPA) laws allow a state to approve and provide governmental oversight and supervision for a health care merger. In these instances, state supervision assures that predetermined societal benefits (e.g., lower prices or keeping a rural hospital open that would otherwise need to close) are realized following a merger that creates a dominating market entity. COPA laws have passed in five states, although one of these laws was repealed in 2015 (Delbanco & Bazzaz, 2014; Berenson, 2015; Brown, 2019; Brown, 2018).

A third approach to increase competition includes policies that reduce anticompetitive behaviors, including restrictions on most-favored nation (MFN) clauses or policies that increase price transparency or ban gag clauses in contracts between payers and providers. In MFN agreements, a health care provider agrees that a given payer will receive their services at lower prices than any other insurer. This effectively assures that the 'favored' payer receives the best negotiated arrangement. Offering a lower price to another insurer would require the provider to honor the same price to the favored payer with the MFN agreement. These agreements ultimately discourage competition in an insurance market and as a result, may be associated with increased costs. Statutes and regulations that specifically increase greater cost and quality transparency also have the potential to influence competition. In theory, as prices are made available and can be used to inform patient selection of low-cost providers, competition over prices could increase and encourage high-cost providers to lower their costs in order to compete for patients in their market.

Lastly, gag clauses, which will not be further discussed due to a lack of studies on the topic, are binding contractual agreements that do not allow parties to discuss or make public the terms of their price negotiations. These clauses assure that the degree to which dominating market players can negotiate favorable rates is kept secret from competitors, regulators, and others (Bonchek, 2019).

What are the benefits and/or drawbacks associated with policies aimed at increasing market competition?

Certificate of Need Laws

Recent studies examining CON laws have primarily focused on home health care and nursing homes because many existing CON laws apply to these settings. Some studies have also examined the impact of CON laws on acute cardiac care and/or have studied the impact of CON deregulation on these types of services.

Evidence indicates that CON laws were generally successful in limiting new entrants to markets in the home health industry (Wu et al., 2018)⁴ without affecting hospitalization rates or overall Medicare expenditures (Polsky et al., 2014)⁹. CON laws also limit the number and growth of beds in nursing homes (Harrington et al., 1997; Swan & Harrington, 1990)^{3,12}. A 2009 study of CON laws pertaining to acute cardiac care found that when these laws were removed, states experienced an increase in the number of hospitals that offer coronary artery bypass graft (CABG) surgery (+15.2% increase) and percutaneous coronary interventions (PCI) (+12.1%) (Ho et al., 2009)⁴. Researchers also reported that following CON removal, costs per patient for CABG dropped but did not change for PCI (Ho & Ku-Goto, 2013)⁵. CON law removal had no effect on quality of care despite lower volumes for some providers due to increased competition (Ho et al., 2009)⁴.

A drawback associated with CON laws includes limited competition in home health markets which was associated with poorer quality on measures of emergency visits and hospitalization rates (Wu et al., 2018)⁴. While costs in the nursing home market have universally been increasing over time, evidence indicates that costs increased faster for nursing homes in states with CON laws compared to those without (Rahman et al., 2016)⁵.

Anti-Trust/COPA Laws

In the 1980s and '90s, state and federal anti-trust enforcers successfully blocked mergers that would have reduced competition in the hospital market (Greaney, 2017). Their efforts were based on growing evidence that competition was declining. Following this period, seven anti-trust cases failed to block mergers resulting in a multiyear period where no anti-trust cases were even attempted. This influenced a belief that anti-trust enforcement was not actively pursued in the health care market. Since a 2002 Federal Trade Commission report, several hospital and physician mergers have been blocked in federal court. Despite the growing enforcement of anti-trust laws, a 2013 longitudinal analysis of hospital markets found that since the 1980s, hospital market competition has continued to decline. In the '80s, the average hospital market had approximately five equal-sized health systems competing. By the early 2000s, the average market had three equal-sized health systems (Cutler & Morton, 2013). Since the Affordable Care Act (ACA), the pace of consolidation has quickened alongside efforts to reform payment. One report suggests that hospital mergers increased by 25% in the two years post-ACA (Monroe, 2013). Although federal anti-trust enforcement seems to be gaining new momentum, even when anti-trust laws are enforced, they generally limit provider consolidation within health care markets, but have no effect over the concentration that already exists. The courts have been challenged by their inability to untangle the complex relationships among employers, insurers, and consumers to determine whom to allocate damages even when provider consolidation has been deemed anti-competitive (Frakt, 2010)

COPA laws allow for mergers to proceed conditional on regulatory oversight provided by state government to assure that predetermined societal benefits are realized. Researchers suggest that COPA laws allow states to mitigate hospital closures and improve population health, particularly in rural areas (Brown, 2018)¹⁹. Researchers note that in North Carolina where controversy arose about the effectiveness of a COPA law, no party was able to produce evidence regarding the impact on hospital prices, overall health care costs, or quality of care (Berenson, 2015)¹⁹. COPA laws represent a long-term resource and time-consuming commitment of public oversight of markets which can be costly for states (Brown, 2018; Berenson, 2015)^{all 19}.

Policies That Reduce Anti-Competitive Behavior

As of 2014, 18 states had attempted to limit the influence of payers by banning MFN contracting clauses (Delbanco & Bazzaz, 2014). In a review of adjudicated court cases that involved MFN contracting, researchers indicate that policies that allow for MFN clauses in health care are associated with reduced choice among providers, increased consumer costs, and reductions in access to care (Wright, 2003)¹⁹. Indiana banned MFN clauses in 2007, but research has documented that some stakeholders believe that the concurrent increase in payer concentration in the following time period did not allow for greater competition among insurers (Katz et al., 2011).

As of 2018, more than half of states had policies that require the release of hospital prices or charges, sometimes accompanied by mandates to release quality performance data (Mehrotra et al., 2018)⁸. However, price transparency has not been associated with the level of price shopping or increased competition it was intended to create (Sinaiko & Rosenthal, 2016; Mehrotra et al., 2017)^{all 18}. A number of challenges have been discussed including information barriers, incentive barriers, and loyalty to existing providers (Mehrotra et al., 2018). In states that have not implemented these policies to date, price transparency information may soon be available following a recent federal executive order regarding the public reporting of price and quality information (HHS, 2019). The proposed rule would require health plans to provide consumers real-time access to in-network and out-of-network costs. It would also require hospitals to publicly display prices for consumers. The extent to which the evolving price transparency tools will increase competition remains unknown.

Experts have raised concerns that price transparency could have a negative effect if implemented in a way that does not place the needs of the stakeholder first and releases more data than is helpful (Cutler & Dafny, 2011). Providing potentially irrelevant information could cause confusion among stakeholders. Patients might seek information on their out-of-pocket costs, including copayments which could vary by plan type, especially for those with high-deductible health plans. Providers and payers may be more concerned with negotiated prices for individual procedures within markets. Experts recommend that price transparency information should be presented in a way that minimizes common biases, including the tendency to overweigh the

probability of uncommon but expensive events. For example, they suggest that prices for births with and without stays in the neonatal intensive care unit could be accompanied by the relative probabilities of these events (Cutler & Dafny, 2011).

What role do policies aimed at increasing market competition have in quality improvement and/or improvements of health status?

Policies that restrict competition including CON laws and MFN clauses negatively affect quality of care. Eliminating these policies is associated with improved quality of care.

Summary of the evidence of policies aimed at increasing market competition

Convincing evidence suggests that CON laws reduce competition especially in the nursing home and home health industries. Convincing evidence suggests that CON laws have negative effects on quality in home health and no effects on costs in nursing homes. **Convincing** evidence also suggests that when CON laws pertaining to acute cardiac care are removed, patients have increased access to care potentially at lower per capita costs. Stricter enforcement of state and federal anti-trust laws has generally reduced provider mergers but has not stopped the decline in competition in most US provider markets. The extent to which even stricter enforcement of anti-trust laws would have an effect is unknown.

COPA laws represent an alternative to blocking mergers and can assure short-term benefits. Little to no evidence has examined the impact of COPA on prices, quality, or other patient outcomes. However, such laws require resource intensive commitments from state agencies over long time periods to increase the likelihood that societal benefits are realized.

Correlational evidence suggests that policies that ban MFN clauses improve competition in health care markets; however some stakeholders in Indiana did not believe banning MFN clauses increased competition among payers in the state. More research is needed regarding policies that promote competition and lower prices.

TAXING ACCRUED PROFITS OF NONPROFIT HOSPITALS

Why is taxing accrued profits of nonprofit hospitals believed to affect prices or population health?

Recent attention has been given to the issue of accrued profits among nonprofit hospitals. Accruing profits is perceived to conceptually conflict with the historical purpose of a nonprofit tax status. Organizations that are granted nonprofit tax exemption status under the Internal Revenue Code are generally expected to provide charitable value to society. In the case of hospitals, starting in 1956, as a federal requirement of nonprofit status, nonprofit hospitals had to provide some level of uncompensated “charity” care (IRS, 1969). After the establishment of Medicare and Medicaid, however, the Internal Revenue Service (IRS) replaced the charity care standard with the “community benefit” standard requiring that nonprofit hospitals provide benefits to their communities. Precise definitions and benchmarks for levels of charity care or community benefit were never set and a longstanding debate has questioned whether tax-exempt status is warranted given the estimated \$24.6 billion in annual taxes forgone (Rosenbaum et al., 2015). Researchers that have examined and/or quantified the community benefits provided by nonprofit hospitals generally, but not always, report that the benefits provided justify the tax exemption (Bazzoli et al., 2010; CBO, 2006; Ginn & Moseley, 2006; Ferdinand et al., 2014; Kane & Wubbenhorst, 2000; Nicholson et al., 2000; Herring et al., 2018).

