

**Proposed Merger Between
Mountain States Health Alliance
and Wellmont Health System**

Expert Report of Robert Town, Ph. D.

August 29, 2017

Submitted to the Attorney General for the Commonwealth of Virginia

Table of Contents

I.	Qualifications.....	1
II.	Case Background and Assignment	1
	A. Virginia Cooperative Agreement Act	1
	B. Assignment	4
III.	Summary of Opinions	7
IV.	Relevant Background.....	13
	A. Overview of the Hospital Systems.....	13
	1. WHS and MSHA Hospitals	13
	2. WHS and MSHA Hospitals Offer Overlapping GAC Inpatient Services	17
	3. WHS and MSHA Outpatient Facilities.....	20
	4. WHS and MSHA Physician Services	21
	B. Overview of Patient Population and Payers.....	23
	1. Traditional Medicare and Medicare Advantage	23
	2. Medicaid	25
	3. Commercial Insurance	26
	4. The Payer Landscape at WHS and MSHA	27
V.	The Proposed Cooperative Agreement	33
	A. Cost Efficiencies	33
	B. Cap on Fixed Rate Increases to Payers	35
	C. Enhancement of the Quality of Hospital and Hospital-related Care.....	36
	D. Improvements in Population Health	39
	E. Preservation of Rural Hospital Facilities Operated by MSHA and WHS	40
VI.	Managed Care Organizations and Hospital Competition	40
	A. Managed Care Organizations.....	40
	B. Hospital Competition Takes Place in Two Stages.....	43
	C. Hospital Prices Are Determined through Negotiations between Hospitals and MCOs	45
	D. Hospital Mergers Can Impact Relative Bargaining Positions	48
VII.	Economic Analysis of the Competitive Impact of the Proposed Cooperative Agreement on Hospital Prices for Commercial Payers	49
	A. Structural Analysis.....	51
	B. Direct Analysis.....	56
	1. Diversion Analysis Indicates that MSHA and WHS Are Each Other’s Closest Competitor	57
	2. WTP Analysis Further Confirms that the Proposed Cooperative Agreement Is Likely to Lead to an Increase in Bargaining Leverage and Lead to Higher Prices.....	65

a.	Overview of the WTP Empirical Strategy	66
b.	Measuring Bargaining Leverage through WTP	67
c.	The Proposed Cooperative Agreement Increases the WTP for the NHS and Will Increase Prices by 24%	68
VIII.	The Parties’ Rate Cap Commitments are Unlikely to Eliminate the Likely Anticompetitive Harm of the Proposed Cooperative Agreement on Hospital Prices.....	69
IX.	The Proposed Cooperative Agreement is Unlikely to Improve Quality.....	75
A.	Evidence Indicates that WHS and MSHA Compete with Each Other on the Basis of Quality.....	78
B.	Economic Studies Largely Indicate that Competition among Hospitals Results in Higher Quality.....	82
C.	Empirical Studies on Previous Hospital Mergers Generally Indicate that Mergers Do Not Improve Quality.....	86
D.	Quality Enhancement Commitments of the Proposed Cooperative Agreement Are Unlikely to Compensate for the Agreement’s Likely Harm on Quality.....	88
X.	The Claimed Cost Efficiencies Are Unsubstantiated, Can Largely be Achieved through Alternative Transactions, and Unlikely to Compensate for the Likely Harm Resulting from the Proposed Cooperative Agreement	92
XI.	The Proposed Cooperative Agreement Is Not Necessary to Improve the Population Health of the Region.....	96
A.	MSHA and WHS Have Already Made Significant Investments in Population Health Programs	98
B.	MSHA and WHS Are Likely to Continue to Invest in Population Health Programs Even without the Proposed Cooperative Agreement Due to the Emerging Value-Based Healthcare Economy	101
1.	MSHA and WHS Have Already Been Engaged in Various Forms of Value-Based Contracting with Payers.....	101
2.	MSHA and WHS Are Likely to Continue to Engage in Value- Based Contracting.....	103
C.	MSHA and WHS are Likely to Continue to Invest in Population Health Programs Even without the Proposed Cooperative Agreement Due to the Emerging Partnerships with Social Serviced Providers to Improve Population Health.....	105
XII.	Assessment of the Preservation of Rural Hospital Facilities	107
A.	The Parties Do Not Provide Adequate Analysis to Substantiate Their Claim That the Rural Hospitals Would Likely Close Absent the Merger	107
B.	The Parties Provide a Limited Commitment to Preserve Rural Hospitals.....	110
XIII.	Rebuttal of Parties’ Expert Reports	111
A.	Challenging Market Conditions and the Potential Closure of Hospitals in Rural Areas	113

B.	Complementarity of the Merging Parties.....	115
C.	Economies of Scale.....	116
D.	Impact of the Merger on the Parties' Incentives.....	118
E.	Cost-Savings from the Merger.....	120
F.	Impact of the Merger on Competition in Physician Services.....	121
G.	The Parties' Price Cap Commitments.....	122
H.	Initiatives to Improve the Population's Health in the Region.....	123

I. Qualifications

1. I am the James L. and Nancy Powell Professor of American Economic Principles in the Department of Economics at the University of Texas at Austin, and I am a Research Associate at the National Bureau of Economic Research located in Cambridge, Massachusetts. I have a B.A. in Economics from the University of Washington. I received M.S. and Ph.D. degrees in Economics from the University of Wisconsin-Madison. Prior to joining the faculty at the University of Texas, I held faculty positions at the Wharton School at the University of Pennsylvania, the University of Minnesota, and at the University of California-Irvine. I was also a staff economist in the Antitrust Division of the U.S. Department of Justice (“DOJ”).

2. I specialize in industrial organization and applied econometrics. Much of my research centers on measuring the impact of competition in the health care sector; however, the methodological approaches I develop and employ are relevant for analysis across a broad variety of market settings. I have published numerous articles in academic journals and published chapters in books. I currently teach a Ph.D. course in industrial organization at the University of Texas. I have previously served as an economic expert in numerous matters for the DOJ and the U.S. Federal Trade Commission (“FTC”). My curriculum vita, which includes a list of my publications and a list of my prior expert work, is attached as Appendix A to this report.

II. Case Background and Assignment

A. Virginia Cooperative Agreement Act

3. According to Code of Virginia Code § 15.2-5384.1, entitled the Review of Cooperative Agreements, a hospital may negotiate and enter into proposed cooperative

agreements with other hospitals in the Commonwealth if “the likely benefits resulting from the proposed cooperative agreements outweigh any disadvantages attributable to a reduction in competition that may result from the proposed cooperative agreements.”¹

4. The Southwest Virginia Health Authority (the “Authority”) reviews a proposed cooperative agreement in consideration of the Commonwealth’s policy to facilitate improvements in the quality of hospital and hospital-related care, enhancements of population health in the region, preservation of hospital facilities in geographical proximity to the communities traditionally served by those facilities to ensure access to care, and gains in the cost-efficiency of services provided by the merging hospitals, among others.²

5. The Authority’s evaluation of any disadvantages attributable to any reduction in competition likely to result from the proposed cooperative agreement includes:³

6. The extent of any likely adverse impact of the proposed cooperative agreement on the ability of health care payers to negotiate reasonable payment and service arrangements with hospitals, physicians, or other health care providers;

7. The extent of any reduction in competition among physicians or other health care providers furnishing goods or services to, or in competition with, hospitals that is likely to result directly or indirectly from the proposed cooperative agreement;

8. The extent of any likely adverse impact on patients in the quality, availability, and price of health care services; and

¹ § 15.2-5384.1, Section B.

² § 15.2-5384.1, Section E.

³ § 15.2-5384.1, Section E.

9. The availability of alternative arrangements that are less restrictive to competition and generate the same or better benefits over disadvantages attributable to any reduction in competition likely to result from the proposed cooperative agreement.

10. The Authority determines whether the proposed cooperative agreement should be recommended for approval by the Virginia State Health Commissioner (the “Commissioner”) within 75 days of the submission date of the completed application for the proposed cooperative agreement.⁴ The Commissioner then consults with the Attorney General for the Commonwealth of Virginia (the “Attorney General”) regarding his assessment of whether to approve the proposed cooperative agreement.⁵ The Commissioner approves the proposed cooperative agreement if she finds that the benefits likely to result from the proposed cooperative agreement outweigh the disadvantages likely to result from a reduction in competition due to the proposed cooperative agreement.⁶ The Commissioner’s evaluation of the anticompetitive harm and the procompetitive benefits of the proposed cooperative agreement must use the same criteria as the Authority is directed to use under Virginia Cooperative Agreement Act.⁷ The Commissioner issues her decision in writing within 45 days of receipt of the Authority’s recommendation.⁸

⁴ § 15.2-5384.1, Section D.

⁵ § 15.2-5384.1, Section F.

⁶ § 15.2-5384.1, Section F.

⁷ § 15.2-5384.1, Section F.

⁸ If the Commissioner has requested additional information from the applicants, the Commissioner will have an additional 15 days, following receipt of the supplemental information, to approve or deny the proposed cooperative agreement. *See* § 15.2-5384.1, Section F.

11. Mountain States Health Alliance (“MSHA”) and Wellmont Health System (“WHS”) [collectively, the “Parties”] submitted an application on February 16, 2016⁹ to the Authority, and simultaneously submitted copies to the Commissioner and the Attorney General, to request the issuance of a letter authorizing a cooperative agreement (or merger) between MSHA and WHS under Code of Virginia Code § 15.2-5384.1. On July 25, 2017, the Parties submitted the Tennessee Terms of Certification that would govern the Certificate of Public Advantage (“COPA”) authorizing the proposed cooperative agreement.¹⁰ I understand that, as of the submission date of this report, the commitments in these Terms of Certification have not been accepted by the Parties.

B. Assignment

12. I have been retained by the Attorney General to assess the likely competitive effects of and the claimed cost efficiencies and benefits resulting from the proposed cooperative agreement between MSHA and WHS.

13. I evaluate the proposed cooperative agreement consistent with the approach outlined in the Virginia Cooperative Agreement Act. I first assess the impact of the lessened competition likely to result from the proposed cooperative agreement on prices of hospital services charged by the Parties to commercial payers. Next, I assess the impact of the proposed cooperative agreement on the quality of healthcare and hospital services

⁹ Commonwealth of Virginia, Application for a Letter Authorizing Cooperative Agreement, Pursuant to Virginia Code § 15.2-5384.1 and the regulations promulgated thereunder at 12VAC5-221-10 *et seq.*, submitted by Mountain States Health Alliance and Wellmont Health System, February 16, 2016 (“Virginia Application”).

¹⁰ Tennessee Terms of Certification Governing the Certificate of Public Advantage Issued for the Master Affiliation Agreement and Plan of Integration Between Mountain States Health Alliance and Wellmont Health System, July 25, 2017 (“Terms of Certification”).

provided by the Parties. These two steps constitute the evaluation of any harm attributable to any reduction in competition likely to result from the proposed cooperative agreement.

14. I then assess the Parties' basis for the claimed cost efficiencies due to the proposed cooperative agreement. In particular, I evaluate the Parties' assertion that a merger with an out-of-region hospital system cannot achieve some of the efficiencies that the proposed cooperative agreement can achieve.

15. Next, I assess the claimed benefits of the proposed cooperative agreement. First, I identify the patient population that is not covered by the price cap commitments offered by the Parties to protect consumers from "pricing increases that could otherwise result from the elimination of competition."¹¹ I then evaluate the extent to which those price cap commitments are likely to mitigate anticompetitive harm likely to result from the proposed cooperative agreement. Second, I evaluate the population health and quality improvement provisions included in the proposed cooperative agreement, and analyze the Parties' claim that the proposed cooperative agreement would lead to the preservation of hospital facilities in the Parties' hospitals in rural areas. Finally, I weigh these claimed benefits against the anticompetitive harm likely to result from the proposed cooperative agreement.

¹¹ Virginia Application, Commitment Chart, Commitment No. 2.

16. I also respond to the three expert reports submitted by the Parties in support of their proposed cooperative agreement: the Compass Report, the Advisory Board Report, and the HCI Report.¹²

17. My work on this matter relies on my professional training, my government and prior consulting experience, my teaching, my research, and relevant academic literature. I have also examined and analyzed documents, data, and testimony¹³ relevant to this matter. In addition, I have reviewed the FTC Staff Public Comment Submission to the Authority,¹⁴ the FTC Staff Public Comment Submission to the Tennessee Department of Health,¹⁵ and two reports by Kenneth W. Kizer,¹⁶ who has been asked by the FTC to assess the claimed benefits of the proposed cooperative agreement.¹⁶ Appendix B includes a complete list of data and materials that I have relied upon to form my opinions and conclusions in this report. I reserve the right to amend or update the opinions in this report should additional information be made available to me.

¹² Margaret Guerin-Calvert, Independent Assessment of the Benefits and Disadvantages in the Proposed Merger of Mountain States Health Alliance and Wellmont Health System,” Compass Lexecon, LLC, April 11, 2017 (“Compass Report”); Independent Assessment of Ballad Health’s Likelihood of Successfully Navigating the Narrow Corridor in a Merged Integrated Delivery System, Prepared for Mountain States Health Alliance and Wellmont Health System, Advisory Board Consulting, April 7, 2017 (“Advisory Board Report”); Ballad Health Population Health Improvement Plan, Capacity and Preparedness Assessment and Recommendations, Conduent Community Health Solutions, Healthy Communities Institute, (“HCI Report”).

¹³ Declaration of Colin Drozdowski, December 18, 2015 (“Drozdowski Declaration”).

¹⁴ Federal Trade Commission Staff Submission to the Southwest Virginia Health Authority and Virginia Department of Health Regarding Cooperative Agreement Application of Mountain States Health Alliance and Wellmont Health System, September 30, 2016 (“FTC Staff Submission to Virginia”).

¹⁵ Federal Trade Commission Staff’s Third Submission to the Tennessee Department of Health Regarding the Certificate of Public Advantage Application of Mountain States Health Alliance and Wellmont Health System, July 18, 2017.

¹⁶ Kenneth W. Kizer, MD., MPH., Independent Assessment of the Proposed Merger Between Mountain States Health Alliance and Wellmont Health System, November 21, 2016 (“Kizer Report”), p. 1; Kenneth W. Kizer, MD., MPH., Supplemental Report Regarding the Proposed Merger Between Mountain States Health Alliance and Wellmont Health System, July 18, 2017.

18. I am being compensated at my standard billing rate of \$800 per hour. I have been assisted in this matter by staff of Cornerstone Research, who worked under my direction. I receive compensation from Cornerstone Research based on its collected staff billings for its support of me in this matter. Neither my nor Cornerstone Research's compensation is contingent upon the conclusions I reach or on the outcome of this matter.

III. Summary of Opinions

19. MSHA and WHS are the two largest hospital systems in the 21-county area¹⁷, encompassing the Southwest Virginia and Northeast Tennessee areas. Both hospital systems are similar in the range and scope of general acute care inpatient services they provide, as well as in several outpatient services and physician specialty service lines. They are each other's closest competitor, and no other hospital system comes close to WHS as a competitor to MSHA or to MSHA as a competitor to WHS. The proposed cooperative agreement will eliminate that competition, and likely lead to a combined healthcare system having a 77% share in general acute care inpatient services, and shares of over 50% in several outpatient and physician specialty services. This substantial decrease in competition is likely to result in anticompetitive harm in the form of higher hospital prices, and lessened quality of care and hospital services.

20. In order to counterbalance this likely anticompetitive harm, the Parties claim, if the proposed cooperative agreement is approved and implemented, that certain amount of cost efficiencies will be achieved, a portion of which will be passed through to consumers

¹⁷ The Parties state in the Virginia Application that the combined hospital system will primarily serve 21 counties and two independent cities in Northeast Tennessee and Southwest Virginia. The Parties designate this 21-county area as their "geographic service area." See Virginia Application, p. 14, 16 for a list of these counties.

in the form of price cap commitments, higher quality, improvements in the population health of the region, and preservation of the Parties' rural hospitals. However, those claimed cost efficiencies and the corresponding claimed benefits are unsupported and can largely be achieved without the proposed cooperative agreement, or through a merger with an out-of-region hospital system that is likely to be less of an anticompetitive threat, and more importantly, is unlikely to offset the agreement's negative impact on prices and quality.

21. Economic research provides a framework in which the likely impact of proposed hospital mergers can be evaluated. Specifically, hospitals compete with one another in two stages. In the first stage, hospitals compete with each other, largely on the basis of price, to be included in a Managed Care Organization ("MCO")'s network. Once a hospital system is included in an MCO provider network, in the second stage, the hospital competes with other hospital systems to attract patients mainly on the basis of non-price factors, such as quality, location, and physician referral base. Prices for hospital services are determined through contract negotiations, or "bargaining," between hospitals and MCOs in the first stage of the hospital competition. These negotiations result in either the inclusion of a hospital system in an MCO's network at an agreed price, or a failure between the MCO and the hospital system to reach an agreement. The price (and non-price factors) depends on how costly it would be for the parties if negotiations fail. This cost of failing to reach an agreement is informed by parties' walk-away point, i.e., the price at which either party would be just as well off not reaching an agreement. If the bargaining hospital demands rates higher than the rates that the MCO is willing to pay, the MCO will refuse to contract with the hospital system and will walk-away from the

negotiations. On the other hand, if the bargaining MCO refuses to pay rates above the hospital system's walk-away point, the hospital system will refuse to contract with the MCO. Each party's walk-away point determines the bargaining leverage it has in the negotiation.

22. An assessment of a proposed hospital merger primarily focuses on the proposed merger's potential impact on this bargaining process. All else equal, the more proximate substitutes the merging hospitals are for one another, the larger the gain in bargaining leverage and the higher the post-merger price increases (See Section VI).