Complicating the ongoing debate about hospital nonprofit status, a 2016 study of hospital profitability among US acute care hospitals found that seven of the ten most profitable hospitals were nonprofits (Bai & Anderson, 2016). Researchers estimated that in 2013, these hospitals each earned more than \$163 million in total profits specifically from patient care services. Recently, a Ball State report concluded that within Indiana, many hospitals have monopoly power and recommended that the state consider taxing nonprofit hospitals’ profits to discourage price increases (Hicks, 2019). The conclusion of this report was criticized (Arwood, 2019; Kacik, 2019, Sentel, 2019) and was ultimately refuted (Wong & Ling, 2019). Nevertheless, we

scoured the literature to better understand the potential evidence on the impact of taxing nonprofit hospital profits. As of the end of 2019, we found no such policies to be present in any place across any state or local community in the US.

What are the benefits and/or drawbacks associated with taxing accrued profits of nonprofit hospitals?

We found no empirical studies that can inform on the potential benefits or drawbacks associated with taxing the accrued profits of nonprofit hospitals. Theoretically, such a tax has the potential to influence the market behavior of hospitals and other stakeholders including by affecting prices and/or quality.

Summary of the evidence regarding taxing the accrued profits of nonprofit hospitals

Both the positive and negative effects of this policy are currently unknown.

PHYSICIAN-FACING PRICE TRANSPARENCY TOOLS

Why are physician-facing price transparency tools believed to affect costs or population health?

Physicians are sympathetic to patient concerns about out-of-pocket costs (Allan et al., 2007; Schiavoni et al., 2017) and recognize their own role in helping to deliver cost-conscious care (Hunderfund et al., 2018). However, physicians' actual understanding of the cost of care is poor for most services and settings (Allan & Lexchin, 2008). For example, physicians tend to overestimate the cost of inexpensive drugs, whereas they frequently underestimate the cost of expensive ones (Allan et al., 2007). Research has found that physicians are not very accurate in estimating the cost of laboratory tests (Tek Sehgal & Gorman, 2011), imaging procedures (Carlson & Dachs, 2015; Tainter et al., 2017), emergency department costs (Broadwater-Hollifield et al., 2014), and surgical procedures (Wiznia et al., 2016).

Price transparency tools are interventions that provide physicians with information on the cost of services at the time of care delivery. Given the expanded adoption of electronic health records (EHRs), pricing information can be more easily integrated into the ordering process through decision support systems or simply as part of provider order entry systems (Everson et al., 2019; Silvestri et al., 2018). Pricing information can also be presented to clinical providers at the time of care through paper-based methods. The primary objective of physician-facing price transparency tools is to provide information to influence clinical decision making such that the care delivered is more cost-conscious and minimizes wasteful spending.

The literature on price transparency tools faces some fundamental limitations. First, the concepts of price, costs, list prices, actual cost, total costs, or out of pocket costs are not the same, but are frequently used interchangeably in the literature (Goetz et al., 2015). For example, the list price of a prescription drug may be of less relevance to patients than the actual out-of-pocket cost after insurance; however physicians may not be aware of their patients' costs sharing responsibilities (Ballard et al., 2008). Second, physicians' care decisions include numerous other inputs

and considerations, which may be more important or relevant than cost information alone. Simply providing cost information may have only limited impact given the overall complexity of the decision making process (Schiavoni et al., 2017). Third, the delivery of this information is not easily accomplished given that (1) different patients might each have different insurance benefits which could require extensive tailoring for accuracy; (2) it is not clear when to introduce cost information into the workflow and for which clinical decisions; (3) there is insufficient information regarding the best way to support providers in understanding what could be an important cost difference between options (Everson et al., 2019). Lastly, the nature of the interventions themselves are highly heterogeneous and often include different tactics to convey price information to providers, which complicates the ability to compare across interventions and to identify the key influential factors.

What are the benefits and/or drawbacks associated with physician-facing price transparency tools?

Physician-facing price transparency tools have been studied in various forms and settings. Following two recent systematic reviews that examined the effects of price transparency tools, we organized the literature based upon evidence of the impact of these tools on medication and imaging orders, laboratory testing, and various diagnostic testing (Goetz et al., 2015; Silvestri et al., 2016). When appropriate, we organized the findings from the literature by inpatient, emergency, and outpatient setting.

Medications & prescribing

In a single inpatient setting within an Indiana hospital, displaying charges for each medication on a computer screen during order entry reduced drug-related charges by 15.3% (Tierney et al., 1993)². Other similar interventions within academic medical centers were not consistently associated with reduction in costs. For example, researchers displayed prices and lower cost alternatives for three high-cost medications in three Washington hospitals and reported a 71% decrease in the use of one medication, but no decrease for others (Gipson et al., 2017)⁶. Displaying prices for intravenous

medications within a Maryland academic medical center resulted in a reduction in usage for only two of the nine drugs that were studied (Conway et al., 2017)⁶. The remaining inpatient studies focused specifically on reducing costs on anesthesiology-related drugs. Whereas one study reported that affixing price stickers to anesthesiology drugs had no overall effect on usage (Horrow & Rosenberg, 1994)¹⁴, a second study found that affixing price stickers to anesthesiology medications resulted in a 12.5% decrease in total expenditures (Lin & Miller, 1998)¹⁴. A third study posted price listings in operating rooms as part of a larger intervention and saw the cost of delivering anesthesia medications reduced by \$24 per case (McNitt et al., 1998)¹⁴.

In a three-month study of approximately 1900 outpatient clinicians in Washington, researchers reported that using EHR-based alerts to identify low cost alternatives resulted in a 32% reduction in the prescribing volume for high-cost medications (Monsen et al., 2019)². In a southern California outpatient urgent care practice, including prices on printed order entry forms reduced high price medication ordering (Guterman et al., 2002)⁶. Three survey-based studies using narrative clinical vignettes found that Canadian and Israeli physicians would be more likely to prescribe lower cost alternatives when given price information (Hart et al., 1997; Hux & Naylor, 1994; Salman et al., 1999). Nevertheless, an additional outpatient study in South Carolina reported no effect from displayed medication prices on EHR order screens (Ornstein et al., 1999)¹⁴.

Imaging Tests

A single hospital intervention in Maryland that displayed the costs for a random subset of common imaging studies in inpatient settings had no effect on ordering behavior (Durand et al., 2013)². In a second study that included 25 primary care clinics affiliated with a single health system in California, researchers found that adding prices reduced the relative ordering of CTs and MRIs in comparison to ultrasounds (Kruger et al., 2016)⁶. However, the intervention also displayed the radiation exposure information along with the prices. Follow-up surveys indicated that physicians viewed the radiation exposure information as more influential whereas nurse practitioners and physician assistants were more influenced by the price information (compared to physicians).

Laboratory Testing

Researchers examining the effect of displaying Medicare reimbursement rates and lower cost options on computer screens during the order entry process for primary care providers in Massachusetts reported reduced monthly test ordering rates of 0.4 - 5.6 per 1,000 visits (Horn et al., 2014)⁶. The study, which took place in five multi-specialty group practices, reported that 30% of physicians 'usually or always' considered the price information during ordering; while 50% reported that costs never affected their decision. Nevertheless, it was also reported by 81% of the physicians that the price displays improved their knowledge of relative costs.

Within a single hospital, researchers reported that including cost information within the computer order entry system resulted in a 9.1% reduction in tests ordered and a 10.1% reduction in total fees in the inpatient setting (Feldman et al., 2013)². An additional study in California identified a reduction in orders and average cost of orders (Fang et al., 2014)¹⁴ following the implementation of physician-facing price transparency tools. However, a similar paper-based intervention that added prices to patient charts and printed order forms did not change ordering behavior (Everett et al., 1983)². In a study of three affiliated hospitals in Philadelphia, adding Medicare-allowable fees for inpatient laboratory tests to the order entry system resulted in no significant changes in overall test ordering behavior or associated fees (Sedrak et al., 2017)².

In a pediatric emergency setting, printing hospital charges on order forms was associated with a 27% reduction in charges but also a higher rate in unscheduled follow-up visits (Hampers et al., 1999)¹⁴.

Diagnostic (Lab and Imaging) Testing

Several studies examined the effect of physician-facing price transparency tools on the ordering of both laboratory and image orders – together known as diagnostic testing. Displaying diagnostic test charges, lists of the most cost-effective tests, and recommended testing intervals resulted in a 12.5% reduction in diagnostic-related charges in an Indiana inpatient hospital (Tierney et al., 1993)². In a single hospital study in Massachusetts, displayed costs at the time of order entry had no effect on radiology orders, laboratory

orders, or costs (Bates et al., 1997)². In a recent study of multiple sites within a single health system in Connecticut, researchers reported that displayed laboratory test and imaging costs were associated with a reduction in laboratory ordering, with an 8% reduction in costs per patient day. The displayed costs also resulted in a reduction in the number of image studies ordered, but a paradoxical increase in imaging costs (Silvestri et al., 2018)⁶. A physician-facing price transparency tool in the intensive care setting of Texas Children's Hospital was associated with a reduction in charges for laboratory testing and imaging studies (Sachdeva et al., 1996)¹⁴.

Only non-US studies were found of emergency department settings. In a single Swedish hospital, distributing paper-based pricelists was associated with a decrease in radiology costs, but not laboratory costs (Schilling, 2010)¹⁴. In a Belgian hospital, displayed prices within a computer order entry system, patient rooms, and on workstations was associated with a reduction in laboratory and imaging costs (Nougon et al., 2015)².

In the outpatient setting, an early systematic review (Beilby & Silagy, 1997) of physician price transparency resulted in fewer tests and costs. In Indiana-based clinics, displaying prices as part of a computer order entry system resulted in 14% fewer tests and 13% lower charges (Tierney et al., 1990)². A second study utilizing paper-based order forms and clinical vignettes reported a reduction in physician test ordering and costs (Cummings et al., 1982)². However, a recent study found that price information had no effect on ordering rates within 35 practices of an Accountable Care Organization in Massachusetts (Chien et al., 2017)².

What role do physician-facing price transparency tools have in quality improvement and/or improvements of health status?