23. In the case of the proposed cooperative agreement, I find that the bargaining leverage of the combined hospital system is likely to increase, thus leading to higher prices. This conclusion is based on both structural and direct analyses. In my structural analysis, I examine the impact of the proposed cooperative agreement on concentration in the 21-county area, the Parties' geographic service area. I find that the proposed cooperative agreement is likely to lead to a New Health System ("NHS"), also referred to by the Parties as "Ballad Health," with a share of 77% of GAC inpatient discharges in the 21-county area. I also find that the proposed cooperative agreement leads to a post-cooperative agreement HHI of 5,989 and a change in HHI of 2,688, which far exceed the levels at which antitrust regulators presume that a merger will likely enhance market power. In my direct analysis, I analyze the impact of the proposed cooperative agreement on prices using an econometric analysis that estimates patients' hospital choice. I find that MSHA and WHS are each other's closest competitors—specifically, if WHS hospitals were no longer available, 88% of WHS patients would switch to a MSHA hospital. Similarly, if MSHA hospitals were no longer available, 81% of MSHA patients would

switch to a WHS hospital. Based on the same patient choice model, I also estimate that the proposed cooperative agreement is likely to increase the prices of GAC inpatient care paid by commercial payers, on average, by at least 24% (See Section VII).

24. “In order to ensure pricing is not increased as a result of the elimination of inpatient competition,” the Parties commit to capping price increases for “Principal Payers” (defined as “commercial payers and governmental payers with negotiated rates who provide more than two percent (2%) of the New Health System’s total net revenue”). However, the proposed rate cap commitments are unlikely to offset the anticompetitive harm likely to result from the proposed cooperative agreement, because they do not prevent the NHS from exercising its increased bargaining leverage to obtain favorable terms from payers in non-price dimensions; are not likely to be effective—that is, they do not guarantee that the NHS’s prices, even with these commitments in place, would not exceed the prices that the payers would have negotiated with the Parties absent the proposed cooperative agreement; and do not apply to payers other than Principal Payers, nor do they apply to value-based contracts. Notably, even though the Parties endorse the proposed cooperative agreement as “greatly accelerat[ing] the move from volume-based health care to value-based health care,” the proposed price cap commitments do not apply to value-based and risk-based contracts (See Section VIII).¹⁸

25. Regarding the impact of the proposed cooperative agreement on quality, a predominant non-price dimension of the second stage of hospital competition, I find that the proposed cooperative agreement is more likely than not to reduce quality due to the elimination of competition between the Parties. The claimed quality enhancement

¹⁸ Virginia Application, p. 9.

initiatives offered by the Parties (such as the consolidation of certain clinical services, standardization of management and clinical practice policies and procedures, establishing a Common Clinical IT Platform, and expanding quality reporting) are not supported, are largely not merger specific, and are not likely to offset the agreement's negative impact on the level of quality offered by the Parties (See Section IX).

26. The Merger Guidelines recognize that mergers can potentially generate significant amounts of cost efficiencies, which must be weighed against the likely anticompetitive harm in assessing a proposed merger. According to Merger Guidelines, cost efficiencies must be non-speculative and measurable; must be merger-specific—that is, they would not have been achieved by merging parties in the normal course of business, absent their merger, or they would not have been achieved through an alternative transaction with comparable antitrust concerns; and must be passed through to consumers. When applying these criteria, I find that the Parties' claimed cost efficiencies (\$121 million annually) are unlikely to offset the anticompetitive harm likely to result from the proposed cooperative agreement because they are unverifiable and can largely be achieved through alternative transactions, and are unlikely to be passed through to consumers in the form of the Parties' claimed benefits (See Section X).

27. Specifically, I have analyzed two such claimed benefits: improvements in the population health of the region and preservation of the Parties' rural hospitals. With respect to the claimed population health improvement, the proposed cooperative agreement is not necessary. This is because MSHA and WHS have already made significant investments in population health programs and are likely to continue to invest in these programs even without the proposed cooperative agreement for at least two

reasons. First, MSHA and WHS have already engaged in various forms of value-based contracting with payers and are likely to continue to engage in these programs due to the emerging value-based healthcare economy. Such programs encourage healthcare providers to manage the care of their population with chronic conditions and encourage health-promoting behaviors. Second, health outcomes of populations are determined more by social factors than by increasing medical care. Therefore, to fully influence the health of their population, the hospital systems participate—and are likely continue to participate—in partnerships with community based organizations, such as nutrition support programs and housing authorities, to influence the social determinants of health. Participation in such partnerships does not require a merger. Further, due to the increasing trend in value-based healthcare and the increasing trend in providers’ partnerships with social institutions to improve social and environmental aspects of care, any other system is likely to engage in value-based contracting or participate in partnerships with community based organizations. Thus, the claimed population health benefits can be achieved through merging with an out-of-region hospital system that is likely to raise fewer antitrust concerns (See Section XI).

28. The Parties’ claim that it would be difficult to maintain rural hospital facilities but for the proposed cooperative agreement is unsubstantiated. In particular, they have not provided any analysis as to the profitability of each of these hospitals or any ordinary course document showing that the closure of rural hospitals has, in fact, been considered absent the proposed cooperative agreement. Further, the Parties’ commitments to preserve the rural hospitals are vague and limited at best, casting doubt on the necessity and the benefits of this commitment (See Section XII).

29. Further, the Parties confirm that the claimed benefits of the proposed cooperative agreement are contingent on achieving the projected cost efficiencies. Thus, to the extent that the Parties cannot achieve those claimed cost efficiencies, or can achieve only a portion of them, the Parties would not be able to fulfill their commitments and fully achieve these claimed benefits.

30. The Parties have submitted three expert reports in support of their proposed cooperative agreement: the Compass Report, the Advisory Board Report, and the HCI Report. None of these alters the opinions developed in this report. In particular, the Compass Report does not provide adequate economic analysis of the competitive effects of the merger or its potential benefits. It does not analyze the claimed benefits or the competitive effects of the proposed merger and cannot, on the basis of the information it presents, determine whether the benefits of the proposed merger outweigh its disadvantages (See Section XIII).

IV. Relevant Background

A. Overview of the Hospital Systems

1. WHS and MSHA Hospitals

31. Formed in 1996 as a result of the merger between Holston Valley Medical Center in Kingsport, Tennessee and Bristol Regional Medical Center in Bristol, Tennessee, WHS is a Tennessee not-for-profit integrated health system,¹⁹ with seven hospitals serving the Northeast Tennessee and Southwest Virginia areas. Table 1 lists these seven hospitals and their characteristics, including geographic location (county and state), teaching status,

¹⁹ [REDACTED]

number of staffed beds, and trauma center information. Of the seven hospitals, five are located in Tennessee and two are located in Virginia. Both of WHS’s trauma centers are located in Tennessee, making WHS is the only health system in the state of Tennessee with two major trauma centers.²⁰ Holston Valley Medical Center is the region’s first Level I Trauma Center, and Bristol Regional Medical Center is the only Level II Trauma Center in Tennessee.²¹

Table 1: WHS Hospitals

Hospital	County	State	Type of Facility	Teaching Status	Staffed Beds	Trauma Center
Bristol Regional Medical Center	Sullivan	TN	Short Term Acute Care	Y	284	Level II
Hancock County Hospital	Hancock	TN	Critical Access	N	10	
Hawkins County Memorial Hospital	Hawkins	TN	Short Term Acute Care	N	30	
Holston Valley Medical Center	Sullivan	TN	Short Term Acute Care	Y	363	Level I
Lonesome Pine Hospital	Wise	VA	Short Term Acute Care	Y	129	
Mountain View Regional Medical Center	Norton City	VA	Short Term Acute Care	N	98	
Takoma Regional Hospital	Greene	TN	Short Term Acute Care	N	100	

Source: American Hospital Directory Hospital Profiles; “Trauma Care.” Wellmont Health System, <http://www.wellmont.org/Medical-Services/Emergency-and-Trauma/Trauma-Care.aspx>, accessed on December 16, 2016.

32. WHS has a strong cardiovascular program. The hospital system’s CVA Heart Institute is nationally recognized and the system also has the region’s only Level One

²⁰ “About Wellmont Health System.” Wellmont Health System, <http://www.wellmont.org/Our-Mission/About-Us/>, accessed on December 16, 2016.

²¹ “Trauma Care.” Wellmont Health System, <http://www.wellmont.org/Medical-Services/Emergency-and-Trauma/Trauma-Care.aspx>, accessed on December 16, 2016.

Heart Attack Network.²² WHS hospitals have received many awards and recognition, especially with respect to cardiovascular care. Holston Valley Medical Center was recognized as the best in the nation at interventional carotid care by CareChex and has been recognized for superior treatment for heart attack patients by the Mission: Lifeline program.²³ Bristol Regional Medical Center was also named by CareChex as one of the Top 100 hospitals in the nation for heart attack treatment.²⁴

33. Founded in 1998, MSHA is also a Tennessee not-for-profit health system, serving the Northeastern Tennessee and Southwestern Virginia areas. MSHA has fourteen hospitals, including a tertiary hospital with a Level I Trauma Center, a children’s hospital, several community hospitals, two critical access hospitals, and one behavioral health hospital. Table 2 provides a list of MSHA hospitals and their characteristics. Like WHS, most of MSHA hospitals are located in Tennessee— specifically, ten are located in Tennessee. MSHA’s only trauma center is also located in Tennessee. That is, neither hospital system has a trauma center in Virginia.

²² “About Wellmont Health System.” Wellmont Health System, <http://www.wellmont.org/Our-Mission/About-Us/>, accessed on December 16, 2016.

²³ “Holston Valley Medical Center.” Wellmont Health System, <http://www.wellmont.org/Holston-Valley-Quality-Awards-and-Recognition/>, accessed on December 16, 2016.

²⁴ “Bristol Regional Medical Center.” Wellmont Health System, <http://www.wellmont.org/Our-Facilities/Hospitals-And-Medical-Centers/Bristol-Regional-Medical-Center/>, accessed on December 16, 2016.

Table 2: MSHA Hospitals

Hospital	County	State	Type of Facility	Teaching Status	Staffed Beds	Trauma Center
Dickenson Community Hospital	Dickenson	VA	Critical Access	Y	2	
Franklin Woods Community Hospital	Washington	TN	Short Term Acute Care	Y	114	
Indian Path Medical Center	Sullivan	TN	Short Term Acute Care	Y	159	
Johnson City Medical Center	Washington	TN	Short Term Acute Care	Y	525	Level I
Johnson County Community Hospital	Johnson	TN	Critical Access	Y	2	
Johnston Memorial Hospital	Washington	VA	Short Term Acute Care	Y	116	

(table continues on next page)

34. MSHA hospitals have won several awards. For example, its children’s hospital has won numerous awards for quality of care, and two of MSHA’s community hospitals, Franklin Woods Community Hospital and Johnson City Medical Center, have been ranked in the Top 100 hospitals in the country by Becker’s Hospital Review. Additionally, Johnson City Medical Center, Indian Path Medical Center, and Sycamore Shoals Hospital have been recognized for their quality of services with respect to cardiac care.²⁵

35. Tennessee patients account for a significant portion of discharges at both hospital systems. During the period from July, 2014 through June, 2015, █% of discharges at WHS and █% of discharges at MSHA were from Tennessee zip codes.²⁶

²⁵ “Awards and Recognition.” Mountain States Health Alliance, <https://www.mountainstateshealth.com/about-us/awards-and-recognition>, accessed on December 16, 2016.

²⁶ MSHA Inpatient Data; WHS Inpatient Data. Analysis is limited to discharges from 7/1/14–6/30/15, excluding newborns.

Table 2: MSHA Hospitals
(cont.)

Hospital	County	State	Type of Facility	Teaching Status	Staffed Beds	Trauma Center
Laughlin Memorial Hospital	Greene	TN	Short Term Acute Care	N	230	
Niswonger Children's Hospital	Washington	TN	Children's	Y	0	
Norton Community Hospital	Norton City	VA	Short Term Acute Care	Y	62	
Quillen Rehabilitation Hospital	Washington	TN	Rehabilitation	N	26	
Russell County Medical Center	Russell	VA	Short Term Acute Care	Y	69	
Smyth County Community Hospital	Smyth	VA	Short Term Acute Care	Y	153	
Sycamore Shoals Hospital	Carter	TN	Short Term Acute Care	Y	121	
Unicoi County Memorial Hospital	Unicoi	TN	Short Term Acute Care	Y	94	
Woodridge Hospital	Washington	TN	Psychiatric	Y	0	

Source: American Hospital Directory Hospital Profiles; "Medical Services." Mountain States Health Alliance, <https://www.mountainstateshealth.com/medical-services>, accessed on December 15, 2016.

2. WHS and MSHA Hospitals Offer Overlapping GAC Inpatient Services

36. Table 3 shows WHS and MSHA 2015 generalized acute care (“GAC”) inpatient discharges by Major Diagnostic Category (“MDC”)²⁷ for all commercial payers in the 21-county area. As the table shows, the two hospital systems are similar in the range and scope of services they provide.²⁸ Both hospitals provide services in each MDC. When commercial GAC inpatient discharges are considered, Diseases and Disorders of the

²⁷ These categories are formed by grouping all principal diagnoses into 25 mutually exclusive diagnosis areas. “Draft ICD-10-CM/PCS MS-DRGv31.0 Definitions Manual.” Centers for Medicare & Medicaid Services, <https://www.cms.gov/icd10manual/version31-fullcode-cms/P0001.html>, accessed on December 16, 2016.

²⁸ Analysis excludes MDC 15 (Newborns and Other Neonates with Conditions), MDC 19 (Mental Diseases and Disorders), MDC 20 (Alcohol/Drug Use and Alcohol/Drug Induced Organic Mental Disorders), and MDC 23 (Factors Influencing Health Status and Other Contacts with Health Services).

Circulatory System (MDC 05) and Pregnancy and Childbirth (MDC 14) services account for the largest and second largest portions of discharges at both hospital systems, respectively. Specifically, discharges for Diseases and Disorders of the Circulatory System (MDC 05) account for 16% of MSHA discharges and 19% for WHS discharges. Discharges for Pregnancy and Childbirth (MDC 14) account for 16% of both MSHA's and WHS's discharges.

Table 3: MSHA and WHS Commercial GAC Inpatient Discharges by MDC

MDC	Service Line	Discharges		Share of Discharges	
		MSHA	WHS	MSHA	WHS
01	Diseases & Disorders Of The Nervous System	435	272	4%	5%
02	Diseases & Disorders Of The Eye	323	200	3%	4%
03	Ear, Nose, Mouth, Throat And Craniofacial Diseases And Disorders	73	31	1%	1%
04	Diseases & Disorders Of The Respiratory System	1,282	752	13%	14%
05	Diseases & Disorders Of The Circulatory System	1,604	989	16%	19%
06	Diseases & Disorders Of The Digestive System	1,049	451	11%	9%
07	Diseases & Disorders Of The Hepatobiliary System & Pancreas	419	195	4%	4%
08	Diseases & Disorders Of The Musculoskeletal System & Conn Tissue	803	602	8%	11%
09	Diseases & Disorders Of The Skin, Subcutaneous Tissue & Breast	273	87	3%	2%
10	Endocrine, Nutritional & Metabolic Diseases & Disorders	383	149	4%	3%
11	Diseases & Disorders Of The Kidney & Urinary Tract	365	141	4%	3%
12	Diseases & Disorders Of The Male Reproductive System	32	19	0%	0%
13	Diseases & Disorders Of The Female Reproductive System	124	136	1%	3%
14	Pregnancy, Childbirth & The Puerperium	1,559	858	16%	16%
16	Diseases & Disorders Of Blood, Blood Forming Organs And Immunolog Disord	86	46	1%	1%
17	Lymphatic, Hematopoietic, Other Malignancies, Chemotherapy And Radiotherapy	36	26	0%	0%
18	Infectious & Parasitic Diseases, Systemic Or Unspecified Sites	685	208	7%	4%
21	Poisonings, Toxic Effects Other Injuries And Other Complications Of Treatment	134	69	1%	1%

(table continues on next page)

Table 3: MSHA and WHS Commercial GAC Inpatient Discharges by MDC
(cont.)

MDC	Service Line	Discharges		Share of Discharges	
		MSHA	WHS	MSHA	WHS
22	Burns	3	4	0%	0%
24	Human Immunodeficiency Virus Infections	51	39	1%	1%
25	Multiple Significant Trauma	3	4	0%	0%
	Pre-MDC	22	23	0%	0%
Total		9,744	5,301	100%	100%

Source: State Discharge Data for Tennessee and Virginia, 2015

Note: Analysis is limited to commercial GAC discharges associated with patients from the 21-county Area, excluding newborns, seniors, and transfers from other hospitals and facilities. WHS does not include Wellmont Ridgeview Pavilion Bristol, an adult inpatient psychiatric hospital.

3. WHS and MSHA Outpatient Facilities

37. WHS and MSHA also have outpatient facilities within the 21-county area²⁹ encompassing Northeast Tennessee and Southwest Virginia. Table 4 shows WHS and MSHA outpatient facilities shares by service type. As the table indicates, if the proposed cooperative agreement is approved and implemented, the combined shares of WHS and MSHA will increase to 50% or higher in several services, based on the number of outpatient facilities in the region. Specifically, the NHS will have a 50% share in Urgent Care, a 55% share in both Radiation Therapy and Cancer Center, a 56% share in Chemotherapy, and a 51% share in CT services.