The literature on physician-facing price transparency tools has focused on utilization rates and associated costs. The impact on the quality of care or health status is not routinely assessed in the literature and any potential undesirable effects due to changes in ordering patterns are not well known (Goetz et al., 2015). The existing evidence suggests that some negative effects are

at least possible. One study that utilized clinical vignettes reported that price displays were associated with less appropriate clinical choices made by clinicians (Hirota et al., 2019). Similarly, an intervention in the pediatric emergency setting was associated with fewer charges, but more unscheduled follow-up visits (Hampers et al., 1999). Researchers reported that including price information for physicians resulted in both lower costs and lower ordering appropriateness scores (Rudy et al., 2001)².

Summary of the evidence on the effectiveness of physician-facing price transparency tools.

There is **convincing** evidence to suggest that physician-facing price transparency tools can reduce the number of tests ordered and their associated costs in multiple clinical settings including in Indiana. There is also **convincing** evidence that such tools have no effect. The most recent systematic review suggests that the overall effect of such tools may be modest (Silvestri et al., 2016). The most consistent **convincing** and **promising** evidence about the desirable effects of physician-facing price transparency tools stems from studies focused on laboratory testing.

The likely impact of physician transparency tools might be a function of how the intervention is structured, what type of utilization is targeted, what information is provided, and at what point in the ordering process it is utilized. Although infrequently reported by researchers, there is some concern (stemming from **convincing** studies) that such transparency tools could have unintended negative effects on quality of care.

USE OF END-OF-LIFE SERVICE

Why is increased use of end-of-life services believed to affect costs or population health?

Health care costs rise exponentially within the last 12 months of life for many Americans (Klingler et al., 2016). However, a 2015 Institute of Medicine report highlighted the fact that health services for persons nearing the end of life are characterized as more intense services than necessary or desired by patients. It is generally estimated that end-of-life care represents approximately 10-12% of total US medical spending (Emanuel & Emanuel, 1994; Aldridge & Kelley, 2015) which is higher than other developed countries. For example, terminal cancer patients in the United States have more hospital costs stemming from intensive care unit admissions being more than double any other developed country (Bekelman et al., 2016). In Medicare, end-of-life costs for cancer patients average over \$30,000 for most cancers and as high as \$75,000 for brain cancers (Yabroff et al., 2008). Yet, the high cost of care has little impact on the quality of care received, and may not be consistent with the treatment preferences of seriously ill patients. Indeed, the lack of expressed treatment preferences and the process by which treatment preferences are formulated is associated with family/caregiver stress, decrease care quality, and result in care incongruent with patient preferences (Duncan et al., 2019; Waller et al., 2017). Several strategies are aimed at improving quality, aligning care with patient preferences, and reducing costs. Among them include the use of hospice, palliative care, and encouraging advance care planning or establishing advance directives, the latter of which can increase the use of hospice and palliative care, which can serve as a means to avoid intensive care unit (ICU) utilization at the end of life (Brinkman-Stoppelenburg et al., 2014).

What are the benefits and/or drawbacks associated with strategies to improve the quality and reduce the cost of end-of-life care?

The literature has examined the benefits of end-of-life care activities by focusing on:

1. Hospice/palliative care
2. Advance directives (ADs)/advance care planning (ACP)
3. Other strategies

Both hospice and palliative care fill gaps that results from the disease-centered approach to medical care common in the US. Hospice is an approach that emphasizes comfort over cure, and is intended for individuals with terminal illnesses or who otherwise have an expected lifespan of six months or less. Alternatively, palliative care also emphasizes comfort measures, but can be delivered along with treatment to cure underlying illness. Medicare enacted coverage for hospice more than 35 years ago allowing researchers to examine potential cost-savings from this covered service.

Recently, researchers found that hospice use is associated with reduced hospital care and Medicare spending at the end of life of between \$900-\$8,000 for cancer patients (Huo et al., 2014; Zuckerman et al., 2015)¹⁰. These findings were consistent with a systematic review that summarized 22 qualitative and quantitative studies that reported benefits of hospice care, irrespective of the setting in which hospice was delivered, including reduced health service use, increased likelihood of pain management, and death occurring outside the hospital (Candy et al., 2011)¹. Nevertheless, rigorously examining many of the benefits of hospice is fraught with methodological and ethical considerations resulting in a void of cost-effectiveness research on hospice care (Candy et al., 2011)¹.

Similar to hospice care, several researchers have conducted systematic reviews of the impact of palliative care. For example, by summarizing 124 randomized control trials, researchers found that palliative care was associated with improvements in patient communication and use of ACP, presence of AD, improvements in patient psychosocial health and experience, reduced hospital use, and reduced health care costs (Singer et al., 2016)¹. Two additional systematic reviews reported that the use of palliative care early in the disease process (e.g., in the outpatient setting proximal to disease diagnosis) was associated with benefits to patient quality of life, reduced aggressive care at the end of life, increased use of ADs, and reduced hospital utilization (Gomes et al., 2013; Davis

et al., 2015)^{all1}. In addition, although not conclusive, there is some evidence that outpatient and in-home palliative care may reduce costs (Gomes et al., 2013; Davis et al., 2015)^{all1}.

Advance directives (ADs) are typically legally-binding, written statements of a person's wishes regarding medical treatment, made to ensure that preferences for treatment are carried out when and if the individual is unable to communicate. The idea that ADs, sometimes called a "living wills," can reduce aggressive end-of-life care utilization and thereby reduce costs, has been hypothesized for decades. While promising, commentators have noted that ADs are often not relevant, could be of dubious validity, and frequently not honored by medical staff. Researchers found that many state AD laws result in unintended legal consequences on clinical care which may be why ADs are not effectively implemented (Castillo et al., 2011)¹⁷. Indeed, the evidence of the effectiveness of ADs is mixed. Whereas, some researchers have concluded that ADs are associated with cost savings (Weeks et al., 1994; Nicholas et al., 2012)^{all11}. Other researchers report that ADs alone typically fail to reduce costs of care at the end of life (Taylor et al., 1999)¹. Nevertheless, ADs are believed to improve quality of life (Garrido et al., 2015; Teno et al., 2007)^{11,18}.

Advance care planning (ACP) emphasizes the process by which individuals and their families articulate and communicate their preferences for care combined with the systematic implementation across health care settings. This process is ultimately intended to improve quality of care at the end of life and ensure that care is congruent with patient preferences, with the intermediate goal of increasing the number of adults with ADs. Medicare began reimbursing physicians for providing ACP in 2016. In a systematic review of the literature that summarized 56 individual studies, researchers reported that interventions to promote ACP were effective at increasing the completion of ADs, generally increased the frequency of conversations regarding end-of-life care preferences, and did so with little or no detrimental effects on anxiety, depression, and psychological well-being (Houben et al., 2014)¹. Nevertheless, an early rigorous study found that ACP did not improve care, patient outcomes, nor reduced the use of hospital resources (The SUPPORT Principal Investigators, 1995)². However, some evidence suggests that ACPs could reduce costs or utilization and may result

in higher quality of death among certain populations including cancer patients (Zhang et al., 2009; Wright et al., 2008)^{all10}. Further, in one study, researchers found that having a communicator facilitate ACP with patients in intensive care led to reduced intensive care length of stay and associated costs without increasing overall mortality (Curtis et al., 2016)². A systematic review of the literature that included 7 individual studies concluded that cost reductions associated with ACP are between \$1,041 to \$64,830 per patient and may be a function of the how ACPs are implemented, the population studied, and the analytical methods used (Klingler et al., 2016)¹.

Researchers also examined the economic impact of ACP in a systematic review of 18 studies and concluded that while evidence of cost-savings was limited and equivocal; health care savings improved among some people in some circumstances without increasing costs for any population (Dixon et al., 2015)¹. An additional group of researchers reported that some aspects of ACPs, such as "do not resuscitate (DNR)" and "do not hospitalize (DNH)" orders were associated with decreased utilization of intensive care and hospitalizations, increased use of out-of-hospital and non-intensive care services including hospice (Brinkman-Stoppelenburg et al., 2014)¹. Lastly, some researchers have examined palliative care and/or the use of ACP in specific settings. In a narrative review of end-of-life services in the intensive care unit, researchers reported that palliative care was generally associated with lower ICU-related utilization (i.e. admissions and length of stay) (Khandelwal & Curtis, 2014)¹. Likewise, in a systematic review of ACP in the nursing home setting, researchers who summarized 13 individual studies and 5 systematic reviews, reported that ACP decreased hospitalizations by 9-26% and increased use of community palliative care; however, improvements in costs were not consistently observed (Martin et al., 2016)¹.

Lastly, the literature includes other **end-of-life strategies** that target various aspects of the entire US health care system in an effort to reduce cost and utilization, while improving quality. Innovative new approaches include medical homes, the use of patient navigators, and targeted use of palliative care for oncology patients. Researchers found that an oncology medical home and a patient navigation program were associated with decreased costs in the last ninety days of life (\$3,346 and \$5,824

per person, respectively) and fewer hospitalizations in the last thirty days of life (57 and 40 per 1,000 people, respectively). Moreover, the patient navigation model was also associated with fewer emergency visits and increased hospice use (Colligan et al., 2017)¹⁰. Another strategy includes promoting in-home end-of-life care, which aligns with the preferences of many older adults and terminally ill patients. In two different systematic reviews, researchers concluded that in-home services were associated with some improved patient and caregiver satisfaction (Shepperd et al., 2016)¹ as well as reducing health care use and costs (Bainbridge et al., 2016)¹.

Drawbacks

Although end-of-life care represents a substantial portion of overall medical spending, investigators have argued for decades that cost savings may be an “illusion” (Emanuel & Emanuel, 1994). Early commentators extrapolated information to illustrate the maximum benefit expected from all end-of-life interventions (i.e. hospice, palliative care, and ADs) was 3.3% of all health care expenditures. Furthermore, they argue any costs avoided from hospitalizations may shift to nursing home or outpatient costs, and may actually increase as a result of the labor-intensity of end-of-life services. In a critical commentary, experts argued that focusing on costs at the end-of-life would not be as fruitful as focusing on broader high cost populations including those with chronic conditions and functional limitations because only 11% among high cost patients were within the last year of life based on some estimates (Aldridge & Kelley, 2015). The debate continues, noting that it is challenging to identify when exactly end-of-life will occur and that it is possible that high aggregate medical spending for some is not due to “last-ditch efforts to save lives but to spending on people with chronic conditions, which are associated with shorter life spans” (French et al., 2017).