²⁹ The Parties state in the Virginia Application that the combined hospital system will primarily serve 21 counties and two independent cities in Northeast Tennessee and Southwest Virginia. The Parties designate this 21-county area as their “geographic service area.” See Virginia Application, p. 14, 16 for a list of these counties.

**Table 4: MSHA and WHS Outpatient Facilities Share by Service
21-County Area**

	MSHA	WHS	Other ^[1]
Pharmacy	1%	0%	99%
Fitness Center	0%	0%	100%
XRAY	15%	13%	72%
Nursing Home	5%	3%	92%
Physical Therapy	2%	5%	93%
Home Health	13%	3%	83%
Rehabilitation	21%	19%	60%
CT	28%	23%	49%
MRI	27%	17%	56%
Surgery - Endoscopy	29%	16%	55%
Urgent Care	25%	25%	50%
Surgery - Hospital-based	30%	17%	53%
Dialysis Services	0%	0%	100%
Wellness Center	10%	5%	86%
Surgery - ASC	14%	21%	64%
Chemotherapy ^[2]	28%	28%	44%
Rehabilitation and Physical Therapy	0%	31%	69%
Radiation Therapy	27%	27%	45%
Cancer Center	27%	27%	45%
Weight Loss Center	0%	14%	86%
Community Center	0%	0%	100%
Cancer Support Services	0%	0%	100%
Women's Cancer Services	0%	100%	0%

Sources: Virginia Application, Exhibit 14.1 Section A.

Notes: This table excludes four Surgery - ASC outpatient facilities that are non-managed joint ventures between the parties.

[1] Includes facilities serving patients from the 21-county Area, but that are located outside of the 21-county Area.

[2] For MSHA, includes one outpatient facility that is a Mountain States-NsCH Affiliate.

4. WHS and MSHA Physician Services

38. In addition to inpatient and outpatient services, WHS and MSHA provide physician services. Wellmont Medical Associates, the physician services component of the health system, is comprised of physicians and specialists staffed at practices located

throughout Northeast Tennessee and Southwest Virginia.³⁰ The group was honored with the 2014 Acclaim Award by the American Medical Group Association for its commitment to service and excellence. It was the only honoree in their region.³¹

39. MSHA has over 1,000 physicians working for or associated with the health system.³² With respect to primary care services, MSHA has more than 300 providers at more than 100 locations in Eastern Tennessee and Southwest Virginia. MSHA primary care physicians typically specialize in both family medicine and internal medicine.³³

40. Amongst all physicians considered in the 21-county service area, the combined shares of WHS and MSHA, if the proposed cooperative agreement is approved and implemented, will increase to 50% or higher in several physician services. Specifically, the NHS will have a 51% share in Pain Management, a 57% share in Cardiothoracic Surgery, a 62% share in Pulmonology, an 80% share in Occupational Medicine, an 85% share in Hematology/Oncology, an 86% share in Cardiology, and a 83% share in Hospital Medicine.³⁴

³⁰ “Our Facilities and Locations.” Wellmont Health System, <http://www.wellmont.org/Our-Facilities/>, accessed on December 16, 2016; “Wellmont Medical Associates Office Locations,” <http://www.wellmont.org/Our-Facilities/Physician-Offices/>, accessed on December 16, 2016; “About Wellmont Medical Associates.” Wellmont Health System, <http://www.wellmont.org/Wellmont-Physicians/Wellmont-Medical-Associates/About-Us/>, accessed on December 16, 2016.

³¹ “Wellmont Medical Associates Is an Acclaim Award Honoree.” Wellmont Health System, <http://www.wellmont.org/Wellmont-Physicians/Wellmont-Medical-Associates/AMGA-Acclaim-Award/>, accessed on December 16, 2016.

³² “Welcome to Mountain States Health Alliance.” Mountain States Health Alliance, <https://www.mountainstateshealth.com/>, accessed on December 16, 2016.

³³ “Primary Care.” Mountain States Health Alliance, https://www.mountainstateshealth.com/medical-services/primary-care#custom_1f18cbc6-6c7f-4a70-82ae-407c7a1a9238, accessed on December 16, 2016.

³⁴ Virginia Application, Exhibit 14.1, Section E. The NHS shares are calculated as the sum of WHS, MSHA, and MSHA Affiliate shares.

B. Overview of Patient Population and Payers

41. GAC inpatients treated at WHS and MSHA are enrollees of a number of commercial payers, governmental payers (primarily Medicare and Medicaid³⁵), or self-pay.³⁶ I will briefly describe these different payers below. I will also address the payer landscape at the two hospital systems.

1. Traditional Medicare and Medicare Advantage

42. In order to be eligible for the U.S. Medicare program, the largest governmental payer, individuals must be at least age 65 or older, or must have certain disabilities if under the age of 65. The eligible beneficiaries can receive health insurance through: (1) Traditional Medicare, which is federal government-provided or (2) Medicare Advantage, which are privately provided plans that are funded by the federal government.³⁷ Under Traditional Medicare, Medicare Part A provides beneficiaries coverage for acute inpatient services, and Medicare Part B provides coverage for physician and outpatient services.³⁸ The Centers for Medicare & Medicaid Services (“CMS”) administers the reimbursement rates that are paid to physicians and hospitals for those individuals enrolled in Traditional

³⁵ Payer coding is based on the categorization provided by the Parties. There are other governmental payers at each hospital. Other Government in the MSHA data includes payers such as CHAMPVA and TRICARE. Other Government in the WHS data is defined as payers where WHS classified the financial class as Other Government, which includes payers such as CHAMPVA, TRICARE, and Black Lung.

³⁶ There are other payers at each hospital, including worker’s compensation, non-health insurance, and hospital employee insurance plans, which are insurance plans provided by the Parties to their employees.

³⁷ “Social Security: Medicare.” Social Security Administration, <https://www.ssa.gov/pubs/EN-05-10043.pdf>, accessed on December 16, 2016; “Eligibility.” Medicaid.gov, <https://www.medicaid.gov/medicaid/eligibility/index.html>, accessed on December 16, 2016; “What’s the difference between Original Medicare and Medicare Advantage?” Blue Cross Blue Shield Blue Care Network of Michigan, <http://www.bcbsm.com/medicare/help/faqs/works/difference-original-medicare-advantage.html>, accessed on December 16, 2016.

³⁸ “Social Security: Medicare.” Social Security Administration, <https://www.ssa.gov/pubs/EN-05-10043.pdf>, accessed on December 16, 2016.

Medicare.³⁹ These reimbursement rates are not negotiated, but are rather predetermined and set by Medicare through a Prospective Payment System (“PPS”). This system matches payer codes, typically found on insurance claims, to the corresponding payment that is predetermined for that payer code.⁴⁰

43. Medicare Advantage plans are offered by commercial Managed Care Organizations (“MCOs”) and typically include Health Maintenance Organization (“HMO”), Preferred Provider Organization (“PPO”), and Private Fee-for-Service (“PFFS”) plans.⁴¹ Medicare Advantage generally offers more benefits and coverage than Traditional Medicare. For example, Traditional Medicare covers only medical and hospital costs, whereas Medicare Advantage covers dental, vision, hearing, and drugs, in addition to hospital and medical costs. Additionally, Traditional Medicare has no cap on what beneficiaries must pay out of pocket each year, whereas Medicare Advantage pays all costs for services once beneficiaries reach an out-of-pocket maximum.⁴² Beneficiaries of Medicare Advantage receive Medicare Part A and Medicare Part B from their Medicare Advantage plans rather than from Traditional Medicare. Medicare pays Medicare Advantage plan providers a fixed per enrollee amount which covers all Part A and Part B

³⁹ “Comparing Reimbursement Rates.” Centers for Medicare & Medicaid Services, <https://www.cms.gov/Outreach-and-Education/American-Indian-Alaska-Native/AIAN/LTSS-TA-Center/info/understand-the-reimbursement-process.html>, accessed on December 16, 2016.

⁴⁰ “PC Pricer.” Centers for Medicare & Medicaid Services, <https://www.cms.gov/Medicare/Medicare-Fee-for-Service-Payment/PCPricer/>, accessed on December 16, 2016; “Prospective Payment Systems – General Information.” Centers for Medicare & Medicaid Services, <https://www.cms.gov/medicare/medicare-fee-for-service-payment/prospmedicarefeesvcprmtgen/index.html>, accessed on December 16, 2016.

⁴¹ “Different Types of Medicare Advantage Plans.” Medicare.gov, <https://www.medicare.gov/sign-up-change-plans/medicare-health-plans/medicare-advantage-plans/types-of-medicare-advantage-plans.html>, accessed on December 16, 2016.

⁴² “What’s the difference between Original Medicare and Medicare Advantage?” Blue Cross Blue Shield Blue Care Network of Michigan, <http://www.bcbsm.com/medicare/help/faqs/works/difference-original-medicare-advantage.html>, accessed on December 16, 2016.

benefits. Medicare Advantage plan providers negotiate reimbursement rates with hospitals, and subsequently bear the final cost of health care services consumed by their Medicare Advantage enrollees. Additionally, each Medicare Advantage plan can charge different out-of-pocket costs (such as co-pay or co-insurance) and may have different rules regarding services, such as needing a referral to see a specialist.⁴³

2. Medicaid

44. Medicaid is a joint federal- and state-run program that provides hospital and medical coverage for individuals with low incomes.⁴⁴ In addition to state-run Medicaid, The Children's Health Insurance Program (CHIP), established in 1997, provides coverage to children in families who cannot qualify for Medicaid, but who also cannot afford private insurance coverage.⁴⁵

45. TennCare is the state of Tennessee's Medicaid program. It covers approximately 20 percent of the state's population, and provides health care for approximately 1.5 million residents of Tennessee. It is the only program in the U.S. to enroll the entire state's Medicaid population in managed care, operating under a Section 1115 waiver from CMS.⁴⁶ Under Medicaid Managed Care, state Medicaid agencies enter into a contract with commercial MCOs, which accept a set per enrollee monthly payment for delivering

⁴³ "How do Medicare Advantage Plans work?" Medicare.gov, <https://www.medicare.gov/sign-up-change-plans/medicare-health-plans/medicare-advantage-plans/how-medicare-advantage-plans-work.html>, accessed on December 16, 2016.

⁴⁴ "Eligibility." Medicaid.gov, <https://www.medicaid.gov/medicaid/eligibility/index.html>, accessed on December 16, 2016.

⁴⁵ "Medicaid & CHIP in Virginia." Medicaid.gov, <https://www.medicaid.gov/medicaid/by-state/stateprofile.html?state=virginia>, accessed on December 16, 2016; "Medicaid & CHIP in Tennessee." Medicaid.gov, <https://www.medicaid.gov/medicaid/by-state/stateprofile.html?state=tennessee>, accessed on December 16, 2016.

⁴⁶ "TennCare Overview." TennCare, <https://www.tn.gov/tenncare/article/tenncare-overview>, accessed on December 16, 2016.

Medicaid services to beneficiaries. MCOs bear the final cost of services rendered to beneficiaries.⁴⁷

46. The Department of Medical Assistance Services (DMAS) administers Medicaid and CHIP (known as Family Access to Medical Insurance Security, or “FAMIS”⁴⁸) in the Commonwealth of Virginia. Medicaid in Virginia is jointly funded by Virginia and the federal government. Virginia’s federal matching rate, the Federal Medical Assistance Percentage (FMAP), is around 50%.⁴⁹ DMAS does not negotiate, but rather sets reimbursement rates through established guidelines and formulas based on the type of service and the type of facility (such as outpatient or inpatient) at which the service is rendered.⁵⁰

3. Commercial Insurance

47. Prices of hospital services between commercial MCOs, or commercial payers, such as Blue Cross Blue Shield, Aetna, and Humana, and hospitals are determined differently than prices between hospitals and governmental payers, such as Traditional Medicare. The primary difference is that unlike the reimbursement rates set by governmental payers, reimbursement rates by commercial payers are determined through

⁴⁷ “Managed Care.” Medicaid.gov, <https://www.medicaid.gov/medicaid/managed-care/index.html>, accessed on December 16, 2016.

⁴⁸ “FAMIS (Family Access to Medical Insurance Security) for Children.” Arlingtonva.us, <https://publicassistance.arlingtonva.us/famis-for-children/>, accessed on December 16, 2016.

⁴⁹ “2016 Virginia Medicaid at a Glance.” Department of Medical Assistance Services, http://www.dmas.virginia.gov/Content_atchs/atchs/Medicaid%20at%20a%20Glance%202016%20FINAL.pdf, accessed on December 16, 2016.

⁵⁰ “Rate Setting.” Department of Medical Assistance Services, http://www.dmas.virginia.gov/Content_pgs/pr-rsetting.aspx, accessed on December 16, 2016.

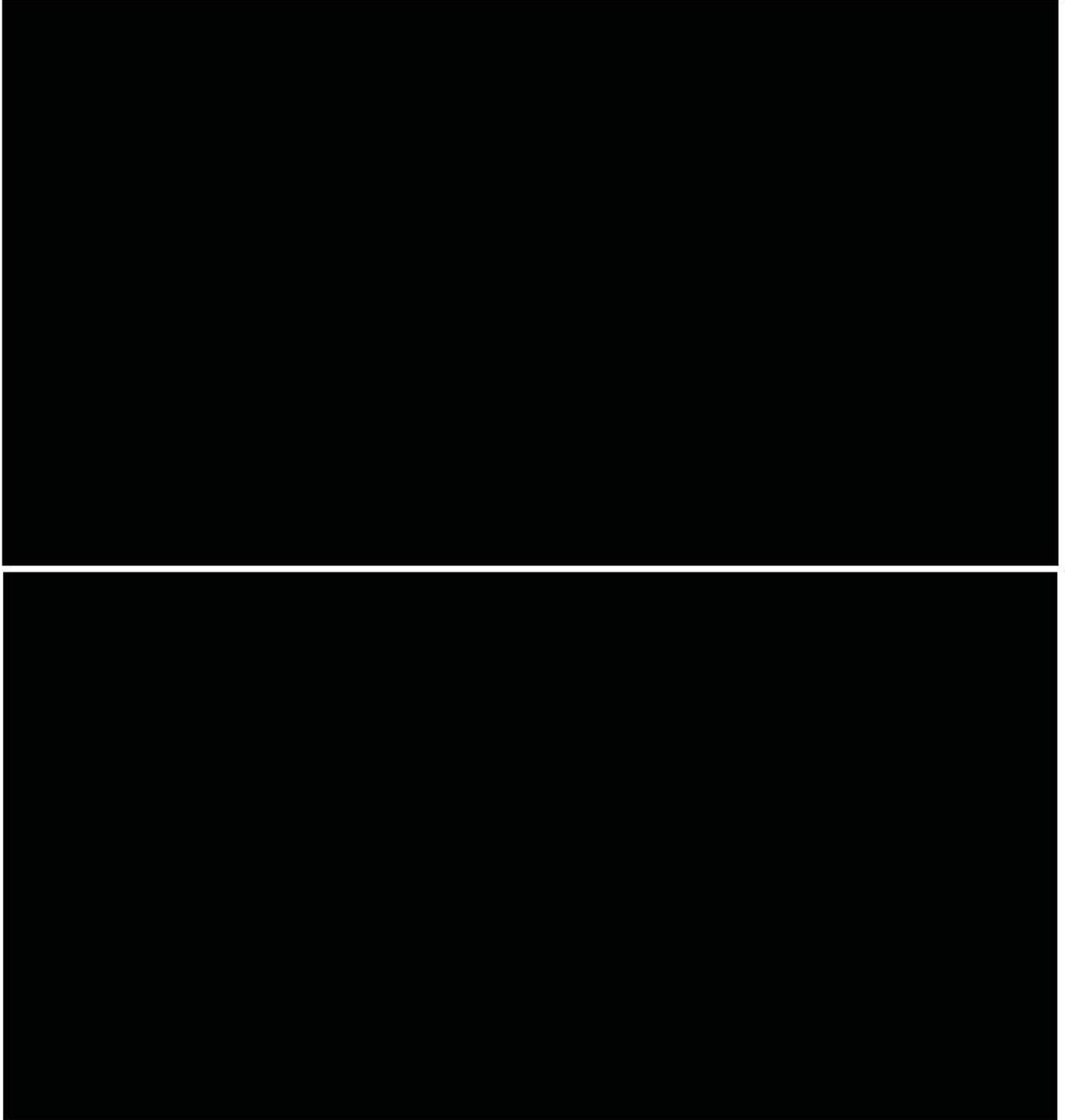
negotiations between the insurers and hospitals. I will discuss how hospital prices are determined in Section VI below. Hospital-payer contract negotiations are complex, including many different dimensions. For example, reimbursement rates could take several different forms, such as case-rates, per-diems, or discounts off charges. Negotiations also determine several non-price dimensions, including how hospital utilization will be monitored and controlled, details of the billing arrangements, and which cost tier the hospital will occupy.⁵¹

4. The Payer Landscape at WHS and MSHA

48. Figure 1 presents payers' shares at the two hospital systems based on 2015 inpatient discharges in the 21-county area. The figures show that WHS and MSHA have similar shares of discharges by payer. Commercial payers' total share of discharges at the two hospital systems is similar, [REDACTED]. Government payers overall (including Medicare, Medicaid, Medicare Advantage, and Other Government) also have similar share of discharges— [REDACTED]. Moreover, self-pay accounts for [REDACTED] of all inpatient discharges at WHS and for [REDACTED] at MSHA.

⁵¹ Ho, Kate and Robin Lee, "Insurer Competition in Health Care Markets," October 2016, Working Paper (Forthcoming in *Econometrica*), p. 6; Gaynor, Martin and Robert J. Town, "Competition in Health Care Markets," *Handbook of Health Economics*. Vol. 2, ed. Mark V. Pauly, Thomas G. McGuire and Pedro P. Barros (Massachusetts: North Holland 2012), 499–537, p. 524; Gaynor, Martin, Kate Ho, and Robert J. Town, "The Industrial Organization of Health-Care Markets," *Journal of Economic Literature*, 2015, 53(2): 235–284, p. 252.