What role does end-of-life care have in quality improvement and/or improvements of health status?

As mentioned above, the use of palliative care has benefits to patient quality of life, reduced aggressive care at the end of life (Gomes et al., 2013; Davis et al., 2015)^{all 1}. Moreover, ADs are associated with better quality of life (Garrido et al., 2015; Teno et al., 2007)^{11, 18}. Further,

researchers have suggested that the use of ACP leads to higher “quality of death” among certain populations, especially cancer patients (Zhang et al., 2009; Wright et al., 2008)^{all 10}. Lastly, several other end-of-life care strategies could improve quality of care, including delivery of in-home services, and enhanced patient and caregiver satisfaction (Shepperd et al., 2016)¹.

Summary of the evidence on the effectiveness of end-of-life care services

Hospice/palliative care

There is **convincing** evidence that the use of hospice and palliative care have benefits to patients and reduce overall health care use. There is **promising** evidence that hospice and/or palliative care can reduce costs among some patient populations. However, several authors have reviewed the scientific literature and independently conclude there is **not enough** evidence to make a definitive determination on whether hospice and/or palliative care is cost-effective in terms of overall health care costs savings.

Advance directives (ADs)/Advance care planning (ACP)

The literature has **conflicting** evidence on whether having an AD alone is sufficient to reduce costs. There are situations where ADs may hold **promise** to reduce utilization and thereby costs, however several concerns regarding the use of the document in practice within the social and legal milieu, may present challenges. More **convincing** is the evidence that ACP can reduce costs of end-of-life care. However, it is notable there is some variation by patient population and the specific type of ACP delivered (e.g. Medicare-reimbursed physician counseling, systematic hospital-based interventions). The literature has **convincing** evidence that having an AD or participating in ACP can result in better quality of life at the end of life, sometimes referred to as “quality of death.”

Other strategies

There is **promising but limited** evidence that new, innovative strategies such as medical homes and navigators combined with palliative care can improve the quality of end-of-life care and reduce utilization and costs. There is **convincing** evidence that encouraging the use of in-home services at the end of life can reduce costs.

LOW-VALUE CARE

What is low-value care and how is it related to costs or population health?

Low-value care includes clinical services that provide little or no benefit to patients. By definition, low-value care unnecessarily increases costs and can be the result of overuse or misuse of services. Because low-value care is not expected to be beneficial, patients receiving these services might be exposed to harm from the side effects or ramifications of wasteful tests or treatments. Low-value care could include (1) care proven to be ineffective; (2) inefficient care due to excessive intensity; or (3) care that is unwanted by patients (Verkerk et al., 2018). Experts believe that addressing low-value care has both ethical (the imperative to reduce harm) and financial (the imperative to reduce spending) benefits (Elshaug et al., 2013). Defensive medicine, which contributes to wasteful services, is considered excluded from our focus on low-value care as defined herein.

Nine medical societies partnered with Consumer Reports to launch the Choosing Wisely campaign in 2012 (Kerr et al., 2017). Choosing Wisely was prompted by the desire to change the historic medical culture that embraced the idea that more care was better. Choosing Wisely published a list of 45 recommendations that represented medical tests and treatments that, under the defined circumstances, should always be avoided. Consumer Reports developed patient-oriented materials to educate patients about the recommendations. By 2016, seventy more health professional societies joined Choosing Wisely, raising the number of recommendations to over 500 (Kerr et al., 2017). In addition to the role of professional societies (Selby et al., 2015), researchers developed a methodology to allow local physicians, within a given institution, to collectively identify lists of low-value care to target for elimination (Gupta & Detsky, 2015). Researchers have identified “do not do” recommendations that serve as a starting point for low-value services within the field of nursing (Verkerk et al., 2018).

Low-value care is difficult to systematically identify using secondary data sources. Researchers developed algorithmic approaches to estimate the costs low-value care. A study of commercially insured people in Washington State estimated that in a one-year period ending in 2016, wasteful services represented 43% of care delivered to

this population amounting to \$785 million dollars in costs (Brown & Clement, 2018). Within Medicare, researchers estimate that 30% of spending is unnecessary or harmful suggesting it could be avoided with no negative impacts on health outcomes (Lallemant et al., 2012).

What are the benefits and/or drawbacks associated with low-value care?

By definition, any service or medical test that is considered “low-value” lacks benefits that outweigh drawbacks. We summarized the literature that has examined how to reduce low-value care as opposed to focusing on benefits and drawbacks as described in other sections of the current report.

Researchers have noted that the use of low-value service is deeply ingrained in the medical practice and clinical training cultures which has been reinforced by the historic financial incentives of fee-for-service reimbursement models (Brown & Clement, 2018). The state of evidence regarding how to eliminate low-value care from routine clinical practice is generally considered underdeveloped. Experts believe that reducing low-value care will require (1) systematically changing the medical culture, including by how medical students and residents are trained; (2) providing the existing clinical workforce with significant education regarding the principles of value-based care including how to balance clinical effectiveness and cost-effectiveness measures in practice; and (3) implementing payment models that pay for value as opposed to volume (Brown & Clement, 2018). The last point is supported by some evidence that suggests that capitated payments in the Medicare Advantage program are associated with a reduction of low-value (but also some high-value) services relative to traditional Medicare patients (Curto et al., 2019).

In a systematic review of the literature that summarized 108 individual studies, researchers determined that the most effective interventions to reduce low-value care included (1) clinical decision support, (2) clinician education, (3) patient education, and (4) patient cost sharing. Interventions with multiple components that simultaneously address patient and provider roles in overuse were particularly effective at reducing low-value

care as well (Colla et al., 2017)⁷. Researchers tested whether clinicians who pre-commit to follow Choosing Wisely recommendations and agree to receive decision supports could decrease their own low-value orders. Clinicians who agreed to participate, experienced a slight (<2%) reduction in low-value orders and a compensating increase in alternative orders, none of which was sustained in follow-up periods (Kullgren et al., 2017)².

Researchers determined that certain physician characteristics were associated with lower spending on low-value services. They reported that among primary care providers, costs from low-value services were lower among family physicians (compared to other primary care doctors), those with allopathic training (compared to osteopathic), those in the Midwest region, those more recently completing their medical training, and those in rural areas (Barreto et al., 2019)¹⁸.

Systematically identifying low-value care using secondary data is challenging. One group of researchers examined whether Medicare claims data could be used to develop estimates of low value services (Schwartz et al., 2014)¹⁸. They developed 26 measures of low-value services across six categories including (1) low-value cancer screenings, (2) low-value diagnostic and preventive testing, (3) low-value perioperative testing, (4) low-value imaging, (5) low-value cardiovascular testing and procedures, and (6) other low-value surgical procedures. They determined that by using this approach, these services affected 42% of Medicare beneficiaries but constituted only 2.7% of 2009 Medicare annual spending (Schwartz et al., 2014)¹⁸.

Drawbacks

There are few or no conceptual drawbacks to addressing the utilization of low-value care especially in the context of transitioning to value-based care in the US. Instead, the drawbacks stem from the challenge that could be anticipated when implementing approaches to reduce low-value services. Clinicians in a Michigan-based Accountable Care Organization (ACO) reported being broadly unaware of and unengaged with ACO objectives and activities (Markovitz et al., 2019). This suggests that some health systems have not yet successfully aligned the interests of their clinical staff with the financial risk that their organization has assumed.

Physicians often encounter barriers to addressing the use of low-value care including challenges in managing patient expectations, time pressures, and the reality of diagnostic uncertainty (Colla et al., 2017)⁷.

Commentators have pointed out that an additional barrier is the lack of consensus on how to define “value” when determining which services should be considered low value. A key disagreement in the literature involves whether to use economic costs in the assessment of low-value care (Pandya, 2018). If costs are not considered, then low-value care is synonymous with care that is clinically ineffective. If costs are explicitly considered as part of value, then definitions of low-value care must include cost-effectiveness analyses to determine whether the additional clinical benefits of a given test outweigh the additional costs of a similar but less costly treatment or test. If costs are not also considered, stakeholders risk spending any amount of money on services that have only marginal improvements on health outcomes (Pandya, 2018).

Researchers have suggested that clinical misconceptions among some providers and patients contribute to the persistent provision of low-value care. For example, misconceptions about the cause of lower back pain results in the over utilization of imaging, medication, and surgery despite being inconsistent with guidelines (O’Keeffe et al., 2019). Based on a study from Australia, coordinated mass media campaigns could serve to counter misconceptions and reduce select low-value services (Buchbinder et al., 2001)⁴.

Summary of the evidence on low-value care

Experts believe that low-value care is responsible for significant unnecessary spending within the US health care system. The prevalence of low-value care appears to be rooted in both a historic mindset that believed more care was better; and a fee-for-service payment model that incentivizes the over utilization of services. The need to reduce low-value care is widely embraced by many medical and health care professional societies. Several barriers must be overcome including revamping the medical culture, changing the payment models to reward providers for value, educating clinicians and patients, and facilitating agreement among stakeholders on how to define and identify low-value services.

HIGH-DEDUCTIBLE HEALTH PLANS

Why are high-deductible health plans (HDHPs) believed to affect costs or population health?

HDHPs are insurance plans that have lower premiums than traditional health plans but higher out-of-pocket costs for patients. When patients have little or no out-of-pocket costs, there is the tendency to over-utilize services due to the lack of financial ramification to the patient. By increasing patient out-of-pocket costs, it is believed that unnecessary care could be reduced because patients now have a financial risk for their utilization decisions. An estimated 40% of Americans have a HDHP which is more than double the rate from 2009. HDHPs are even more common in small- and medium-sized firms (with less than 200 employees) where rates of HDHPs are approaching 60% (Mazurenko et al., 2019). HDHPs are frequently paired with a health savings account (HSA) that allows individuals to make tax-free contributions that can support their out-of-pocket medical expenses. Unused funds in HSAs roll over annually and remain in the possession of the individual for future eligible medical expenses. In 2018, to qualify for an HSA, HDHPs had to have a minimum deductible of \$1,350 for an individual and \$2,700 for a family.