Figure 1: Inpatient Discharge Shares by Payer Type, FY2015

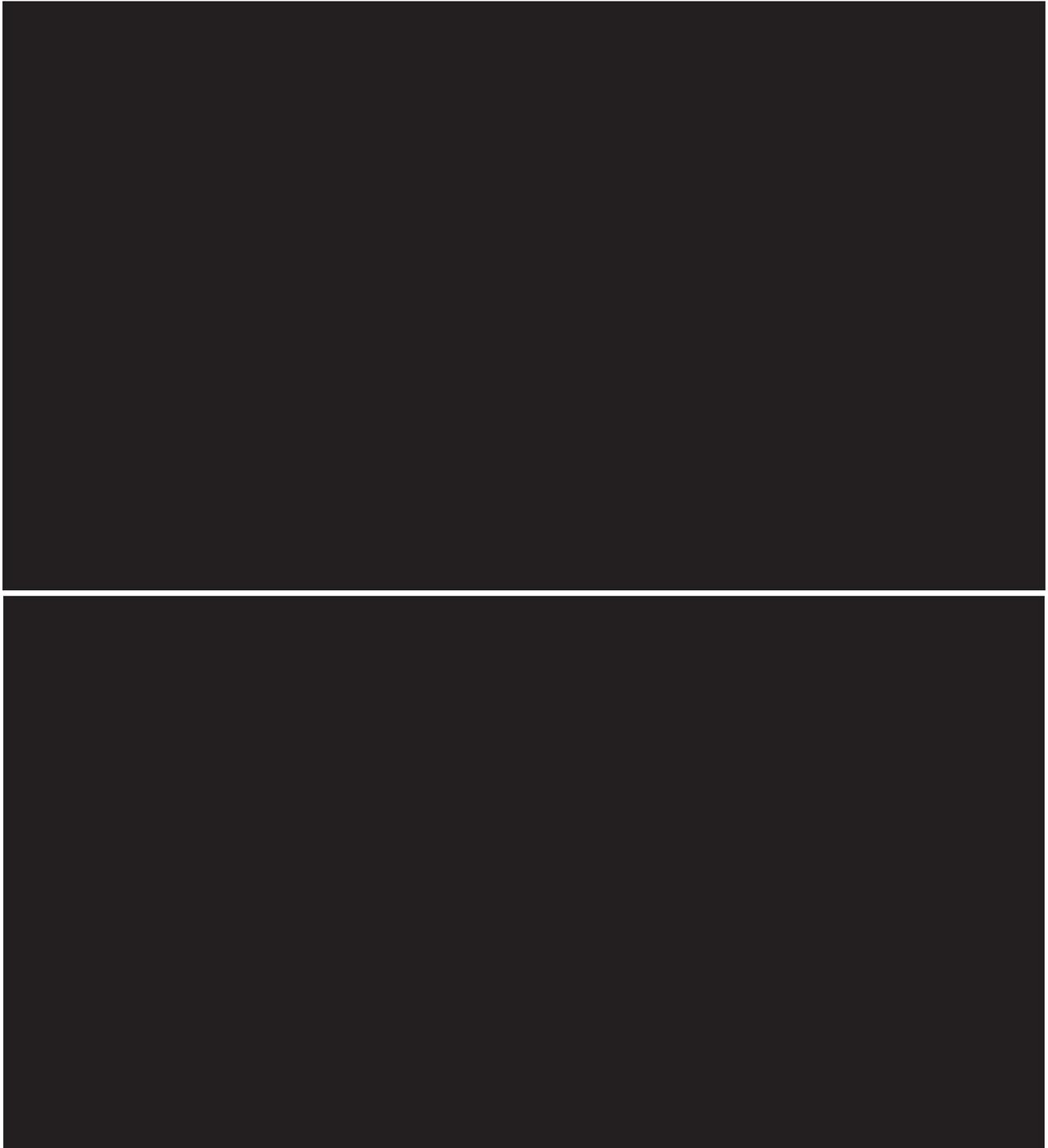


Source: WHS Inpatient Data; MSHA Inpatient Data

Note: Analysis is limited to discharges from 7/1/14–6/30/15, excluding newborns. Payer coding is based primarily on the categorization provided by WHS and MSHA (see Appendix D for details).

49. Figure 2 shows payers' shares at WHS and MSHA, based on the hospitals' revenues from inpatient services in the 21-county area. As seen in the figures, commercial payers overall have a similar share of revenues at WHS and MSHA— [REDACTED] [REDACTED]. In addition, governmental payers as a whole (including Medicare, Medicaid, Medicare Advantage, and Other Government) have the highest share of revenues at both hospital systems, [REDACTED].

Figure 2: Inpatient Revenue Shares by Payer Type, FY2015



Source: WHS Inpatient Data; MSHA Inpatient Data

Note: Analysis is limited to discharges from 7/1/14–6/30/15. Payer coding is based primarily on the categorization provided by WHS and MSHA (see Appendix D for details).

50. Table 5 shows commercial payers' shares of inpatient discharges and associated revenues at WHS and MSHA for the 21-county area. When all inpatient discharges are considered, [REDACTED]

[REDACTED]

51. With respect to revenues from 2015 inpatient discharges in the 21-county area,

[REDACTED]

[REDACTED]. Overall, several payers, including [REDACTED] have less than a 2% share of inpatient revenues at the NHS.

Table 5: Share of Total Inpatient Revenue and Discharges
Commercial Payers, FY2015

[REDACTED TABLE CONTENTS]

(table continues on next page)

Table 5: Share of Total Inpatient Revenue and Discharges
 Commercial Payers, FY2015
 (cont.)

Source: MSHA Inpatient Data; WHS Inpatient Data

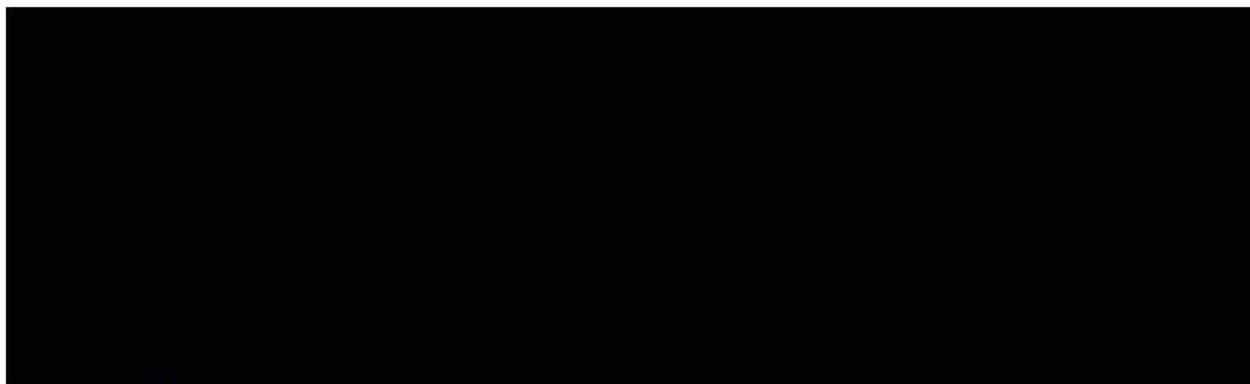
Note: Analysis is limited to discharges from 7/1/14–6/30/15. Payer coding is based on the categorization provided by MSHA and WHS (see Appendix D for more details). Other Commercial includes all other payers categorized as “Commercial” by MSHA and WHS that are not part of the specified payers.

52. Table 6 below shows Medicare Advantage payers’ shares of inpatient discharges and associated revenues at WHS and MSHA for the 21-county area in 2015. When all inpatient discharges are considered, Humana is the largest Medicare Advantage payer at WHS and United Healthcare is the largest Medicare Advantage payer at MSHA, with shares of 11% and 10.7%, respectively. United Healthcare is the second largest Medicare Advantage payer at WHS and Humana is the second largest Medicare Advantage payer at MSHA, with shares of 10.2% and 7.2%, respectively. Other Medicare Advantage payers, such as Aetna, Anthem, and CrestPoint Medicare Advantage, have smaller shares.

53. With respect to revenues from 2015 inpatient discharges in the 21-county area, Humana is the largest Medicare Advantage payer at WHS and United Healthcare is the largest Medicare Advantage payer at MSHA, with shares of 12.6% and 9.5%, respectively. Humana, the second largest Medicare Advantage payer at MSHA, has a share of 7.1%. United Healthcare and Blue Cross Blue Shield of Tennessee, the second and third largest Medicare Advantage payers at WHS, have shares of 10.3% and 6.0%. Overall, several Medicare Advantage payers, such as Aetna, Anthem, CrestPoint Medicare

[REDACTED] have less than a 2% share of inpatient revenues at the NHS.

**Table 6: Share of Total Inpatient Revenue and Discharges
Medicare Advantage Payers, FY2015**



Source: MSHA Inpatient Data; WHS Inpatient Data

Note: Analysis is limited to discharges from 7/1/14–6/30/15. Payer coding is based on the categorization provided by MSHA and WHS, with the exception of Non-Health Insurance, which includes auto insurance payers. Other Medicare Advantage includes all other payers categorized as “Medicare Advantage” or “Medicare HMO” by MSHA and WHS, respectively, which are not part of the specified payers.

[REDACTED]

V. The Proposed Cooperative Agreement

54. In this section I briefly describe the Parties’ claimed cost savings and efficiencies, and how they would use and invest these cost savings into various projects purported to mitigate likely price increases, improve quality of care and hospital services, improve population health, and preserve rural hospitals.

A. Cost Efficiencies

55. MSHA and WHS claim three types of cost efficiencies, amounting to \$121 million annually: non-labor efficiencies, labor efficiencies, and clinical efficiencies. The

Parties are committed to reinvest \$450 million over a ten-year period to improve access to healthcare, quality of care, and population health in the region.^{52,53}

56. Non-labor efficiencies are efficiencies and savings that could be achieved in the area of purchased services, such as medical equipment, pharmaceuticals, and non-medical services,⁵⁴ and are estimated to be approximately \$70 million annually.⁵⁵

57. Labor efficiencies⁵⁶ are efficiencies and savings that could be achieved by aligning the two hospital system's health work forces in a variety of areas—such as administration, finance and accounting, and health information management,⁵⁷ and are estimated to be \$25 million annually.⁵⁸

58. Clinical efficiencies are efficiencies and savings that could be achieved by clinical alignment,⁵⁹ which, as the Parties claim, would lead to operating efficiencies and improved quality and improved access.⁶⁰ These efficiencies are claimed to be driven by the combined system's ability to align duplicative health care services (e.g., the area's two

⁵² Virginia Application, pp. 6, 44–47.

⁵³ The Terms of Certification indicate a commitment to spend \$308 million over a ten-year period on initiatives for expanded access to healthcare services, health research and graduate medical education, population health improvement, and a region-wide health information exchange. Terms of Certification, 3.01(a).

⁵⁴ Virginia Application, p. 44.

⁵⁵ Virginia Application, p. 45.

⁵⁶ As the Parties admit, there will be job losses as a result of the proposed cooperative agreement. *See* Virginia Application, p. 11. To the extent that the labor efficiencies are offset by the loss of jobs that will result to achieve these efficiencies, the benefits of aligning the two hospital system's work forces are reduced.

⁵⁷ Virginia Application, p. 44.

⁵⁸ Virginia Application, p. 45.

⁵⁹ Virginia Application, p. 44.

⁶⁰ Virginia Application, p. 46.

Level I Trauma Centers⁶¹) for better care delivery,⁶² and are estimated to be approximately \$26 million annually.⁶³

59. The Parties claim that the savings from these efficiencies will be used to finance a cap on fixed rate increases to certain commercial payers,⁶⁴ improvements in health care quality and patient outcomes, improvements in population health in the region,⁶⁵ and preservation of rural hospital facilities in geographical proximity to the patients they serve, and other benefits such as expanding access to health care and prevention services, enhancing behavioral health and substance abuse services, and investing in health research and graduate medical education.^{66, 67}

B. Cap on Fixed Rate Increases to Payers

60. MSHA and WHS state in their Virginia Application that their price cap commitments have two components.⁶⁸ First, for all Principal Payers—including commercial payers and governmental payers with negotiated rates who provide more than

⁶¹ Virginia Application, pp. 38, 47.

⁶² Virginia Application, p. 46.

⁶³ Virginia Application, p. 47.

⁶⁴ Virginia Application, p. 48.

⁶⁵ Virginia Application, p. 49.

⁶⁶ Virginia Application, pp. 51-53.

⁶⁷ I have not addressed certain of the Parties' claimed benefits (expanding access to health care and prevention services, enhancing behavioral health and substance abuse services, and investing in health research and graduate medical education). I understand that the Kizer Report analyzed the Parties' commitment regarding investing in health research and graduate medical education, and concluded that the Parties did not provide enough details about their commitment to provide judgment about its value. Further, the Kizer Report concluded that the Parties' commitment to invest \$85 million over 10 years is quite modest. *See* Kizer Report, p. 30.

⁶⁸ Virginia Application, p. 48.

2% of the new health system's ("NHS") total net revenue,⁶⁹ the NHS will reduce existing commercially contracted fixed rate increases by 50% for the first contract year following the first contract year after the formation of the NHS ("One Year 50% Rate Reduction Commitment"). Second, for subsequent contract years, the NHS will commit to not increasing hospital negotiated rates⁷⁰ by more than the hospital Consumer Price Index for the previous year minus 0.25%, while NHS negotiated rates for physician and non-hospital outpatient services will not increase by more than the medical care Consumer Price Index minus 0.25% ("Rate Cap Commitment").

61. The Parties clarify in their response to the FTC that they commit to apply the Rate Cap Commitment immediately upon consummation of the cooperative agreement, allowing no gap following the consummation of the cooperative agreement before any rate commitment enters into effect.⁷¹

C. Enhancement of the Quality of Hospital and Hospital-related Care

62. MSHA and WHS claim that the proposed cooperative agreement, if approved and implemented, will enable the NHS to improve the quality of health care and health outcomes in the region.⁷² According to the Parties, the NHS will achieve this by standardization of management and clinical practice procedures and policies,⁷³ by

⁶⁹ Response by Applicants to Federal Trade Commission Staff Submission on September 30, 2016 and Supporting Memorandum to the Southwest Virginia Health Authority and Virginia Department of Health Regarding Cooperative Agreement Application, October 14, 2016, p. 16.

⁷⁰ It appears that this commitment applies to both hospital inpatient and outpatient services. *See* Virginia Application, Commitment Chart, Commitment No. 2.

⁷¹ Applicants' Response to FTC, p. 15.

⁷² Virginia Application, p. 72.

⁷³ Virginia Application, p. 73.

consolidation of certain clinical services,⁷⁴ by creating a fully integrated and interactive Common Clinical IT Platform,⁷⁵ and by participating in a health information exchange to promote coordination among community providers,⁷⁶ among others.⁷⁷

63. With respect to the integration of clinical services, the Parties claim that they will consolidate the area's two Level I Trauma Centers, specialty pediatric services, certain co-located ambulatory facilities, and repurpose acute care beds.⁷⁸ In particular, referring to studies supposedly showing that higher-volume trauma centers result in better patient outcomes, the Parties argue that the consolidation of the area's two Level I Trauma Centers would likely lead to improved patient outcomes.⁷⁹

64. The Parties' commitment regarding the standardization of management and clinical practice policies and procedures is to create a system-wide, physician-led Clinical Council (including independent physicians as well as physicians employed by the NHS) in order to identify best practices that will be used to develop standardized clinical protocols and models for care across the NHS. The Parties claim that these standardized practices, models and protocols will help reduce clinical variation and overlap, shorten length of stay, reduce costs, and improve patient outcomes. The Parties further claim that this standardization requires sharing clinical and financial information between the Parties, and

⁷⁴ Virginia Application, p. 73.

⁷⁵ Virginia Application, p. 72.

⁷⁶ Virginia Application, p. 72.

⁷⁷ Virginia Application, p. 72–76.

⁷⁸ Virginia Application, pp. 46–47, 83.

⁷⁹ Virginia Application, pp. 82–83.

hence it would not be possible for two competing systems to achieve the claimed standardization and its benefits, absent the proposed cooperative agreement.⁸⁰

65. Moreover, the Parties state that they plan to invest about \$150 million over ten years to establish a Common Clinical IT Platform for electronic medical records among the combined 19 hospitals and employed physicians, which enable ready access to patient records by physicians from any location. According to the Parties, this Common Clinical IT Platform would increase the adoption of best practices, and provide immediate, system-wide alerts and new protocols to improve quality of care.⁸¹ The Parties claim that implementation of the Platform requires sharing of proprietary information and commitment of significant resources by both systems, which would not be achieved absent the proposed cooperative agreement.⁸² In addition to the Common Clinical IT Platform, the Parties argue that they will facilitate a community health information exchange.⁸³ Such an exchange, the Parties claim, would ensure that providers have the information they need to make high-quality treatment decisions and reduce unnecessary duplication of services.⁸⁴ The Parties again contend that the exchange requires sharing of confidential information, and hence would not be accomplished without the implementation of the proposed cooperative agreement.⁸⁵

⁸⁰ Virginia Application, p. 36.

⁸¹ Virginia Application, pp. 9, 72, 74.

⁸² Virginia Application, p. 72.

⁸³ Virginia Application, p. 84.