What are the benefits and/or drawbacks associated with HDHPs?

By increasing patients' out-of-pocket (e.g., HSA) spending, HDHPs build upon the strong evidence of the RAND Health Insurance Experiment which was conducted between 1971 – 1982. The experiment found that out-of-pocket costs, in the form of patient cost sharing, decreased health services utilization and associated costs. Increased cost sharing decreased the annual number of doctor and dentist visits, hospital visits, prescription drugs, and mental health treatment without generally affecting quality of care or health status (Gruber, 2006)². This suggests that some proportion of health services utilization does not yield improvements in health and erodes value. Overall reductions in spending observed in the RAND experiment were estimated to be 20–30%.

Because HDHPs are designed to increase the amount

of patient cost sharing through increased out-of-pocket costs, researchers have specifically focused on understanding how HDHPs affect the utilization of health services and overall costs. A 2017 systematic review summarized the findings from 28 methodologically rigorous published studies¹, and found that HDHPs reduced a wide range of health service utilization and reduced overall costs (Agarwal et al., 2017). Across the 28 included studies, HDHPs reduced or delayed service utilization in emergency department and inpatient settings, diagnostic testing, and prescription drug use.

HDHPs also theoretically incentivize increased use of clinical preventive services (e.g., pap smear, mammogram, influenza vaccine) because such services are fully covered by all health plans and exempt from out-of-pocket cost sharing by patients. Nevertheless, there are several drawbacks of HDHPs. Both the RAND Health Insurance findings (RAND, 2006), and subsequent studies of HDHPs (Agarwal et al., 2017)¹, have found that patient cost sharing reduces both low value care and desirable preventive care. Given that preventive care has the potential to avert disease and disease complications, more research is needed to understand why preventive care is less likely for patients with HDHPs.

Other drawbacks of HDHPs include a correlation to being underinsured (e.g., forgoing necessary care because of costs) (Collins et al., 2015)¹⁴ and unpaid bills to providers which can occur when patients are confused by invoices for expensive services that they perceive should be covered by their plans (Grande, 2016; Albright, 2017). Unpaid bills have resulted in hospitals suing patients and/or garnishing wages, especially if the hospital is financially unstable (Bruhn et al., 2019).

What role do HDHPs have in quality improvement and/or improvements of health status?

Most of the contemporary studies on the impacts of HDHPs have focused on utilization and costs. While some evidence suggests that cost sharing did not affect the quality of care, the problematic impact of HDHPs on preventive services (Agarwal et al., 2017; Mazurenko et

al., 2019) raises the question about the need for more research to understand what impact such plans have on overall health status and population health—especially for vulnerable populations.

Summary of the evidence on the effectiveness of HDHPs

The literature has convincingly shown that out-of-pocket costs by patients, including in the form of deductibles, decreases health services utilization and associated costs. Spending decreases are estimated to be as much as 20–30%. Convincing evidence from the RAND Health Insurance Experiment found that individual health status was not affected by patient out-of-pocket costs except for the chronically ill and low income. However, because of new contemporary and convincing evidence that HDHPs reduce desirable preventive care, more research is needed to understand the impact of HDHPs on population health.

There is correlational evidence that links HDHPs to patient confusion, unpaid bills, and underinsurance rates.

CONSUMER-FACING TRANSPARENCY TOOLS

What is known about consumer-facing transparency tools, health care costs, and population health?

It is believed that patients, as consumers, have a role to play in selecting lower-cost and/or higher quality providers. However, traditionally, very limited information about either costs or quality have been available to the general public. Thus, advocates have argued for the need to make health care cost and quality information transparent so that consumers can compare provider options available to them (Findlay, 2016; Mehrotra et al., 2018). It is believed that available price and or quality information will allow consumers to make more informed decisions when seeking care and subsequently choosing higher-value providers (Schlesinger et al., 2019). Furthermore, transparency with respect to price and quality information may lead to increased competition among providers. For instance, providers may be encouraged to increase their quality efforts in order to maintain or enhance their reputation within the community (Shi et al., 2017). Similarly, economic theory suggests that information symmetry which can be facilitated with transparent cost information contributes to more efficient markets and may trigger high-cost providers to lower the costs of their services (Mehrotra et al., 2018). Finally, payers can use quality or price information when negotiating with providers which could reduce overall costs (Dor et al., 2016).

Several legislative and private initiatives have facilitated the availability of comparative price and/or quality information (Findlay, 2019) resulting in a plethora of initiatives that target information to specific groups (e.g., those receiving coverage from a specific employer or health plan) or the public at large (Hussey et al., 2014; Kullgreen et al., 2013; Mehrotra et al., 2018; Sarpatwari et al., 2016). Unfortunately, despite consumers' stated desire for such reports (Mehrotra et al., 2017) and their growing awareness about the availability of comparative quality or price information (Schlesinger et al., 2019), actual use of such transparency tools remains relatively low (Altman, 2015; Bhandari et al., 2019; Findlay, 2016; Mehrotra et al., 2018). In one study, approximately 65% of adults indicated being aware that physician quality

data is publicly available, but only 25% consulted such websites when choosing a primary care doctor (Hanauer et al., 2014). Similarly, other studies estimate that 1 to 12% of patients with access to price transparency tools use them when choosing a health care provider or service (Desai, 2016; Desai, 2017; Chernew et al., 2019; Sinaiko et al., 2016).

What are the benefits and/or drawbacks associated with consumer-facing transparency initiatives?

Studies that have examined how consumer-facing transparency tools affect consumer behavior could be organized as initiatives that have provided information:

1. Targeting a specific population, most frequently those receiving health care coverage through a particular payer, with tools such as telephone hotlines, websites, apps, and consultants.
2. Publicly available information on websites accessible by anyone.

Such transparency tools have focused on either making prices or quality information available. Thus, we organize the literature into sections that review the tools that target a specific population versus the tools that are available to the population at large. Where appropriate, we also present information about price transparency tools separate from quality-transparency tools.

Price Transparency Tools that Target a Specific Population

On the one hand, several studies report that price transparency tools lead to lower health care costs. For example, researchers have found that self-insured employers who used price transparency tools had significantly lower claims paid, than their counterparts, for laboratory tests and imaging tests (–14 to 16 %), as well as physician visits (–1%) (Whaley et al., 2014; Whaley, 2015)^{11,4}. Similarly, in a national sample of patients, those who accessed health care price information through a consultant (mostly via phone) experienced a reduction in average prices paid (–1.6%), especially for non-emergency services which are more amenable to search, than

a comparable control group (Leiber, 2017)⁴. Similarly, patients who were informed about price differences among available facilities for MRIs experienced a \$220 cost reduction (–18.7%) per test and a decrease in the use of hospital-based facilities (–53% to –45%) compared to individuals who were not informed about the price differences (Wu et al., 2014)⁴. Finally, introducing a price transparency tool by insurers led to modest or very small reductions in health care costs in two studies (Sinaiko et al., 2016)¹⁴ (–3.5%) (Chernew et al., 2019)¹⁴ (–0.5%)—mainly because a very small number of individuals used the tool.

On the other hand, several studies evaluating various price transparency tools failed to report lower health care costs or at times found paradoxical increases in costs. For example, employees from two large firms who were offered price transparency information experienced an unintended mean increase in outpatient costs (+\$59) compared to a control group not offered the tool (Desai, 2016)⁴. Similarly, California public employees enrolled in a commercial plan that were offered a price transparency tool did not have lower costs for laboratory tests, office visits, nor advanced imaging services compared to a control group of enrollees within the state (Desai et al., 2017)⁴. A similar study also reported no reductions in the costs paid for laboratory tests and imaging services for a nationally representative sample that were offered price transparency tools (Whaley et al., 2019)⁴.

Price Transparency Initiatives That Make Publicly Available Information

The state of New Hampshire introduced a website that provides residents with information about insurer-specific out-of-pocket prices for various services. Researchers found that costs for imaging procedures were reduced (–3%) for procedures listed on the website (Brown, 2019)⁴; however, price variation for 30 listed medical procedures did not decrease (Tu & Lauer, 2009)⁴. Finally, hospital charges fell by 5% for procedures with disclosed prices relative to procedures without price disclosures following state-level regulations mandating hospitals to release charges on publicly available websites in 27 states (Christensen et al., 2014)⁴.

We were unable to identify any studies that examined how price transparency tools affect health care quality or population health.

Quality transparency tools that make publicly available information

On the one hand, studies report lack of the association between publicly available quality data and health care costs. For instance, hospitals that participated in a national quality reporting program were not observed to have changes in Medicare costs for surgical patients compared to hospitals that did not participate in the program (Osborne et al., 2015)⁴. Moreover, a study of autoworkers in thirteen Midwestern markets reported that high-price hospitals had poorer performance on hospital readmissions and on some patient-safety indicators (White et al., 2014)¹⁸. On the other hand, two analyses that used a national sample of private insurance claims found that Medicare’s Hospital Compare Quality reports had slowed price increase for several major cardiac procedures, including coronary artery bypass graft (CABG) and percutaneous coronary intervention (PCI) (Dor et al., 2015; Dor et al., 2016)^{all 4}.

Evidence on the effects of quality transparency tools on quality of care is more robust. A 2012 systematic review of 198 articles including both quantitative and qualitative studies concluded that public quality reporting was associated with improvements in various quality measures and process indicators in hospitals (e.g., CAHPS domains), long-term facilities (e.g., Nursing Home Compare measures) and health plans (e.g., HEDIS measures) (AHRQ, 2012). Importantly, the degree of improvement in quality varied across specific measures. For example, public reporting was shown to positively affect all quality measures for short-stay nursing residents, but only minimally affected quality of care for long-stay residents. Specifically, only physical restraint and pain measures of long-stay residents in nursing homes consistently improved as a result of the public reporting, with the rest of the measures having inconsistent changes (AHRQ, 2012). Similarly, quality measures improved for almost all HEDIS and CAHPS domains (such as maternity care; chronic illness management, and some of immunization rates)

that were examined studies after public reporting for health plans. Furthermore, public reporting was more likely to lead to improvements in quality in more competitive markets and for providers with baseline lower quality or at the first instance of reporting (AHRQ, 2012).