⁸⁴ Virginia Application, p. 84.

⁸⁵ Virginia Application, p. 72.

D. Improvements in Population Health

66. MSHA and WHS assert that the proposed cooperative agreement would improve the population health in the region by allowing the NHS to invest part of the claimed cost savings (\$75 million over ten years), if the agreement is approved and implemented, on four programs:⁸⁶

67. First, the NHS will invest in programs such as reducing the incidence of low birthweight babies, decreasing the prevalence of childhood obesity and Type 2 diabetes, while improving the management of childhood diabetes.

68. Second, the NHS will contingently invest in programs that decrease premature mortality from diabetes, cardiovascular disease, and breast, cervical, colorectal, and lung cancer.

69. Third, the NHS will contingently invest in programs that prevent the use of controlled substances in youth and teens (including tobacco), reduce the over-prescription of painkillers, and provide residential treatment with community-based support for individuals addicted to drugs and alcohol.

70. Lastly, the NHS claim that they will decrease avoidable hospital admission and emergency room use by connecting high-need, high-cost uninsured individuals in the community to the care and services needed by investing in intensive case management support and primary care.

⁸⁶ Virginia Application, p. 88; Terms of Certification, 3.04. The Terms of Certification do not list the specific programs on which the proposed funds would be spent.

E. Preservation of Rural Hospital Facilities Operated by MSHA and WHS

71. MSHA and WHS argue that because of decreasing reimbursements and other challenges, it will be increasingly difficult to continue to sustain rural hospitals over the long term without the claimed cost savings the proposed cooperative agreement would create.⁸⁷ In fact, the Parties argue that most hospitals operated by MSHA and WHS operate with negative or very low operating margins.⁸⁸ The Parties commit, upon the consummation of the proposed cooperative agreement that all hospitals in operation at the effective date of the merger will remain operational as clinical and health care institutions for at least five years, but the NHS may adjust scope of services or repurpose hospital facilities.⁸⁹

VI. Managed Care Organizations and Hospital Competition

72. In this section, I explain relevant aspects of the interaction between payers, enrollees, hospitals, and patients, in which payers compete for enrollees, hospitals compete for patients, and payers and hospitals negotiate prices. Understanding this interaction among different stakeholders in the healthcare industry is crucial for analyzing the impact of the proposed cooperative agreement on prices and quality.

A. Managed Care Organizations

73. The majority of patients treated in a hospital setting have health insurance that covers a substantial portion of their hospital bill. Patients can be classified according to

⁸⁷ Virginia Application, pp. 80–81.

⁸⁸ Virginia Application, p. 81.

⁸⁹ Virginia Application, p. 81.

their primary means of payment: private insurance (also called commercial insurance), government insurance (primarily Medicare and Medicaid), and self-pay.

74. Privately insured patients predominately obtain health insurance coverage through MCOs, which are commercial payers that use a variety of methods to manage the cost of the medical care provided to their enrollees. MCOs often utilize selective provider contracting in which a subset of the providers in a given location are included “in-network.” MCO members can utilize “in-network” providers at a substantially lower cost than “out-of-network” providers. Other cost management techniques include requiring referrals for enrollees to visit specialists, introducing financial incentives for providers to reward more efficient care, encouraging the use of preventative care, and reviewing the necessity and appropriateness of the care provided to their members.⁹⁰

75. Most privately insured patients obtain health insurance coverage through their employers.⁹¹ Employers that offer health insurance to their employees are doing so as part of the employees’ compensation package. That is, an employee’s total compensation consists of his or her salary and wages, fringe benefits (e.g., retirement contributions), and health insurance.⁹² MCOs compete with one another to be offered by employers in the

⁹⁰ See, for example, Ho, Katherine, “The Welfare Effects of Restricted Hospital Choice in the U.S. Medical Care Market,” *Journal of Applied Econometrics*, 2006, 21(7): 1039-1079, p. 1042; Town, Robert and Gregory Vistnes, “Hospital competition in HMO networks,” *Journal of Health Economics*, 2001, 20(5): 733–753, p. 733.

⁹¹ Kaiser Family Foundation and Health Research & Education Trust, “Employer Health Benefits 2012 Annual Survey,” Sept. 2012, available at <https://kaiserfamilyfoundation.files.wordpress.com/2013/03/8345-employer-health-benefits-annual-survey-full-report-0912.pdf> (“Kaiser Survey”), pp. 1, 41; Ho, Katherine, “The Welfare Effects of Restricted Hospital Choice in the U.S. Medical Care Market,” *Journal of Applied Econometrics*, 2006, 21(7): 1039-1079, p. 1042; Ho, Kate and Robin Lee, “Insurer Competition in Health Care Markets,” October 2016, Working Paper (Forthcoming in *Econometrica*), p. 6.

⁹² “Compensation: Outline and Definitions.” HR Guide, <http://www.hr-guide.com/data/G400.htm>, accessed on December 16, 2016.

menu of plans available to employees. Once on the employer’s menu, health insurance plans then compete directly with one another to attract enrollees.⁹³

76. MCOs compete with one another along multiple dimensions. The two most important dimensions are the quality and breadth of the health care provider network and the premiums, or prices, for health services. Generally, the lower the premium, the more attractive the MCO is to employers and their employees, provided the MCO’s network offers the employees’ preferred set of providers. MCOs generally value a broad network of providers, desiring to have “in-network” physicians and hospitals spanning the geographic areas in which employees work and reside, and providing the health care services that employees need. MCOs that do not include hospitals desired by employers in their network will not be able to successfully market their products to employers or their employees.⁹⁴ Thus, employers negotiate with MCOs over rates (e.g., premiums and/or administrative fees) and select the MCO or set of MCOs that offer the combination of rates, benefits, and provider networks that best meet their and their employees’ needs.

77. MCOs offer two broad classes of insurance arrangements to employers: self-insured and fully-insured. In a self-insured plan, the employer pays for the full cost of its employees’ health care, thus bearing the risk that such expenses will exceed the premiums collected from employees. In self-insured arrangements, the employer pays the MCO in exchange for the administration of its employees’ claims. Under a fully-insured plan, the employer pays a premium to the MCO and the MCO absorbs all the costs of the medical

⁹³ See, for example, Ho, Kate and Robin Lee, “Insurer Competition in Health Care Markets,” October 2016, Working Paper (Forthcoming in *Econometrica*), pp. 6-7.

⁹⁴ Town, Robert and Gregory Vistnes, “Hospital Competition in HMO Networks.” *Journal of Health Economics*, 2001, 20(5): 733–753, p. 736.

care the employees receive and hence bears the risk that such expenses will exceed the premiums collected.⁹⁵ Accordingly, in a self-insured plan, increases in the cost of medical care are directly borne by the employer, while in a fully-insured plan, increases in the cost of medical care are initially imposed on the MCO, but generally are passed onto the employer in the form of higher premiums. Under either type of arrangement, the employer, in turn, will generally pass the majority of the increased health care costs on to employees in the form of higher health insurance premiums, lower wages and/or reduced (or eliminated) plan benefits.⁹⁶

B. Hospital Competition Takes Place in Two Stages

78. Hospitals or hospital systems compete with one another in two stages. They compete first with other hospitals to be included in MCO provider networks. Once included in an MCO provider network, hospitals or hospital systems compete with one another to attract patients.⁹⁷

⁹⁵ Kaiser Report, p. 160.

⁹⁶ Economic theory and the empirical evidence show that increases in employers' cost of providing health insurance for employees are passed on to employees in the form of lower wages or reduced benefits. *See* Gruber, Jonathan, "Health Insurance and the Labor Market," ed. Anthony J. Culyer and Joseph P. Newhouse, *Handbook of Health Economics Volume 1*, (Elsevier Science: Amsterdam 2000), pp. 645-706; Madrian, Bridget, "The U.S. Health Care System and Labor Markets," NBER Working Paper, w11980, 2006. In addition to reducing wages, health insurance premium increases can have other deleterious impacts on firms and their employees. These include an increased probability of unemployment and a reduction in the number of full-time employees. *See* Baicker, Katherine and Amitabh Chandra, "The Labor Market Effects of Rising Health Insurance Premiums," *Journal of Labor Economics*, 2006, 24(3): 609-634, and Cutler, David and Brigitte C. Madrian, "Labor Market Responses to Rising Health Insurance Costs: Evidence on Hours Worked," *RAND Journal of Economics*, 1998, 29(3): 509- 530. The empirical literature has also shown that the rising premia due to increases in medical costs led to an increase in employee contribution. *See* Gruber, Jonathan, and Robin McKnight, "Why did employee health insurance contributions rise?" *Journal of Health Economics*, 2003, 22(6): 1085-1104.

⁹⁷ *See*, for example, Vistnes, Gregory, "Hospitals, Mergers, and Two-Stage Competition," *Antitrust Law Journal*, 2000, 67(3): 671-692, pp. 673-674; Gaynor, Martin and Robert J. Town, "Competition in Health Care Markets," *Handbook of Health Economics. Vol. 2*, ed. Mark V. Pauly, Thomas G. McGuire and Pedro P. Barros (Massachusetts: North Holland 2012), 499-537, p. 525.

79. The first stage competition includes competition primarily over prices (paid in the first instance by MCOs and self-insured employers), location, perceived quality, and patient experience. In assessing whether to add a hospital or hospital system to its network, an MCO balances the value its enrollees place on having in-network access to the hospital against the costs of adding that hospital to the network.⁹⁸

80. Once included in an MCO provider network, hospitals or hospital systems, in the second stage, compete with one another along non-price dimensions (e.g., quality, location, amenities, and physician referral base) within the MCO’s network to attract patients.⁹⁹ From the patient’s perspective, there is generally little out-of-pocket price difference between in-network hospitals.¹⁰⁰ For this reason, hospitals compete on the basis of non-price factors, leading to differentiation among competing hospitals in non-price dimensions. For example, all else equal, patients prefer hospitals that are closer to their homes to hospitals that are more distant.¹⁰¹

81. If hospitals can negotiate with MCOs to exclude competing hospitals from the MCOs’ networks, the hospitals benefit, as the second-stage competition is reduced.

⁹⁸ Town, Robert and Gregory Vistnes, “Hospital Competition in HMO Networks.” *Journal of Health Economics*, 2001, 20(5): 733–753, p. 736; Gaynor, Martin and Robert J. Town, “Competition in Health Care Markets,” *Handbook of Health Economics*, Vol. 2, ed. Mark V. Pauly, Thomas G. McGuire and Pedro P. Barros (Massachusetts: North Holland 2012), 499–537, p. 526.

⁹⁹ See Vistnes, Jessica P., Philip F. Cooper, and Gregory S. Vistnes, “Employer Contribution Methods and Health Insurance Premiums: Does Managed Competition Work?” *International Journal of Health Care Finance and Economics*, 2001, 1(2): 159–187.

¹⁰⁰ See, for example, Town, Robert and Gregory Vistnes, “Hospital Competition in HMO Networks,” *Journal of Health Economics*, 2001, 20(5): 733–753, p. 736; Gowrisankaran, Gautam, Aviv Nevo, and Robert Town, “Mergers When Prices Are Negotiated: Evidence from the Hospital Industry,” *The American Economic Review*, 2015, 105(1): 172–203, p. 192.

¹⁰¹ See, for example, Gowrisankaran, Gautam, Aviv Nevo, and Robert Town, “Mergers When Prices Are Negotiated: Evidence from the Hospital Industry,” *The American Economic Review*, 2015, 105(1): 172–203, pp. 173–174 discussing that a patient’s utility from an hospital is a function of distance to the hospital, among other factors.

82. A hospital’s volume of patients from a specific MCO is largely determined by whether the hospital is part of the MCO’s provider network. Because of the difference in the out-of-pocket expenditures, all things being equal, an “out-of-network” hospital will treat fewer patients from that MCO relative to an in-network hospital. The volume of patients an in-network hospital will treat depends upon patient preferences, the location and characteristics of the hospital, the admitting patterns of physicians, and the location and characteristics of other competing network hospitals. As I will explain in Section VII, a proper competitive analysis of hospital markets requires accounting for this differentiation among competing hospitals or hospital systems.

C. Hospital Prices Are Determined through Negotiations between Hospitals and MCOs

83. A central focus of my analysis is whether, as a result of the proposed cooperative agreement between MSHA and WHS, the prices of the services sold to MCOs by the Parties will increase. It is, therefore, important to understand how hospital prices are determined.

84. Prices for hospital services are determined through contract negotiations, or “bargaining,” between hospitals and MCOs.¹⁰² For example, prior to the application for the cooperative agreement, both MSHA and WHS have engaged in extensive negotiations with MCOs over rates for services and contractual terms, with the goal of reaching a multi-year contract with each MCO.¹⁰³

¹⁰² See, for example, Gowrisankaran, Gautam, Aviv Nevo, and Robert Town, “Mergers When Prices Are Negotiated: Evidence from the Hospital Industry,” *The American Economic Review*, 2015, 105(1): 172–203, p. 172.

¹⁰³ Drozdowski Declaration, ¶¶ 34-51.

85. These negotiations between a hospital system and a MCO typically involve a series of offers and counteroffers, and result in either the inclusion of a hospital system in an MCO’s network, or a failure of the MCO and the hospital system to reach an agreement. The terms of the agreement, when achieved, depend on how the parties would fare if they failed to reach an agreement.¹⁰⁴ That is, each party considers how costly it would be if negotiations fail. This cost of failing to reach an agreement is informed by what is commonly referred to as its walk-away point, i.e., the price at which the party would be just as well off not reaching an agreement.¹⁰⁵ Every negotiation involves consideration of both the hospital system’s and the MCO’s walk-away points. If the bargaining hospital demands rates higher than the rates that the MCO is willing to pay, the MCO will refuse to contract with the hospital system and will walk-away from the negotiations. On the other hand, if the bargaining MCO refuses to pay rates above the hospital system’s walk-away point, the hospital system will refuse to contract with the MCO. Each party’s walk-away point determines the bargaining leverage, it has in the negotiation.

86. A hospital system’s walk-away point is largely based on the degree of difficulty an MCO would face in marketing a viable network without the hospital system. In other words, the bargaining leverage of a hospital system is tied to the value the MCO’s members (employers and employees) place upon having in-network access to that system.

¹⁰⁴ This view of bargaining relationships is widely accepted in economic theory and is corroborated by testimony of MCO executives. See Drozdowski Declaration, ¶¶ 26-33.

¹⁰⁵ For example, if hospital “H” is negotiating with MCO “M” for inclusion in its network and the loss in profits to M of failing to agree on a contract with H is relatively larger than H’s loss in profits (for example, because M is small and H is a desirable hospital with other contracts), then H will have more bargaining leverage than M, all else equal. The reason that H has more bargaining leverage than M is that agreeing to a contract is more important to M than it is to H. The more important the contract is to a party (e.g., the greater the loss from failing to reach an agreement), the lower is their bargaining leverage.

The more valued the hospital system is by the MCO's members, the more important the system is to the MCO's ability to market its network, and the more bargaining leverage the hospital system will possess. Put differently, a hospital system's bargaining leverage is determined by the perceived loss in value to the MCO's members if that system were dropped from the MCO's network. If failing to reach an agreement with a hospital or system makes an MCO's network substantially less attractive to employers and employees, that hospital system will have significant bargaining leverage with the MCO.¹⁰⁶

87. An MCO's walk-away point is determined by the strength of the system's desire to be included in the MCO's network. This, in turn, depends in large part on the patient volume that the MCO can offer the hospital system. An MCO's patient volume is derived from the size of its membership. The larger the MCO's membership, the more patient volume it can offer a hospital system and the more motivated the hospital is to reach an agreement with that MCO. If a hospital system stands to lose significant patient volume upon failing to reach an agreement with the MCO, the MCO will have more bargaining leverage in negotiations with that hospital system than a smaller MCO.¹⁰⁷

88. A hospital system's value to a MCO's network is determined by the availability of substitute hospitals to serve the MCO's members if no agreement is reached in the negotiation. A hospital system with a dominant share of the market will be more difficult for an MCO to replace. For example, if there are few viable substitutes for a desirable

¹⁰⁶ Town, Robert and Gregory Vistnes, "Hospital competition in HMO networks," *Journal of Health Economics*, 2001, 20(5): 733–753, p. 734.

¹⁰⁷ *See*, for example, Wu, Vivian Y., "Managed Care's Price Bargaining with Hospitals," *Journal of Health Economics*, 2009, 28(2): 350–360, p. 350.

hospital or system, its exclusion from the MCO's network will reduce the marketability of the MCO's insurance product and the MCO will face difficulty retaining members and attracting new ones. When there are only poor substitutes for a hospital system, failing to reach an agreement will inconvenience the MCO's members and these members will be less willing to pay for the MCO's services. It follows that the worse and more distant the substitute hospitals, the stronger a hospital's bargaining leverage will be relative to the bargaining leverage of the MCO.¹⁰⁸

D. Hospital Mergers Can Impact Relative Bargaining Positions

89. An assessment of a proposed hospital merger primarily focuses on the proposed merger's potential impact on this bargaining process. Consolidation between hospitals can increase the bargaining leverage of the newly-structured organization if the hospitals are close substitutes. If the hospitals are not proximate substitutes for one another, the merger, in general, will not affect the bargaining leverage of the hospitals in as meaningful a way. Hospital mergers can affect bargaining leverage by changing the consequences to the MCO of failing to reach an agreement with the newly-structured hospital system. Specifically, if patients view the affiliating hospitals as substitutable, then the loss in value to the MCO of not including the new hospital system will be much higher than the loss in value from losing one hospital but not the other. All else equal, the more proximate substitutes the merging hospitals are for one another, the larger the gain in bargaining leverage and the higher the post-merger price increases. If the hospitals are not close

¹⁰⁸ Town, Robert and Gregory Vistnes, "Hospital competition in HMO networks," *Journal of Health Economics*, 2001, 20(5): 733-753, pp. 734-735.

substitutes for one another, the merger, in general, will not affect the bargaining leverage of the hospitals in a meaningful way.¹⁰⁹

90. Hospitals and MCOs generally do not negotiate a separate price for every product MCOs purchase from hospitals. Hospitals provide thousands of services and it is impractical for the parties to negotiate a price for every single service individually. Instead, hospitals and MCOs generally settle on a set of normalized prices to negotiate over. MCO reimbursements to hospitals are generally based on Diagnostic Related Groups (DRGs), a per inpatient day rate (per-diem), or a percentage of the hospital's listed price (charges). Because reimbursement contracts typically specify only a limited number of prices, a hospital with greater bargaining leverage over some of its services will generally negotiate a higher price over all of its services. This higher price might be viewed as reflecting the average market power that the hospital possesses over all of the services it provides. Alternatively, a hospital may negotiate carve outs or case rates that impose a separate rate structure to a particular service or set of services.¹¹⁰

VII. Economic Analysis of the Competitive Impact of the Proposed Cooperative Agreement on Hospital Prices for Commercial Payers

91. In this section, I analyze the competitive impact of the proposed cooperative agreement on the GAC inpatient care prices paid by commercial MCOs (i.e., commercial payers). First, I provide a structural analysis examining the impact of the proposed

¹⁰⁹ Brand, Keith and Christopher Garmon, "Hospital Merger Simulation," American Health Lawyers Association, 2014, p. 6 ("[U]nder the merger it would be less costly for one hospital to fail to reach an agreement with the MCO if at least some consumers view its partner hospital as a substitute for it.")

¹¹⁰ Gaynor, Martin and Robert J. Town, "Competition in Health Care Markets," Handbook of Health Economics. Vol. 2, ed. Mark V. Pauly, Thomas G. McGuire and Pedro P. Barros (Massachusetts: North Holland 2012), 499–537, p. 536. See also Ho, Kate and Robin Lee, "Insurer Competition in Health Care Markets," 2016, Working Paper (Forthcoming in *Econometrica*), p. 6.

cooperative agreement on concentration in the 21-county area, the Parties’ geographic service area.¹¹¹ In this analysis, I examine standard metrics of concentration, measured based on the Parties’ and other competing hospitals’ shares of GAC inpatient discharges in the 21-county area. I find that the proposed cooperative agreement is likely to exacerbate concentration in the Parties’ geographic service area. Indeed, the metrics I examined far exceed the levels at which antitrust regulators presume a merger to be “likely to enhance market power.”¹¹² I then directly analyze the impact of the proposed cooperative agreement on prices, without relying upon those concentration metrics. In particular, using an econometric analysis that estimates patients’ choice of a hospital, I directly evaluate the impact of the proposed cooperative agreement on prices. I find that MSHA and WHS are each other’s closest competitors, and the proposed cooperative agreement is likely to substantially reduce competition in the 21-county area. I also estimate that the proposed cooperative agreement is likely to increase the GAC inpatient care prices paid by commercial payers, on average, by 24%. Therefore, both the structural analysis and the direct analysis indicate that the proposed cooperative agreement is likely to increase the bargaining leverage of the NHS, and hence, likely to result in higher prices.¹¹³

¹¹¹ See footnote 14.

¹¹² *Merger Guidelines* § 5.3.

¹¹³ In addition to the assessment of the likely adverse impact of the proposed agreement on prices, I understand that the Authority’s evaluation also includes an assessment of the extent of any reduction in competition among physicians or other health care providers furnishing goods or services to, or in competition with, hospitals that is likely to result directly or indirectly from the proposed cooperative agreement (See § 15.2-5384.1, Section E). The impact of vertical integration between hospitals and physicians on consumers has been examined in the economic literature. On one hand, vertical integration may potentially improve quality. For example, close interactions between physicians and hospitals can improve communications across care settings and reduce wasteful duplications of diagnostic tests. On the other hand, vertical integration may raise hospital prices. For example, by employing or contracting with physicians, hospitals can obtain market power by bundling hospital and physician services, or by depriving competing hospitals of referrals. Nevertheless, there are economic studies demonstrating a positive relationship between vertical integration and hospital prices. See, for example, Baker, Laurence C., M. Kate Bundorf

A. Structural Analysis

92. A structural analysis of a proposed merger examines the extent to which the merger leads to an increase in market concentration within a defined relevant product and geographic market. In my structural analysis of the proposed cooperative agreement, I evaluate the Parties’ and other relevant hospital systems’ shares and concentration of commercially insured GAC inpatient discharges in the 21-county area. While I do not claim that the 21-county area is the “relevant market” under the *Merger Guidelines*,¹¹⁴ it is reasonable to analyze the competitive effect of the proposed cooperative agreement in this geographic area for the following reasons: First, the 21-county area has been identified by the Parties as their geographic service area.¹¹⁵ Indeed, discharges of patients residing in this service area account for ██████% of the Parties’ total inpatient discharges and ██████% of the Parties’ overall revenue in their most recent fiscal year, as shown in Table 7. Simply put, patients residing in this area account for a large fraction of the Parties’ day-to-day businesses.¹¹⁶

and Daniel P. Kessler, “Vertical Integration: Hospital Ownership Of Physician Practices Is Associated With Higher Prices And Spending,” *Health Affairs*, 2014, 33(5): 756-763, p. 762.

¹¹⁴ *Merger Guidelines*, § 4.1.1.

¹¹⁵ See footnote 14.

¹¹⁶ The 21-county area is potentially broader than a reasonable relevant geographic market under the *Merger Guidelines*, in which case my structural analysis understates any anticompetitive effect resulting from the proposed cooperative agreement. As I explain below, my direct analyses, which do not rely on geographic market definition, confirm the results from this section.

Table 7: MSHA and WHS Inpatient Discharges and Revenues
(dollars in thousands)

Source: MSHA Inpatient Data; WHS Inpatient Data

Note: Analysis is limited to discharges from 7/1/14–6/30/15 for inpatient revenues. In addition, newborns are excluded when counting discharges.

93. Second, as I mentioned in Section IV, the Parties offer overlapping GAC inpatient services in the 21-county area. This suggests that the competitive conditions are similar across all GAC inpatient services in the 21-county area, where MSHA and WHS are the largest hospital systems. In particular, each service line is likely to be impacted by the proposed cooperative agreement in a similar manner. As such, it is appropriate and more analytically feasible to aggregate, or “cluster” all GAC inpatient services in analyzing the competitive effect of the proposed cooperative agreement. Indeed, this market has been validated as a relevant product market in prior case laws.¹¹⁷

94. Examining the Parties’ shares within this service area provides information about the bargaining leverage these two hospital systems possess in the 21-county area. These shares lend some insight into how patients residing in the 21-county area value hospitals: hospitals that display higher share of discharges within the 21-county area are likely to be

¹¹⁷ These case laws have stated that economic analyses can be done at the cluster market, as opposed to conducting a separate analysis for each service line offered by merging hospitals, when each service line faces similar competitive conditions (e.g., similar market conditions, same market participants, and within the same geographic market). *See*, for example, *FTC v. Freeman Hosp.*, 69 F.3d 260 (8th Circ 1995); *FTC v. Univ. Health Inc.*, 938 F.2d 1206, 1210-12(11th Circ. 1991).

valued by the patients residing in this area. Thus, a hospital system that owns these hospitals possesses relatively high bargaining leverage when it negotiates with MCOs that market their plans to enrollees residing in the 21-county area.

95. Table 8 shows the discharge share of the hospital systems within the 21-county area for GAC inpatient services. As the table shows, concentration for the Parties in the 21-county area is high, with MSHA constituting about 50% share of the area's GAC inpatient discharges. Though MSHA has a large share, WHS is a meaningful competitor with a share of 27%, the second largest system in the area. No other hospital system comes close to WHS as a competitor to MSHA hospitals. The proposed cooperative agreement eliminates the competition between the MSHA and WHS, and the NHS will have an overall share of almost 77%, with the second largest hospital system capturing a fraction of this share (LifePoint Health at 6%).

**Table 8: Pre-Cooperative Agreement and Post-Cooperative Agreement HHI
21-county Area, 2015**

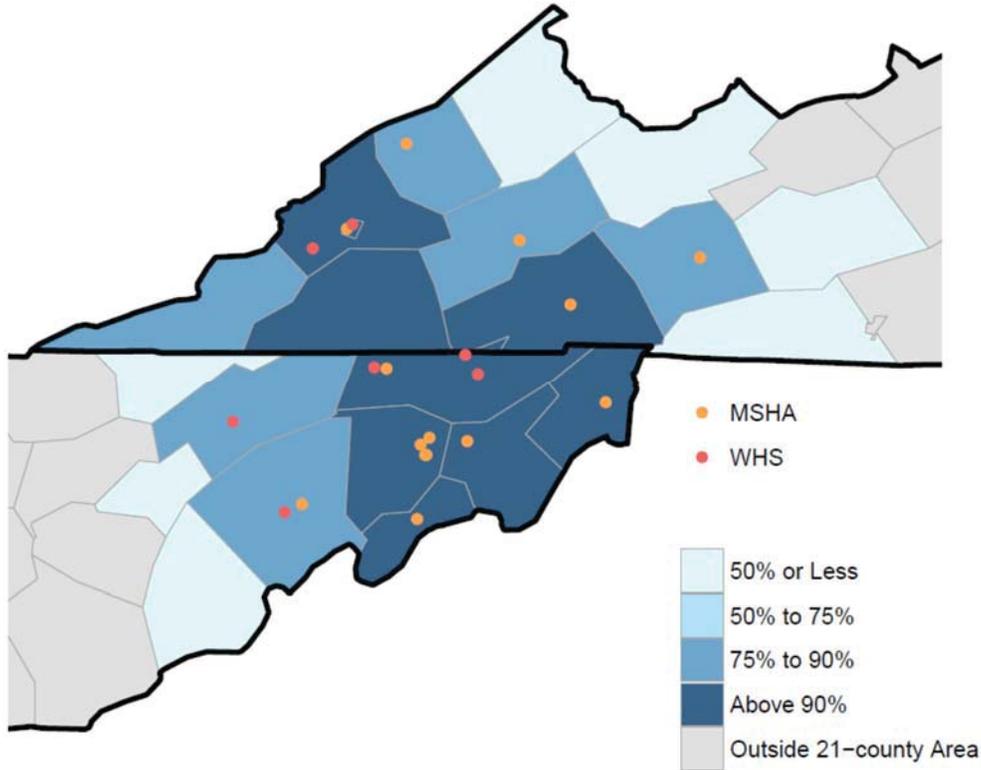
Hospital System	Share of GAC Inpatient Discharges	
	Pre-Cooperative Agreement	Post-Cooperative Agreement
MSHA	50%	77%
WHS	27%	
LifePoint Health	6%	6%
Covenant Health	5%	5%
Vanderbilt Health	2%	2%
Carilion Clinic	2%	2%
Community Health Systems, Inc.	2%	2%
UVA Health System	1%	1%
Duke LifePoint Healthcare	0%	0%
HCA	0%	0%
Erlanger Health System	0%	0%
Sentara Healthcare	0%	0%
Inova Health System	0%	0%
VCU Health System	0%	0%
Methodist Le Bonheur Healthcare	0%	0%
Bon Secours Health System, Inc.	0%	0%
Riverside Health System	0%	0%
Valley Health System	0%	0%
West Tennessee Healthcare	0%	0%
Baptist Memorial Health Care Corporation	0%	0%
Centra Health, Inc.	0%	0%
Mary Washington Healthcare	0%	0%
Maury Regional Health System	0%	0%
Novant Health	0%	0%
Other Hospitals	6%	6%
HHI	3,301	5,989
Change in HHI		+2,688

Source: State Discharge Data for Tennessee and Virginia, 2015

Note: Analysis is limited to commercial GAC discharges associated with patients from the 21-county Area, excluding newborns, seniors, and transfers from other hospitals and facilities. WHS does not include Wellmont Ridgeview Pavilion Bristol, an adult inpatient psychiatric hospital. Shares may not add up to 100% due to rounding.

96. When shares are considered on a county-by-county basis, the NHS's share is also high in most counties in the 21-county area. Figure 3 shows a map of the NHS's share by county. In most counties, the share of NHS GAC inpatient discharges amounts to more than 75%. This suggests that eliminating competition between the two hospital systems is likely to affect most counties in the 21-county area.

Figure 3: MSHA and WHS Share of Inpatient Discharges by County
21-county Area, 2015



Source: State Discharge Data for Tennessee and Virginia, 2015

Note: Analysis is limited to commercial GAC discharges associated with patients from the 21-county Area, excluding newborns, seniors, and transfers from other hospitals and facilities. WHS does not include Wellmont Ridgeview Pavilion Bristol, an adult inpatient psychiatric hospital.

97. Another common and related metric of market concentration is the Herfindahl-Hirschman Index (“HHI”), which is equal to the sum of squared of the market shares of each hospital system in the relevant market. For example, if there are three systems with 50%, 40% and 10% market share, then the HHI is calculated as $50^2 + 40^2 + 10^2$. HHI ranges between 0 and 10,000 and a higher number indicates a more concentrated market. For example, a market with a local monopoly admits an HHI level of 10,000. A proposed

merger that leads to high HHI and a large increase in HHI raises antitrust concern. Specifically, under the *Merger Guidelines* mergers that lead to a post-merger HHI above 2,500 and a change in HHI by more than 200 are presumed to be “likely to enhance market power.”¹¹⁸ As shown in Table 8, the proposed cooperative agreement leads to a post-cooperative agreement HHI of 5,989 and a change in HHI of 2,688, which far exceed the *Merger Guidelines* thresholds mentioned above. In addition, these measures of market concentration are also above the levels at which courts have determined mergers to be anticompetitive (See Table 9).

Table 9: Post-Merger HHI and Change in HHI in Previously Proposed Hospital Mergers Deemed Anticompetitive

Case Law	Combined Share of Merging Parties	Post-Merge HHI	Change in HHI
<i>University Health</i> (11th Cir. 1991)	43%	3,200	630
<i>Promedica Health System</i> (6th Cir. 2014)	58%	4,391	1,078
<i>OSF Healthcare</i> (N.D. Ill. 2012)	59%	5,179	1,767

Source: Docket No. 91-8308; Docket No. 12-3583; Docket No. C 50344; Docket No. 89-1900

B. Direct Analysis

98. In this section, I analyze the extent to which the two hospital systems currently compete with one another and quantify the competitive impact of the proposed cooperative agreement on the hospitals’ prices. Unlike the structural analysis discussed above, which relies on discharge shares and the HHI concentration measure in the 21-county area, direct analyses rely on the economic theory of bargaining and econometric methods to assess the competitive effect of the proposed cooperative agreement. A key

¹¹⁸ *Merger Guidelines* § 5.3.

advantage of direct analyses is that they do not rely on defining a relevant geographic market.¹¹⁹

99. I present two empirical analyses that both point to an increase in prices upon the consummation of the proposed cooperative agreement: First, I show, using diversion analysis, that the two hospital systems are each other's closest competitor. Second, I estimate the change in "willingness-to-pay" ("WTP") resulting from the proposed cooperative agreement. This change in WTP captures the change in the bargaining leverage of the NHS, and can be used to quantify the price impact of the proposed cooperative agreement. Indeed, using the WTP analysis, I estimate that the proposed cooperative agreement is likely to increase prices of the hospitals' services, on average, by 24%.

1. Diversion Analysis Indicates that MSHA and WHS Are Each Other's Closest Competitor

100. To analyze the extent to which enrollees view MSHA and WHS hospitals as substitutes, I examine the diversion ratios between MSHA hospitals and WHS hospitals. The diversion ratio of one hospital system to a given hospital in the other system is the share of the hospital system's patients that would seek care at the other if the hospital system were no longer available. These ratios are commonly used in analyzing the competitive effects of a proposed hospital merger and are common metrics that quantify

¹¹⁹ Indeed, the model I employ to calculate diversion ratios and WTP allows patients to select any hospital in the states of Virginia and Tennessee. Both measures account for the geographic dispersion of hospitals and patients, patient preferences for certain hospitals, and varying travel times to hospitals due to traffic patterns, without imposing assumptions on the boundaries of any potential geographic market. For this reason, the diversion and WTP analyses are invariant to the relevant geographic market definition and will not change, whether the relevant geographic market is defined as narrowly as 90% service area or as broadly as the 21-county area.

the extent of substitutability among hospital systems.¹²⁰ A low diversion ratio between MSHA hospitals and WHS hospitals would indicate that very few patients would be expected to substitute between the two systems, whereas a high diversion ratio implies that many patients would be expected to substitute between the two systems.

101. In my analysis, I consider the diversion of GAC inpatients covered by commercial payers. Newborns are excluded so as not to double-count discharges, as the mother is already in the sample. Seniors are excluded since a majority of these individuals are insured under Medicare. In addition, I exclude patients whose discharge status indicates that they were transferred to another GAC hospital. This provides a sample of 19,605 GAC inpatient discharges, of which 9,744 and 5,301 are MSHA and Wellmont discharges, respectively.