Multiple studies examined whether public quality reports influence how patients, and their representatives, select providers. While the methodological rigor of evidence differs somewhat across settings, the general conclusion is that public quality reporting does not, or only minimally affects, how patients and their representatives choose health care providers (AHRQ, 2012; Bhandari et al., 2019; Ketelaar et al., 2011; Sandmeyer & Fraser, 2016; Shi et al., 2017). Nevertheless, at least one recent study found that the public release of Hospital Compare quality information was associated with hospital choice for hip replacement patients in Texas (Blake & Clarke, 2019)⁶.

Substantial research has been conducted to explore whether public quality reporting affects patient outcomes, with majority of research focusing on patient mortality. On the one hand, a 2012 systematic review found that publicly reporting quality information was associated with a small decline in mortality (AHRQ, 2012). On the other hand, several more recent studies reported that public quality reporting did not affect mortality rates. Specifically, a 2018 meta-analysis of 22 studies focusing on coronary artery bypass grafts and percutaneous coronary interventions (4, 6,14) concluded that public reporting led to no significant reductions in mortality rates (Dunt et al., 2018). Similarly, hospitals across the country that participated in a quality reporting program saw no changes in surgical patient outcomes (30-day mortality; serious complications; reoperation; 30-day readmission) at 1, 2, and 3 years after enrollment compared to hospitals that did not participate (Osborne et al., 2015)⁴. Furthermore, availability of quality indicators under Medicare's Hospital Compare did not reduce 30-day hospital mortality rates for heart attack and pneumonia and had only minimal impact on mortality rates for heart failure among national sample of Medicare enrollees (Ryan et al., 2012)⁶.

Collectively, we have identified seven reasons, reported by researchers, for the low use of price and quality information by patients:

1. Most studies find that relatively few patients (usually less than 10%) are aware of the existence of such transparency tools (Chernew et al., 2019; Desai, 2016; Desai et al., 2017; Sinaiko et al., 2016; Whaley, 2014; Wu et al., 2014;).
2. Even if the patients are aware, the complexity and variability of price and/or quality data presented undermines patients' ability to effectively compare providers and price shop (Ginsburg, 2007; Mehrotra et al., 2018; Schlesinger et al., 2014; Singh et al., 2019). The majority of the price and/or quality reports use technical language, and thus, not adequately targeting consumers' needs (Hussey et al., 2014).
3. Patients often lack an incentive to price shop due to anticipated costs exceeding their deductible limits. Researchers note that prices of many inpatient services quickly exceed even the largest deductible, thus creating a weak incentive to compare prices (Adashi & Tang, 2019).
4. Less than half of the overall health care spending comes from shoppable services (service that can be searched in advance), with only 7% out-of-pocket spending being allocated to shoppable services (Frost & Newman, 2016). Thus, given that patients spend relatively little out-of-pocket, they have little incentive to price shop.
5. Patients may not have a choice between providers, due to insurance network restrictions, limited appointment availability, or insufficient providers in their geographic location, thus restricting their ability to compare providers on quality and price shop (Abraham et al., 2004).
6. Patients often fear to disturb an established patient-physician relationship, subsequently following the physician's advice for a particular provider, even for shoppable services (Mehrotra et al., 2018; Volpp, 2016).
7. Most reports do not combine price and quality information (Findlay, 2016), thus further complicating the comparison of providers.

Importantly, when patients are presented with consumer-friendly price and quality information in a controlled research environment, they are likely

to choose high-value providers (Greene & Sacks, 2018; Hibbard et al., 2012; Maurer et al., 2019)². Furthermore, a recent study of 29 employers showed that a reward program that pays patients for choosing a lower-price provider, led to a 2.1% reduction in prices paid for targeted services, resulting in \$2.3 million in savings (Whaley et al., 2019)⁴.

What role does consumer-facing transparency tools have in quality improvement and/or improvements of health status?

To our knowledge, no evidence exists on how price transparency tools affect quality of care or population health outcomes. However, as mentioned above, the availability of quality data has led to improvements in quality. Specifically, evidence suggests that public quality reporting has led to improvements in care processes and quality indicators for hospitals, health plans, and long-term care services. Furthermore, abundant research has shown that public quality reporting has minimal, or no negative effect on patient outcomes in general, and mortality specifically.

Summary of the evidence on the effectiveness of consumer-facing transparency tools

Importantly, the literature consistently shows that patients rarely use transparency tools and thus these tools do not systematically affect consumer behavior. Moreover, very few tools display comparative price and quality information together. With that said, the literature on whether price transparency tools lower health care costs is inconclusive with several **convincing** and **promising** studies reporting either no effect or reduction in spending. However, there is some **promising** and **convincing** evidence to suggest that publicly available quality information can improve quality outcomes and/or process indicators of quality. However, generally speaking publicly available quality information has minimal or no effect on health status or population health outcomes.

SECTION 3: PRIORITIZING ACTION AND STAKEHOLDER RECOMMENDATIONS

After characterizing the Indiana context in Section 1, and reviewing a wide range of factors that could affect both overall costs and population health in Section 2, our overall conclusions are as follows:

- There is no simple 'magic bullet' to reduce costs and improve population health in the US overall or within any given state. Thus, it is unlikely that any one solution will achieve the desired results for Indiana.
- Achieving the desired outcomes in Indiana can be facilitated with a comprehensive portfolio of activities each of which encourages maximum collaboration among stakeholder groups. Thus, state policymakers should actively encourage, and incentivize, stakeholder cooperation.
- Although the context in Indiana has unique challenges, opportunities exist to improve health and implement change by tapping into the expertise, assets, and motivation of stakeholder coalitions who can assure the continued economic vitality of the Hoosier State.

We believe that the work represented in this report is a preliminary step towards developing an Indiana strategic plan for health care. A necessary next step is to convene stakeholders for further discussion, contemplation, and activation based on consensus and known best practices. To assist in that goal, in this section of our report we identify the policies, strategies, or practices that deserve further consideration by Indiana stakeholders. We believe that collaborative input from Indiana stakeholder groups is necessary because they have the capacity and knowledge to assess the feasibility (including downsides) of successfully implementing any policy, organizational strategy, or other solution to the current situation. By working together, we believe that stakeholders can craft the optimal set of 'solutions' to pursue within a portfolio of activities that will be needed. Policy makers should consider ways to allow stakeholders to work together and encourage cooperation beyond the time frame of the legislative session.

For each of the 16 items reviewed in Section 2, we describe the recommended next steps that should be prioritized. Along with each recommendation, we discuss our justification and information about the Indiana

context that might be relevant to each factor. In addition, we provide suggestions regarding the role of various stakeholder groups in championing lower health care costs and improved health outcomes in our state. Our list of stakeholder groups is not intended to be comprehensive and we recognize that many other stakeholder groups might have relevancy that we did not consider. Instead, we identify the stakeholder groups that could serve as a starting point for the collaborative involvement of others.

Recommendations with Justifications and the Role of Stakeholders

Market and local activities

Provider (Hospital and Physician) and Payer Concentration

There is convincing evidence that provider and payer concentration each lead to higher costs. However, provider and payer concentration each have mixed/inconclusive effects on quality of care and health outcomes. Federal policy has encouraged provider consolidation (creating more concentration) in order to be competitive for new Medicare payment models with the goal of improved care at lower costs. Separately, many attempts to mitigate the negative implications of market concentration have been ineffective. Thus, actions are necessary to level the playing field and encourage cooperation among stakeholders. The following options should be considered in Indiana:

Implement an all-payer claims database to enable insurers, employers, providers, policymakers, and researchers have improved transparency in price and quality performance in Indiana.

Such a database should conform to national standards regarding data elements and governance structures. In addition, although depending on how this is implemented, the Employee Retirement Income Security Act (ERISA) may exempt self-insured employers from having to participate (Curfman, 2017). Therefore, it is recommended that the participation of self-insured employers should be compelled or at least encouraged and actively incentivized.

Indiana should examine scope of practice laws that

govern mid-level providers and determine whether policy changes could facilitate a safe increase in primary care practitioners. Stakeholders should consider whether the current scope of practice laws restrict access to care by contributing to shortages of clinicians which in turn may exacerbate market conditions and may contribute to higher health care costs.

Stakeholders should leverage technology like telemedicine to increase competition among providers. To the extent that telemedicine (or other technologies) could increase access to cost-effective care, particularly in provider concentrated areas, stakeholders could collaborate to expand such opportunities.

- *Relevance to Indiana and Justification:* Indiana has a highly concentrated payer market and moderately concentrated central Indiana hospital market. Hospital market concentration is not routinely measured in other Indiana markets, but clearly varies. Moreover, there is a relative shortage of physicians in the state—especially those practicing primary care. These market conditions contribute to stakeholder dissatisfaction especially when viewed from the vantage point of any group’s individual perspective. An all-payer claims database could provide the transparency and impetus to encourage collaboration among stakeholders and ultimately serve as a means to evaluate whether policy or organizational interventions have been successful in lowering costs and/or improving patient outcomes. An examination of scope of practice laws might broaden the options to expand clinical capacity thus enabling more competition. Lastly, the expanded use of technology could allow payers and providers to negotiate new arrangements that support improved cost-effective access to care including through expanded competition.
- *Key Stakeholders:* The executive branch of government, working with the legislature, could focus on the policy changes needed for each of these recommendations. Payers, employers, and providers could work together to identify opportunities to collaborate on these initiatives. It is important to encourage the participation of self-insured employers in an all-payer claims database initiative.