102. The diversion ratios I estimate are based on a patient choice model that uses information on the characteristics of competing hospitals and patients' actual choices of hospitals to identify the factors that affect the patients' valuation for a hospital and ultimately their choices. The principal explanatory variables are travel times to the hospitals and various indicator variables for each hospital that capture the hospitals' characteristics that may influence a patient's hospital choice.¹²¹ I employ a flexible model specification that allows patient preferences to vary along a number of other dimensions,

¹²⁰ See Garmon, Christopher, "The Accuracy of Hospital Merger Screening Methods," FTC Working Paper no. 326, 2015, p. 2 ("Another branch of the literature attempted to model price formation in hospital markets and developed a set of tools to directly predict the price effects of hospital mergers. These tools (e.g., diversion ratios, Willingness-to-Pay, the Logit Competition Index, and merger simulation) were used by the federal antitrust agencies in recent hospital merger challenges.").

¹²¹ Travel times from zip codes to each of the hospitals considered are derived using Google API software and are calculated from the centroid of the zip code. I use hospital indicator interacted with DRG weight in addition to a dummy that identifies the closest hospital to a patient. See Appendix C for the model specification.

such as different preferences on travel time for those patients being admitted on an emergency basis, different preferences on travel time for children, and different valuations of hospitals depending on the severity of the patient's clinical condition.

103. I also allow the value that patients place on having access to specific hospitals to vary depending on the clinical condition of the patient.¹²² This modeling characteristic is important because hospitals may be close substitutes in dimensions other than geographic location. For example, two hospitals that are popular among patients for obstetrics may be closer substitutes for the relevant patients than their geographic proximity might suggest. To capture these differences in valuation across different diagnoses, I allow a patient's valuation for a hospital to differ depending on the patient's MDC.¹²³ Appendix C describes the specifics of the patient choice model employed to calculate diversion ratios as well as WTPs.

104. After identifying the factors that determine patients' choices, these models can be used to predict the likelihood of each patient choosing a hospital from a set of hospitals a patient can potentially choose.¹²⁴ These predictions are then used to estimate the diversion ratio from a hospital system to a given hospital at the other hospital system by examining

¹²² Clinical conditions are characterized by DRG weight (disease severity) and MDC code.

¹²³ I include variables that are hospital indicators interacted with the patient's MDC in the model.

¹²⁴ As is the standard practice in the economics literature, the hospital choice model is based on the Multinomial Conditional Logit ("MNL") model. *See* Garmon, Christopher, "The Accuracy of Hospital Merger Screening Methods," FTC Working Paper no. 326, 2015, p. 2

each patient's predicted likelihood of choosing such a hospital conditional upon removing a hospital system from the patient's choice set.¹²⁵

105. Then, the relevant question for the proposed cooperative agreement is: suppose that hospitals in the MSHA (WHS) system were to be removed from patients' choice sets (i.e., it ceases to be an option for patients), where would the MSHA (WHS) system patients divert? Hospitals that capture a larger fraction of these diverted patients are deemed closer substitutes with the hospitals in the system.

106. Tables 10 and 11 answer these questions and show that the systems are each other's closest competitor. In particular, if WHS hospitals were to be removed from the patients' choice sets, 88% of those patients would switch to a MSHA hospital. Indeed, Johnson City Medical Center would receive the largest share of these patients (32%) and no other hospital would receive more than 3% of the patients in the WHS system.

Similarly, if MSHA hospitals were to be removed from the patients' choice sets, 81% of those patients would switch to a WHS hospital, with WHS - Holston Valley Medical Center capturing the bulk of the diverted patients (37%). In addition, there would be no hospitals outside the MSHA system that are reasonable substitutes for WHS patients, given that less than 3% of WHS patients divert to any particular non-MSHA hospital.

107. The conclusion that the hospitals in the MSHA and WHS systems are the closest substitute to each other is true across various MDCs. Table 12 shows the diversion ratios

¹²⁵ Another key input into a patient choice model is the set of hospitals between which patients are allowed to choose (the choice set). It is important that the choice set includes hospitals that patients would actually consider when deciding where to seek care. If a patient chooses any hospital outside a pre-specified list of hospitals, this choice is often modeled as the patient having chosen an "outside good." For that patient, the model would have no information on the characteristics of the selected hospital. In my model, I allow patients to choose from all hospitals in the 21-county area. If a patient chooses a hospital outside the 21-county area that had less than 20 discharges in 2015, the patient is assumed to have chosen the "outside good."

from MSHA hospitals to WHS hospitals and from WHS hospitals to MSHA hospitals by MDC. For each MDC, I take the average (weighted by each hospital system's discharges within a MDC) diversion between the two hospital systems. In most MDCs, the weighted average diversion ratio is above 70%—that is more than 70% of patients would divert to one of the system if the other system were removed from the patients' choice set.¹²⁶

¹²⁶ I also examined the hospital-level diversion ratio from a given hospital in either the MSHA or WHS system (hospital-level diversion). For any given hospital, the hospital for which it has the highest predicted diversion ratio can be thought of as the hospital's "closest" competitor, in the sense of having the highest substitution of patients to the hospital. In Exhibit I, I display each hospital's closest or second closest competitor. The exhibit indicates that most of WHS hospitals' closest or second closest competitors are hospitals in a MSHA system. Similarly, a sizable number of hospitals in the MSHA system have closest or second closest competitors that are part of the WHS system.

Table 10: Diversion Ratios from WHS Hospitals

Hospital	Diversion Ratio
Total Diversion Ratio to MSHA Hospitals	87.9%
Dickenson Community Hospital	0.0%
Franklin Woods Community Hospital	12.0%
Indian Path Medical Center	15.6%
James H. and Cecile Quillen Rehabilitation Hospital	0.0%
Johnson City Medical Center	31.5%
Johnson County Community Hospital	0.0%
Johnston Memorial Hospital	13.5%
Laughlin Memorial Hospital	5.2%
Norton Community Hospital	5.0%
Russell County Medical Center	0.4%
Smyth County Community Hospital	0.6%
Sycamore Shoals Hospital	2.8%
Unicoi County Memorial Hospital, Inc.	0.3%
Woodridge Psychiatric Hospital	0.9%
Total Diversion Ratio to Non-MSHA Hospitals	12.1%
Vanderbilt University Hospitals	2.1%
Morristown - Hamblen Healthcare System	1.4%
University of Tennessee Memorial Hospital	1.4%
Total Diversion Ratio to Other Hospitals ^[1]	7.2%

Source: State Discharge Data for Tennessee and Virginia, 2015; DRG Weight and MDC Crosswalk, 2015; CMS DRG to MS DRG Crosswalk, 2008

Note: See Appendix C for details of the patient choice model used to calculate diversion ratios. Analysis is limited to commercial GAC discharges associated with patients from the 21-county Area, excluding newborns, seniors, and transfers from other hospitals and facilities. WHS does not include Wellmont Ridgeview Pavilion Bristol, an adult inpatient psychiatric hospital which is included in "Outside Good."

[1] Diversion ratios to these other hospitals (including the "Outside Good") are under 1.4%.

Table 11: Diversion Ratios from MSHA Hospitals

Hospital	Diversion Ratio
Total Diversion Ratio to WHS Hospitals	80.6%
Takoma Regional Hospital	6.5%
Wellmont - Holston Valley Medical Center, Inc.	36.6%
Wellmont Bristol Regional Medical Center	33.1%
Wellmont Hancock County Hospital	0.0%
Wellmont Hawkins County Memorial Hospital	0.3%
Wellmont Lonesome Pine Hospital	4.0%
Wellmont Mountain View Regional Medical Center	0.1%
Total Diversion Ratio to Non-WHS Hospitals	19.4%
Vanderbilt University Hospitals	2.7%
University of Tennessee Memorial Hospital	2.3%
Clinch Valley Medical Center	1.9%
Total Diversion Ratio to Other Hospitals ^[1]	12.5%

Source: State Discharge Data for Tennessee and Virginia, 2015; DRG Weight and MDC Crosswalk, 2015; CMS DRG to MS DRG Crosswalk, 2008

Note: See Appendix C for details of the patient choice model used to calculate diversion ratios. Analysis is limited to commercial GAC discharges associated with patients from the 21-county Area, excluding newborns, seniors, and transfers from other hospitals and facilities. WHS does not include Wellmont Ridgeview Pavilion Bristol, an adult inpatient psychiatric hospital which is included in "Outside Good."

[1] Diversion ratios to these other hospitals (including the "Outside Good") are under 1.9%.

Table 12: Diversion Ratios by Select MDCs

MDC	Description	Diversion Ratio		
		MSHA to WHS	WHS to MSHA	Weighted Average
01	Diseases & disorders of the nervous system	75.7%	78.2%	76.7%
02	Diseases & disorders of the eye	83.7%	83.7%	83.7%
03	Diseases & disorders of the ear, nose, mouth & throat	57.3%	74.8%	62.1%
04	Diseases & disorders of the respiratory system	77.7%	83.9%	80.0%
05	Diseases & disorders of the circulatory system	84.4%	87.5%	85.6%
06	Diseases & disorders of the digestive system	78.4%	87.1%	81.0%
07	Diseases & disorders of the hepatobiliary system & pancreas	80.8%	83.3%	81.6%
08	Diseases & disorders of the musculoskeletal system & connective tissue	72.4%	79.4%	75.4%
09	Diseases & disorders of the skin, subcutaneous tissue & breast	74.1%	83.2%	76.2%
10	Endocrine, nutritional & metabolic diseases & disorders	68.1%	77.5%	70.7%
11	Diseases & disorders of the kidney & urinary tract	74.5%	81.3%	76.4%
12	Diseases & disorders of the male reproductive system	50.2%	57.4%	52.8%
13	Diseases & disorders of the female reproductive system	72.9%	75.7%	74.4%
14	Pregnancy, childbirth & the puerperium	87.1%	90.8%	88.4%
16	Diseases & disorders of blood, blood forming organs, immunological disorders	70.6%	75.6%	72.4%
17	Myeloproliferative diseases & disorders, poorly differentiated neoplasm	41.2%	41.9%	41.5%
18	Infectious & parasitic diseases, systemic or unspecified sites	74.9%	88.3%	78.0%
21	Injuries, poisonings & toxic effects of drugs	74.2%	78.9%	75.7%
24	Multiple significant trauma	26.8%	46.7%	32.4%

Source: State Discharge Data for Tennessee and Virginia, 2015; DRG Weight and MDC Crosswalk, 2015; CMS DRG to MS DRG Crosswalk, 2008

Note: See Appendix C for details of the patient choice model used to calculate diversion ratios. MDCs with fewer than 20 discharges in the sample are excluded from this analysis. Analysis is limited to commercial GAC discharges associated with patients from the 21-county Area, excluding newborns, seniors, and transfers from other hospitals and facilities. WHS does not include Wellmont Ridgeview Pavilion Bristol, an adult inpatient psychiatric hospital which is included in "Outside Good."

108. These results indicate that the proposed cooperative agreement is likely to increase the NHS’s bargaining leverage. As discussed earlier, a hospital system’s value to a commercial payer’s network is constrained by the availability of substitute hospitals to serve the payer’s enrollees if the payer fails to reach an agreement with that system. The diversion ratio results indicate that if the payer fails to reach an agreement with the NHS, then more than 80% of the enrollees who lose access to their most preferred hospital also lose access to their second-most preferred hospitals. Indeed, if the MSHA and WHS hospital were removed from the choice sets, 72% of the patients in the 21-county area would seek care *outside* the area. Therefore, for the commercial MCOs marketing their plans to patients in the 21-county area, the proposed cooperative agreement leaves little room for negotiation: failure to include the NHS results in a plan where most of the enrollees residing in the 21-county service area do not have in-network access to their most preferred or second-most preferred hospitals.

2. WTP Analysis Further Confirms that the Proposed Cooperative Agreement Is Likely to Lead to an Increase in Bargaining Leverage and Lead to Higher Prices

109. To estimate the extent of the price impact, I model the bargaining relationship between hospitals¹²⁷ and commercial payers that negotiate the prices of GAC inpatient care in the 21-county area. I first measure the relative bargaining leverage of the Parties. I then assess the change in that bargaining leverage caused by the proposed cooperative agreement to evaluate the extent of its likely price impact. The analysis proceeds by

¹²⁷ In this section, unless indicated otherwise, I use the term “hospital” to refer to both hospital systems (e.g., WHS) and individual hospital campuses (e.g., Wellmont Lonesome Pine Hospital).

assuming that there is no institutional constraint, such as the Parties' price cap commitments I described in Section IV, on the pricing behavior of the NHS. In Section VIII, I consider the impact of such pricing constraints on my conclusions.

110. My price impact analysis and its predictions are based on observed prices in 2015. That is to say, these are predictions of what prices would have been in 2015 had the proposed cooperative agreement already been implemented, and the 2015 prices were negotiated and determined. As such, these predictions hold constant all other factors that determine hospital prices, such as quality of care and other hospital-specific attributes.

a. Overview of the WTP Empirical Strategy

111. As mentioned in Section VI, the impact of a hospital merger on prices is driven by two relationships: (1) the increase (if any) in hospital bargaining leverage from the merger and (2) the relationship between hospital bargaining leverage and price. My analysis quantifies these relationships in the context of the proposed cooperative agreement, and hence, predicts the change in prices of hospital services likely to result from the proposed cooperative agreement.

112. The analysis has three main steps:

113. The first step measures the bargaining leverage possessed by each hospital in its price negotiations with each commercial payer. These measures of bargaining leverage (i.e., WTPs) are calculated using the patient choice model described above. These measures reflect the value that patients place upon having in-network access to a hospital. Consequently, WTP measures the importance of that hospital to the payer.

114. The second step estimates the increase in bargaining leverage resulting from the proposed cooperative agreement by calculating the change in WTPs.

115. Using the estimated relationship between WTPs and GAC inpatient prices, along with the change in WTPs resulting from the proposed cooperative agreement, the third step calculates the likely price impact of the proposed cooperative agreement.

116. I describe each of these steps in detail below.¹²⁸

b. Measuring Bargaining Leverage through WTP

117. WTP measures the loss (or gain) in value to the commercial payer's network that would result if the hospital were excluded from (or included in) that network. The loss (or gain) in value reflects both the desirability of the hospital as well as the closeness of available substitute hospitals. The more important the hospital is to a commercial payer (i.e., the higher its WTP), the higher the price that the payer is willing to pay to include the hospital in its network.¹²⁹ That is, hospitals that attract more patients, all else equal, will have more bargaining leverage with payers than hospitals that are not as popular.

118. WTP is calculated using the patient choice model described above. As I mentioned earlier, the patient choice model predicts the value (measured in utils) each patient receives from a hypothetical hospital choice.¹³⁰ A commercial payer's WTP for a given hospital system is the aggregate WTP for the hospital system across its enrollees. For example, if a network that includes hospitals in the MSHA system is worth 20 utils to the enrollees whereas one that does not include these hospitals is worth 12 utils, then the commercial payer's WTP is 8 utils for the MSHA system.

¹²⁸ I note that previous case laws have used WTP analysis to evaluate the competitive effects of hospital mergers. *See*, for example, Opinion of the Commission, In the Matter of ProMedica Health System, Inc., Docket No. 9346.

¹²⁹ Town, Robert and Gregory Vistnes, "Hospital competition in HMO networks," *Journal of Health Economics*, 2001, 20(5): 733–752.

¹³⁰ A util is a hypothetical unit used by economists to measure satisfaction. The utils used to measure WTP are arbitrarily scaled, such that a WTP is only meaningful in comparison to another, similarly scaled WTP.

c. The Proposed Cooperative Agreement Increases the WTP for the NHS and Will Increase Prices by 24%

119. The proposed cooperative agreement affects the WTP of MSHA and WHS because the cost to a payer of failing to reach an agreement will increase when MSHA and WHS merge: there would be fewer substitute hospitals in the network given that MSHA and WHS are each other’s closest substitute. Thus, the post-merger WTP for the NHS will be greater than the sum of the pre-merger WTPs of MSHA and WHS.

120. The change in WTP reflects the difference between the WTP for the NHS and the sum of the pre-merger WTPs of MSHA and WHS, and is a measure of the increased bargaining leverage of the NHS due to the proposed cooperative agreement. Table 13 shows the pre-merger WTP for each hospital system as well as the change in WTP resulting from the proposed cooperative agreement. As the table shows, the proposed cooperative agreement will result in an increase in WTP for the NHS by 120%.

Table 13: WTP Estimates

Hospital System	Calculation	WTP
WHS	[1]	8,309
MSHA	[2]	19,590
WHS + MSHA	[1] + [2]	27,899
NHS	[3]	61,371
Change	[3] - [1] - [2]	+33,472
Percent Change		120%

Source: State Discharge Data for Tennessee and Virginia, 2015

Note: See Appendix C for details of the patient choice model used to calculate WTP. Analysis is limited to commercial GAC discharges associated with patients from the 21-County Area, excluding newborns, seniors, and transfers from other hospitals and facilities. WHS does not include Wellmont Ridgeview Pavilion Bristol, an adult inpatient psychiatric hospital.

121. Based on the study by Barrette, Gowrisankaran, Nevo, and Town, a percentage increase in WTP is typically associated with a 0.2 percent increase in prices.¹³¹ This estimate of the elasticity of price with respect to WTP is a conservative estimate. For example, the study by Fournier and Gai provide an estimate of the elasticity that range from 0.627 to 0.683.¹³² By applying the conservative elasticity estimate of 0.2 to the estimated percentage increase in WTP, I estimate that the proposed cooperative agreement is likely to result in an average price increase of 24% in GAC inpatient services offered to commercial payers.