Employer-Provider Direct Price Negotiations

Employers should explore ways to negotiate directly with providers and implement pilot projects to determine

if doing so is beneficial and scalable. Potential joint ventures between employers and providers can include: (1) exclusive partnerships with single health systems for price discounts; (2) exploring whether on-site primary care, especially on a capitated basis, is feasible; and (3) form employer purchasing alliances to gain leverage in negotiating directly with providers with the possible use of performance guarantees. Importantly, an all-payer claims database (as recommended above), especially if inclusive of self-insured populations, could facilitate the transparency needed for effective negotiations.

- *Relevance to Indiana and Justification:* Despite being historically uncommon in the US, some Indiana-based employers are considering this option, which includes working directly with local health systems on a joint venture to provide primary care (Corlette et al., 2019). Even though the literature contains only limited promising evidence regarding the cost benefits of direct negotiations between employers and providers, the well-organized and motivated Employers’ Forum of Indiana could help mitigate some of the challenges that employer alliances elsewhere have experienced. Given the number of self-insured employers in Indiana, there is an opportunity to determine whether employer-provider direct negotiations can yield desired outcomes.
- *Key Stakeholders:* Employers, hospital providers, and physician groups have a role to play in exploring this approach.

Narrow and tiered provider networks

To the extent feasible, the use of narrow and tiered provider networks should be encouraged. This could

involve action by multiple stakeholder groups including employers, health insurers, and providers.

- *Relevance to Indiana:* Insurers report receiving insufficient support from employers who typically dislike restricting provider options for their employees (Corlette et al., 2019). Further, given the higher risk of closure among financially vulnerable rural hospitals in Indiana, care must be taken to not inadvertently affect providers and patients that are geographically isolated. Nevertheless, employers and insurers have an opportunity to play a leadership role in incentivizing and rewarding both patients and providers who can achieve improved care at lower costs.
- *Justification:* Convincing evidence shows that the use of narrow provider networks can reduce costs with promising evidence suggesting no effects on quality. Further, some

promising evidence suggests that tiered networks could also steer patients towards lower-cost providers. These approaches could be considered along with the use of reference-based pricing and value-based payment models as described below. In addition, narrow or tiered networks could be implemented with tenets from the concept of managed competition which involves incentives to favor cost-conscious high-quality providers in employer-offered coverage options (see for example, Enthoven et al., 2019). The issue of out-of-network bills represents a significant nuisance for consumers. As such, stakeholders should work to address this issue which could be exacerbated by greater use of narrow networks.

- *Key Stakeholders:* Employers could work with insurers to support the greater use of narrow and tiered networks. Employers could also incentivize employees to make more cost-conscious decisions regarding their health care utilization—including by selecting health plans that make use of narrow provider networks and/or using principles of managed competition. The Indiana Chamber of Commerce and other business groups can create a forum to exchange best practices. The media and others can partner with stakeholder groups to educate the public on how to successfully navigate narrow networks and managed competition.

Public Health Activities

Given the scientific evidence, **Indiana should increase investments in public health activities and increase the use of community-based multisector partnerships** that address, mitigate, or otherwise focus upon socioeconomic conditions that drive preventable health care utilization and exacerbate poor health outcomes.

- *Relevance to Indiana:* Overall public health investments in Indiana are less than half of US averages and the lowest among neighboring states (Indiana is ranked 47th of 50 for per capita investments in public health). Operating as a decentralized county-based local public health network, the state health department provides minimal oversight and very limited state funding to support the essential services of public health. County health departments are largely governed autonomously by local boards of health and modestly funded by county tax revenue. Indiana requires that a physician health officer be appointed for each county. Unlike many other states, Indiana does not require public health experience or education requirements for public health directors at the local level.

The vast majority of county health officers serve on a part-time basis with minimal stipends to support the activities of their health department. Although national standards for accreditation of local and state health departments have been established for over a decade, only three county health departments in Indiana are nationally accredited by the Public Health Accreditation Board (PHAB). In contrast to the nation, the majority of the US population is served by a PHAB accredited health department.

In Indiana, most local health departments are minimally staffed with insufficient resources to support the complex health issues facing the Hoosier state. Investments in public health should be implemented with assurances of accountability. The state could encourage health departments to seek accreditation and public health professionals to seek national certification as a means to assure a minimal level of competence. Moreover, the state should consider strategies to assure the optimal level of coordination between state and local health departments to maximize the investments being made.

- *Justification:* Convincing scientific evidence links investments in public health to a reduction in health care spending and improvements in population health. Moreover, partnerships that involved multiple sectors (e.g., hospitals, technology firms, governmental agencies, others) hold promise for innovative approaches to address local issues.
- *Key Stakeholders:* Investments in public health should be pursued by the executive and legislative branches of Indiana government especially with support of any stakeholders interested in reducing health care costs and/or improving the health of Hoosiers. Multisector partnerships can be pursued by a wide range of stakeholder groups including but not limited to provider organizations, payers, employers, technology firms, governmental agencies including county health departments, and others.

Payment Issues

Accountable Care Payment Models

Similar to Medicare, Indiana should **move towards increased use of accountable care payment models among commercial payers**. To the extent possible and as appropriate, such programs should include upside risks and consider moving towards eventually implementing downside risks and/or an explicit focus on primary care given that both strategies are linked to benefits in the literature.

- *Relevance to Indiana:* Insurers could potentially contract with physician groups for downside risk more easily than with hospitals, but the relative shortage of Indiana physicians (compared to US average and neighboring states) could be challenging if physician groups are unable or unwilling to participate. On the other hand, several Indiana health systems have experience participating in the Medicare Accountable Care Organization (ACO) payment model which could be a facilitator to pursuing similar payment arrangements with commercial insurers in the state.
- *Justification:* Convincing evidence from the Medicare ACO program and commercial ACO programs in several states have linked provider incentives under these payment models to a reduction in costs and some improvements in the quality of care.
- *Key Stakeholders:* Commercial health insurers can work together with provider groups (both those representing hospital executives and clinical leaders) to implement a greater use of Accountable Care payment models. Likewise, Indiana Medicaid can consider implementing Accountable Care payment models. Insurers could help to assess provider capabilities for population health management particularly among geographically isolated or small provider organizations and help guide providers to effective care management support strategies. Insurers could also play a role in spurring collaboration and learning across providers (HCPLAN, 2019)—especially among those not directly competing with each other in a given market. Insurers and organizational providers should work together to educate and incentivize physicians about their role and responsibility under such payment models. While it is important that providers be held accountable for their performance, it may be inappropriate to expect for them to assume responsibility for factors not under their control (e.g., actuarial risk) (Conrad, 2015). To the extent possible, downside risk should be considered and phased in over time. Lastly, given the experience with these payment models in other states, stakeholders should assure that the lessons learned from other states (e.g., Maryland's experience with rural hospitals) are considered in Indiana.

Bundled Payment Models

Indiana should **move towards increased used of bundled payment reimbursement models among commercial payers**. Bundled payments are a single payment

for all services related to a specific episode of care, typically including a hospitalization, and can potentially span multiple providers and settings. Importantly, the simultaneous implementation of both bundled payments and ACO payment models could create confusion for patients and providers. Thus, bundled payments are viewed as a temporary model that eventually moves providers to more comprehensive alternative payments (e.g., ACOs). To the extent possible as appropriate, commercial payers and providers should work to expand the use of bundled payments especially for episodes of care supported by the literature. Doing so will pave the way for eventual greater use of accountable care models and could more immediately increase competition in price and quality and encourage improved coordination and economies of scale.

- *Relevance to Indiana:* The literature has identified strong candidates for cost reduction from bundled payments, including select orthopedic procedures and a broad range of cancer care. Given the demographic composition of Hoosiers, this creates an opportunity to expand the use of bundled payments for conditions affecting a significant proportion of Indiana residents. In particular, if 'bundles' for a particular procedure (e.g., knee replacement surgery) could be standardized across payer-provider dyads with defined expectations for costs and quality, competition may increase among providers (Khullar & Rajkumar, 2018).
- *Justification:* There is convincing evidence that bundled payments can reduce overall costs without adversely affecting (and frequently improving) quality of care. There is also some evidence that bundled payments improve the coordination of care.
- *Key Stakeholders:* Insurers as a stakeholder group along with providers have an opportunity to expand the use of bundled payments, as appropriate, in Indiana.

All-payer Rate Setting (e.g., Price Caps)

Based upon our literature synthesis and the Indiana context **implementing an all-payer rate setting approach is not recommended**.

- *Rationale:* Convincing evidence from the 1970s and 1980s suggests that all-payer rate caps can reduce costs but also erode quality or worsen population health. More recently, promising evidence from Maryland suggests that while rate caps can reduce costs per hospital

admission, they may inadvertently encourage an increase in inpatient stays as a way to offset the reduction in revenues thus negating the impact on overall costs.

Cost-Shifting

Based on national studies, cost-shifting is unlikely to play a large role in prices and/or cost of care. Thus, **no further action is recommended with respect to this issue** (with one caveat).

- *Rationale:* Cost-shifting from public to private payers was historically more common than in current practice. Convincing contemporary evidence suggests that cost-shifting is unlikely to play a large role in prices or quality; and that market forces such as provider and payer concentration appear to be more prominent determinants of prices. In addition, promising current evidence suggests that rather than cost-shifting, hospitals affected by reductions in governmental payments may delay technology purchases, prune unprofitable services, and/or reduce the quality of care provided.
- *Caveat:* If stakeholders believe that cost-shifting in Indiana might be occurring despite national evidence to the contrary, we recommend an Indiana-specific analysis of this issue to more accurately assess this issue locally. An all-payer claims database (as recommend above) can facilitate such an analysis.

Reference-Based Pricing

Reference-based pricing is a coverage design in which the employer or insurer pays a defined cost of a particular service charged by the provider, with the patient being required to pay the remainder. Payers, including **self-insured employers and traditional insurers, should experiment with reference-based pricing approaches that target cost reductions in non-emergency services and products that have wide price variation with little or no quality variation.** Given their complementary nature, to the extent possible, this approach should be considered concurrently with the use of narrow or tiered networks.

- *Relevance to Indiana:* Given the strong presence of self-insurer employers in Indiana and their high motivation for health care cost control, the use of reference-based pricing deserves further consideration.
- *Justification:* Convincing evidence of cost savings have been observed following the use of reference-based pricing among public, for-profit, and nonprofit payers.

Although the evidence is limited, reference-based pricing does not affect quality or population health.

- *Key Stakeholders:* Employers could collaborate with insurers to pilot test this approach on services or products most amenable to success. Such products or services should be nonemergent, have easily obtainable and shareable price information (with help from an all-payer claims database), and a sufficient number of providers available with little or no variation in quality.

Regulatory Approaches

Regulations Aimed at Increasing Competition

Based upon our literature synthesis and the Indiana context, **there is insufficient evidence on which policies can effectively increase competition. More research should examine ways to effectively increase competition in Indiana.**

- *Relevance to Indiana:* The strongest evidence in the literature pertains to certificate of needs laws (CON) which reduce competition with the potential to affect prices and quality of care. Indiana does not have a CON law for hospital services but recently implemented CON requirements on nursing homes. Determining the effect of CON on nursing homes in Indiana is warranted. Stakeholders have called for increased enforcement of state and federal anti-trust laws in Indiana, but doing so nationally has only marginally slowed provider or insurer mergers, and ultimately has no impact on existing concentration levels. Overall, given the implementation of regulations that can affect competition in Indiana and elsewhere, there is an opportunity to rigorously study the effects of these policies.
- *Justification:* Stricter enforcement of state and federal anti-trust laws has generally reduced provider and payer mergers, but has not affected existing levels of concentration or stopped the competitive decline in most US markets. The extent to which even stricter enforcement of anti-trust laws would have an effect is unknown. Evidence suggests that CON laws could reduce competition and at times adversely affect prices and/or quality of care. An alternative to CON laws, Certificate of Public Advantage (COPA) laws allow mergers to proceed conditional on resource-intensive state regulatory oversight to assure societal benefits. The effectiveness of COPA laws in reducing costs and assuring expected benefits is unknown. Other regulations such as site-neutral payments and banning 'most favored nation'

- or gag clauses in provider-payer contracts have an insufficient evidence base and warrant more research.
- *Key Stakeholders:* The executive and legislative branches of government have an opportunity to more closely study this issue. In particular, in some cases, researchers have noted the role that state attorneys general could play in requiring cost reductions or assurances of society-benefiting activities when consolidation is allowed to occur. Stakeholders should work with researchers to develop and test ways to effectively increase competition in Indiana.

Taxing the Accrued Profits of Nonprofit Hospitals

Based upon our literature synthesis and the Indiana context, **taxing nonprofit hospitals with accrued profits to discourage price increases is not recommended.**

- *Rationale:* Theoretically, such a tax has the potential to influence the market behavior of hospitals and other stakeholders including by affecting prices and/or quality. This approach was raised in a recent Ball State report (Hicks, 2019). However, we found no empirical studies that can inform on the potential benefits or drawbacks associated with this approach. Without further evidence, and given the limited opportunity to evaluate this option, this approach is not recommended.

Physician and Clinical Services

Physician-Facing Price Transparency Tools

We recommend pursuing additional rigorous research to determine if physician-facing price transparency tools, particularly focused on laboratory tests, could reduce overall costs of care in our state. These price transparency tools provide physicians with information on the cost of services at the time of care delivery usually by integrating a system in the electronic medical record.

- *Relevance to Indiana:* Indiana institutions have been recognized nationally for the expertise needed to implement and rigorously study how informatics-based decision-support tools could affect physician decision making.
- *Justification:* There is conflicting evidence on the impact of physician-facing price transparency tools on costs. However, convincing evidence from Indiana has shown a reduction in the number of tests ordered and lower associated costs. Such tools that target laboratory tests show particular promise in achieving desirable effects.

- *Key Stakeholders:* Health systems and academic researchers could partner with payers (employers and insurers) to conduct studies that identify which approaches can yield desired benefits.

End-of-Life Services

We recommend incentivizing increased use of end-of-life services including hospice and palliative care as well as advanced care planning and in-home services.

While the goals of end-of-life care, such as hospice and palliative care, are not cost reduction but rather to improve the quality of remaining life, these services are typically aligned with more efficient use of health care. Additionally, Indiana can benefit from greater incentive to provide advanced care planning and communication of medical orders across all health care settings. While many advanced directives are legally recognized within Indiana, evidence suggests these documents alone may not accomplish improvements in quality or more efficient health care utilization at the end of life. Ultimately, the goal for Indiana should be to facilitate a process by which patients and nursing home residents can plan care consistent with their preferences.

- *Relevance to Indiana:* Indiana recognizes several types of advanced directives, including spoken wishes to physicians (e.g. do not resuscitate), organ and tissue donation, health care representatives, living will declaration, among others. Recently, Indiana passed legislation to legally recognize the Physicians Orders for Scope of Treatment (POST) form as advanced directive, which is used frequently in nursing homes statewide.
- *Justification:* There is convincing evidence that the use of hospice and palliative care has benefits to patients; with promising evidence on cost reduction in some patient populations. Advanced directives and advanced care planning also show some benefits to patients; while the use of in-home services at the end of life has convincing evidence of cost reduction.
- *Key Stakeholders:* As seen by the coalition that supported the POST program in Indiana, stakeholders to enhance advanced care planning could include clinicians, members of the community, and legislators.

Low-Value Care and Wasteful Services

We recommend a concerted effort to reduce low-value care by raising awareness among physicians, patients, and others; and implementing payer-initiated incentives and programs

that target a reduction of low-value services. In addition, addressing low-value care could in part be accomplished synergistically by improving end-of-life care and expanding the use of advance care planning (as described above).

- *Relevance to Indiana:* Given the heightened awareness in Indiana regarding the rising costs of care, and the general agreement that low-value care should be eliminated, collaborating on this issue could serve as a meaningful opportunity for broad stakeholder cooperation.
- *Justification:* Low-value care is responsible for much unnecessary spending and is rooted in a clinical and consumer mindset that believes more care is preferred. Most medical societies embrace reducing low-value care and have identified opportunities to do so. Reducing low-value care will require educating physicians and changing the medical culture which could be supported with extensive information from medical societies that participate in the Choosing Wisely campaign. In addition, a comprehensive campaign to educate consumers on low-value care should be simultaneously pursued.
- *Key Stakeholders:* Payers can partner with medical societies to identify opportunities to educate physicians about low-value care within their scope of practice. Hospital and health systems can use established tools to help identify opportunities to reduce low-value services within their organizations. Payers can leverage opportunities including, as described in the current report, designing incentives that target a reduction of low-value services into their payment models. To the extent feasible, payers could also implement utilization reviews and other cost-management tools targeting low-value services. Lastly, the media, based on the work of Consumer Reports, can work with other stakeholders to develop a campaign to educate Hoosiers about low-value care.

Consumer Focused Approaches

High-Deductible Health Plans (HDHPs)

HDHPs can reduce costs by reducing utilization of both unnecessary and desirable (e.g., preventive services) care. We recommend swiftly **addressing the issue of less utilization of preventive services among patients with high-deductible health plans.**

- *Relevance to Indiana:* Indiana has higher rates of HDHPs than the US overall, but within the range of neighboring states. HDHPs could be further utilized to control costs,

but the higher rates of these plans in Indiana, coupled with the reduced likelihood of preventive service utilization is concerning.

- *Justification:* Convincing evidence suggests that HDHPs can reduce costs by reducing overall utilization of services. Problematically, there is convincing evidence that desirable preventive care decreases for patients on an HDHP—despite being exempt from out-of-pocket costs.
- *Key Stakeholders:* Payers should work with providers and researchers to better understand why patients with HDHPs utilize fewer preventive services. All stakeholders could incentivize patients with HDHPs (including through education) to participate in preventive services. Payers could also clarify patients' expected out-of-pocket costs for preventive screenings that become intervention procedures (e.g., screening colonoscopy with polyp removal) and/or those utilizing anesthesia services (which generate unexpected bills for prevention services to the patient).

Consumer-Facing Price Transparency tools

Based upon our literature synthesis and the Indiana context, **expanding the use of price transparency tools that target consumers is not recommended. However, to the extent possible, the use of consumer-facing quality transparency tools should not be ruled out.**

- *Rationale:* There is inconclusive evidence on the effects of consumer-facing price transparency tools (e.g., websites, apps, telephone hotlines) on costs especially because patients rarely use such tools resulting in a lack of impact on overall consumer behavior. However, there is some convincing evidence that publicly available quality information can improve quality of care (but not health status or population health). Based on scientific evidence, expending resources on consumer-facing price transparency tools is not recommended. If greater consumer transparency is desired, Indiana should consider quality-transparency tools which could yield benefits. Importantly, the transparency afforded by an all-payers claims database, as recommended above, is not intended for consumers but can be of benefit. Thus this database is different than consumer-facing price transparency tools (Brennan & Martin, 2019).

APPENDIX: RESEARCH DESIGNS USED IN CITED STUDIES

Articles cited in the literature syntheses have superscripts indicating the study design used as follows:

1. Systematic Review of Trials and/or Quasi Experiments
2. Randomized Control Trial
3. Instrumental Variable Design
4. Difference in Difference Design
5. Generalized Difference in Difference Design
6. Interrupted Time Series with a Comparison Group
7. Systematic Review or Meta-Analysis
8. Narrative Review of Literature Analysis
9. Pre-Post Design
10. Designs utilizing Propensity Scores or Inverse Probability Weighting
11. Longitudinal Design with Inverse Probability Weighting
12. Pooled Cross Sectional with Temporal Controls
13. Interrupted Time Series
14. Cohort Study
15. Pooled Cross Sectional (Without Temporal Controls)
16. Simulation Study Design
17. Policy Surveillance Study
18. Cross Sectional Design
19. Case Study
20. Geospatial Analysis



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INDIANA UNIVERSITY
RICHARD M. FAIRBANKS SCHOOL OF PUBLIC HEALTH

1050 Wishard Blvd. | Indianapolis, IN 46202
(317) 274-2000 | fsph.iupui.edu



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