VIII. The Parties’ Rate Cap Commitments are Unlikely to Eliminate the Likely Anticompetitive Harm of the Proposed Cooperative Agreement on Hospital Prices

122. “In order to ensure pricing is not increased as a result of the elimination of inpatient competition,” the Parties commit to capping price increases for “commercial payers and governmental payers with negotiated rates who provide more than two percent (2%) of the New Health System’s total net revenue.”¹³³ In my opinion, the Parties’ rate cap commitments are unlikely to eliminate the likely anticompetitive harm resulting from the proposed cooperative agreement. First, the proposed rate cap commitments do not prevent the NHS from exercising its increased bargaining leverage to obtain favorable terms from payers in non-price dimensions. Second, the rate cap commitments are likely

¹³¹ Barrette, Eric, Gautam Gowrisankaran, Aviv Nevo, and Robert Town, “Countervailing Market Power and Hospital Competition,” 2016, Working Paper.

¹³² Elasticity estimates are based on overall estimates across different DRGs. *See* Fournier, Gary M., and Yunwei Gai, “What does Willingness-to-Pay reveal about hospital market power in merger cases?” iHEA 2007 6th World Congress: Explorations in Health Economics Paper, 2007, p. 28

¹³³ Virginia Application, Commitments Chart, p. 1. *See* Section VIII for details of the Parties’ rate cap commitments.

to be ineffective—that is, even with these commitments in place, the prices after the consummation of the proposed cooperative agreement can still be higher than the prices that would have been negotiated absent the proposed cooperative agreement. Third, there are likely to be payers or contracts that do not qualify for the proposed rate-cap commitments. Fourth, even though the Parties endorse the proposed cooperative agreement as “greatly accelerat[ing] the move from volume-based health care to value-based health care,” the proposed price cap commitments do not apply to value-based and risk-based contracts, or to new contracts specifying services that do not correspond to a service on the Medicare fee schedule.¹³⁴ I will elaborate on each of these points below.

123. With respect to the first point, the proposed cooperative agreement will eliminate competition between the Parties and hence, is likely to increase the Parties’ bargaining leverage in negotiations with payers, as discussed above. While the proposed rate cap commitments, assuming they are effective at limiting price increases, may prevent the Parties’ from exercising their increased bargaining leverage to obtain higher prices, they do not prevent the Parties from exercising their increased bargaining leverage through other means. The Parties can successfully negotiate on other terms that may be unfavorable to the payers but profitable to the Parties.¹³⁵

¹³⁴ Virginia Application, p. 9.

¹³⁵ As discussed in Section IV, hospital-payer contract negotiations are complex, including many different dimensions (both price and non-price). For example, in addition to the complexity of how reimbursement rates are set, the Parties can specify how hospital utilization will be monitored and controlled, details of the billing arrangements, and which cost tier a hospital will occupy. *See* Ho, Kate and Robin Lee, “Insurer Competition in Health Care Markets,” October 2016, Working Paper (Forthcoming in *Econometrica*), p. 6; Gaynor, Martin and Robert J. Town, “Competition in Health Care Markets,” *Handbook of Health Economics*. Vol. 2, ed. Mark V. Pauly, Thomas G. McGuire and Pedro P. Barros (Massachusetts: North Holland, 2012), 499–537, p. 524; Gaynor, Martin, Kate Ho, and Robert J. Town, “The Industrial Organization of Health-Care Markets,” *Journal of Economic Literature*, 2015, 53(2): 235–284, p. 252.

124. These commitments purportedly ensure (1) that hospital negotiated rates for existing contracts, after the first year, do not “adjust ... by more than the hospital Consumer Price Index for the previous year minus 0.25%.” and (2) that there is a reduction in the fixed rate increases for existing commercial contracts by “50% for the second full fiscal year commencing after the closing date of the NHS.” But, these commitments do not guarantee that the NHS’s prices, even with these commitments in place, would not exceed the prices that the payers would have negotiated with the Parties absent the proposed cooperative agreement.

125. There are two reasons why the negotiated prices absent the proposed cooperative agreement can be lower than the NHS’s prices with the rate cap commitments. First, the competitive dynamics between the payers and the Parties may change in the future. In particular, the Parties’ bargaining leverage may decrease over time absent the proposed cooperative agreement. In this case, payers can potentially renegotiate the terms of their contracts and command lower prices in the future. Such lower prices may be below the rate caps offered by the Parties. Indeed, there is some indication that the competition between the Parties may increase in the future absent the proposed cooperative agreement. Anthem, for example, has stated their plans to introduce tiered network plans in Southwest Virginia, and they anticipate such a plan to increase competition among the Parties’ hospitals.¹³⁶ Second, it may also be the case that increases in the hospital CPI index and medical care CPI index may be more than the increases in the Parties’ costs. In this case, there is room for the Parties to exercise their bargaining leverage through price increases since they can increase prices more than the rate at which the Parties’ cost increases.

¹³⁶ Drozdowski Declaration, ¶ 33.

126. Third, not all payers are covered by the proposed rate cap commitments, as they only apply to “commercial payers and governmental payers with negotiated rates who provide more than two percent (2%) of the New Health System’s total net revenue” (that is, “Principal Payers”).¹³⁷ Prices for commercial payers that are not subject to the rate cap commitments are likely to exhibit an average price increase by 24%, if the proposed cooperative agreement is consummated. Moreover, to the extent that patients covered by governmental payers (e.g., Medicare Advantage patients) exhibit similar preferences or patterns of hospital choices as commercial payers’ enrollees, governmental non-Principal Payers are also likely to exhibit some harm from the reduction in price competition.

127. The Parties have not identified a list of Principal Payers, but based on my review of the Parties’ own inpatient data, it is likely that there are a significant number of payers that do not qualify for the proposed rate cap commitments (See Table 14).¹³⁸ Indeed, it is likely that Aetna, Cigna, and a large number of smaller payers will not qualify for Parties’ rate cap commitments.¹³⁹ The commercial discharges for these payers account for

¹³⁷ Virginia Application, Commitments Chart, p. 1.

¹³⁸ To identify potential Principal Payers and as well as potential Non-Principal Payers, I use the Parties’ own inpatient data and calculate each payer’s share of NHS total inpatient net revenue. As dictated by the Parties’ rate cap commitments, I consider “[a]ll of a payer’s revenue” in calculating the shares (Virginia Application, Commitments Chart, p. 1). As such, I group together multiple contracts administered by the same payer when I calculate a payer’s total revenue. The commitment does not specify whether the NHS plans to combine commercial plans and Medicare Advantage plans belonging to the same insurer organization (e.g., Humana commercial insurance and Humana Medicare Advantage) when determining Principal Payers. To be conservative, I treat a commercial plan and Medicare Advantage plan under the same insurer organization as part of a single payer. Table 14 lists the share of NHS total inpatient net revenue for each commercial payer and each Medicare Advantage payer, as well as the combined (commercial and Medicare Advantage) share of NHS total inpatient net revenue.

¹³⁹ The groupings of the contracts or payers are based on Parties’ group identification, but may not be the final grouping used by the Parties to identify its Principal Payers. Moreover, it is possible that the Parties may identify additional governmental contracts/payers as a part of a non-Principal Payer’s group of contracts. As such the list of non-Principal Payers is tentative, and the Parties may identify some of the non-Principal Payers listed in Table 14 as Principal Payers.

approximately [REDACTED] of the Parties' inpatient revenue, or approximately \$ [REDACTED] in 2015.

Table 14: Share of Total Inpatient Revenues

Payer	MSHA	WHS	NHS
Commercial			
<i>Potential Principal Payers</i>			
Anthem	[REDACTED]	[REDACTED]	[REDACTED]
Blue Cross Blue Shield of Tennessee	[REDACTED]	[REDACTED]	[REDACTED]
Hospital Employees	[REDACTED]	[REDACTED]	[REDACTED]
United Healthcare	[REDACTED]	[REDACTED]	[REDACTED]
<i>Potential Non-Principal Payers</i>			
Aetna	[REDACTED]	[REDACTED]	[REDACTED]
Cigna	[REDACTED]	[REDACTED]	[REDACTED]
Humana	[REDACTED]	[REDACTED]	[REDACTED]
Other Commercial ⁽¹⁾	[REDACTED]	[REDACTED]	[REDACTED]
Subtotal	[REDACTED]	[REDACTED]	[REDACTED]

(table continues on next page)

Table 14: Share of Total Inpatient Revenues
(cont.)

Payer	MSHA	WHS	NHS
Medicare Advantage			
<i>Potential Principal Payers</i>			
Blue Cross Blue Shield of Tennessee			
CrestPoint Medicare Advantage ^[2]			
Humana			
United Healthcare			
<i>Potential Non-Principal Payers</i>			
Aetna			
Anthem			
Other Medicare Advantage ^[1]			
Subtotal			
Commercial & Medicare Advantage			
<i>Potential Principal Payers</i>			
Anthem			
Blue Cross Blue Shield of Tennessee			
CrestPoint Medicare Advantage ^[2]			
Hospital Employees			
Humana			
United Healthcare			
<i>Potential Non-Principal Payers</i>			
Aetna			
Cigna			
Other Commercial ^[1]			
Other Medicare Advantage ^[1]			
Total			

Source: MSHA Inpatient Data; WHS Inpatient Data

Note: Analysis is limited to discharges from 7/1/14–6/30/15. The groupings of the contracts or payers are based on Parties' group identification, but may not be the final grouping used by the Parties to identify its Principal Payers. Moreover, it is possible that the Parties may identify additional governmental contracts/payers as a part of a non-Principal Payer's group of contracts. As such the list of non-Principal Payers in this table is tentative, and the Parties may identify some of the non-Principal Payers listed in this table as Principal Payers.

[1] Each individual plan grouped into "Other Commercial" or "Other Medicare Advantage" account for less than 1% of total revenues.

[2] As of 6/1/16, CrestPoint's Medicare Advantage members were transferred to new Medicare Advantage plans due to MSHA's decision to cease its insurance operations.

128. In addition, the rate cap commitments do not apply to value-based contracts or to new contracts (both contracts offered by new commercial payers entering the market and existing insurers wishing to offer alternate plans to their enrollees).¹⁴⁰ The proposed cooperative agreement does not address how these contracts will be protected, if any, from an increase in bargaining leverage resulting from the proposed cooperative agreement. This omission is striking given the Parties' claim that the proposed cooperative agreement would "greatly accelerate the move from volume-based health care to value-based health care."¹⁴¹

IX. The Proposed Cooperative Agreement is Unlikely to Improve Quality

129. As I discussed in Section VI.B above, hospital competition takes place in two stages. In the first stage, hospital systems compete with each other to be included in an MCO's network. A hospital system and a MCO negotiate on the basis of price and non-price factors. Once a hospital system is included in the network, it competes, in the second stage, with other hospital systems to attract patients mainly on the basis of non-price factors. This is because patients typically prefer an in-network hospital over an out-of-network hospital (because the cost of selecting an out-of-network hospital to patients is higher than the cost of selecting an in-network hospital), and there is generally little out-of-pocket price difference between in-network hospitals from a patient's perspective.

¹⁴⁰ As I mention in Section XI, there is a trend for hospital systems and commercial insurers to engage in such contracts.

¹⁴¹ Virginia Application, p. 9.

130. Quality is a predominant non-price dimension of stage two of hospital competition.^{142, 143} Hospitals have greater incentives to provide higher quality services—for example, in the form of improved patient satisfaction, and/or in the form of improved clinical outcomes, such as lower mortality rates— when patient demand is more responsive to quality.¹⁴⁴ Patient demand, in turn, is more responsive to quality when patients are able to switch from one hospital to another when their quality expectations are not met by a hospital. That is, when patients are able to substitute one hospital for another, hospitals have greater incentives to provide higher quality in order to avoid losing their patients to other hospitals and to steal patients from competing hospitals. Consequently, in the case of the proposed cooperative agreement, to the extent that MSHA and WHS compete with each other on the basis of quality to attract patients, the proposed cooperative agreement will reduce the Parties’ incentives to invest in quality.

131. The importance of providing higher quality in attracting patients, when patients can choose among competing hospitals systems, is also acknowledged by the Parties. For example, in an August 2014 newsletter article, Alan Levine, President and CEO of MSHA, stated:

¹⁴² Part of “2012 Strategic Plan for MSHA” was

[REDACTED]

¹⁴³ A MSHA document demonstrates the importance of quality competition:

[REDACTED]

¹⁴⁴ Gaynor, Martin, Kate Ho, and Robert J. Town, “The Industrial Organization of Health-Care Markets,” *Journal of Economic Literature*, 2015, 53(2): 235–284, p. 244.

So when we talk about growth, the most important word I want you to keep in mind is **CHOICE**. Let me explain what I mean by that. Our patients do not have to use our services. They have a choice. They can choose a different doctor, a different hospital, a different outpatient clinic. And if we don't deliver the quality they deserve or the patient experience they want, they **will** choose someone else. Our goal, and the way we will achieve success in the Growth pillar, is by giving our patients such outstanding care and such a positive patient experience that they will **want** to choose us. If we do our jobs well, they'll not only choose us, but they'll tell their family and friends that **they** ought to choose us too, if they want the very best that health care has to offer. . . . **That** is how we grow -- by earning our patients' trust and loyalty and respecting the fact that they always have a choice.¹⁴⁵

132. While the two stage hospital competition is generally addressed in terms of the hospital-commercial payer relationship, the benefits of quality competition among hospitals are not confined to commercially insured patients. Because hospitals cannot choose to offer different quality levels to patients based on their insurance type,¹⁴⁶ quality improvements benefit all patients including those patients covered by Medicaid and Medicare programs as well as self-pay patients.

133. In this section, I address the impact of the proposed cooperative agreement on quality. I first review the available information to assess whether the Parties compete with

¹⁴⁵ Alan Levine, "A look at our new Growth Pillar: Earning our patients' trust." The Mountain Star, August 19, 2014, <http://www.mshanews.org/news/article.aspx?id=1958>, accessed on December 16, 2016.

¹⁴⁶ Gowrisankaran, Gautam and Robert J. Town, "Competition, Payers, and Hospital Quality," Health Services Research, 2003, 38(6): 1403–1422, p. 1405.

each other on the basis of quality. I then analyze and draw inferences from the economic literature on the relationship between hospital competition and quality as well as the relationship between hospital mergers and quality. I also evaluate the effect of certain quality enhancement provisions of the proposed cooperative agreement on quality that the NHS would provide if the cooperative agreement is approved and implemented. Based on these analyses, I conclude that the proposed cooperative agreement is more likely than not to reduce quality due to the elimination of competition between the Parties, and the quality enhancement measures committed by the Parties are unsupported, and/or unlikely to outweigh the proposed cooperative agreement’s likely harm on quality resulting from the lessened competition. Moreover, nothing in the expert reports submitted by the Parties alters these opinions.

A. Evidence Indicates that WHS and MSHA Compete with Each Other on the Basis of Quality

134. Evidence indicates that WHS and MSHA compete with each other on the basis of quality. Each hospital system monitors various quality measures and evaluates its quality relative to the other hospital system. For example, in an August 2012 news article, MSHA addressed the results of a survey conducted by the National Research Corporation that compared MSHA and WHS on quality and patient experience. Among the categories for the comparison were “Best Overall Quality,” “Most Personalized Care,” and “Top Mind Awareness,” as well as patients’ preferences by service lines, including heart care and maternity/OB.¹⁴⁷ Similarly, a spreadsheet produced by MSHA includes a study entitled

¹⁴⁷ “Survey shows MSHA is No. 1 health care provider in the region.” The Mountain Star, August 20, 2012, <http://www.mshanews.org/news/article.aspx?id=368>, accessed on December 16, 2016.

[REDACTED] with a preliminary release date of January 2014, where MSHA and WHS were compared based on [REDACTED].¹⁴⁸ In addition, in a July 2014 newsletter, Mr. Levine, President and CEO of MSHA, stated that “our region is blessed to have two systems who share in a commitment to achieve high value, low cost and high quality. And so, I tip my hat to our colleagues at Wellmont for the good job they do. But I also think it is important to take a moment and reflect on a truism” and shared the following three examples to demonstrate the high quality services provided by MSHA: US News and World Report named Johnson City Medical Center to be among the top 10 hospitals in Tennessee; Johnson City Medical Center was one of the only four Tennessee hospitals that made to the “100 Hospitals with Great Oncology Programs;” and three MSHS hospitals (Smyth County, Sycamore Shoals, and Indian Path) were among the top performers delivering high quality, cost effective health care.¹⁴⁹ A few months later, in a December 2014 email trail, Mr. Levine and other MSHA employees discussed [REDACTED]

[REDACTED]
[REDACTED]¹⁵⁰ MSHA also often [REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]

¹⁴⁸ [REDACTED].

¹⁴⁹ Alan Levine, “Message from our CEO: remember, when things get tough, ‘just fly the plane.’” The Mountain Star, July 29, 2014, <http://www.mshanews.org/news/article.aspx?id=1932>, accessed on December 16, 2016.

¹⁵⁰ [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]¹⁵¹ A few

months later, in June 2015, Mr. Levine iterated: [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]¹⁵²

135. Similarly, Wellmont compares itself to MSHA on the basis of quality. For example, after learning that U.S. News & World Report ranked Holston Valley Medical Center as third in Tennessee and recognized it as “high-performing” in several specialties including Cardiology & Heart Surgery in 2013, [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]¹⁵³ In an October 2013 email trail, [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]¹⁵⁵

151 [REDACTED]

152 [REDACTED]

153 [REDACTED]

154 [REDACTED]

155 [REDACTED].

136. The importance of hospital quality in attracting patients is also evidenced by the Parties' advertisements of the quality of care and patient satisfaction they offer. For example, Wellmont "promise[s] ... not only the highest quality medical services in the region but also an environment of safety, comfort and caring."¹⁵⁶ Similarly, in its 2014 Community Report, MSHA noted that "All Mountain States hospitals perform better than the national average in Patient Safety for Selected Conditions" based on data from the Hospital Compare study dated December 2014.¹⁵⁷ In addition, both hospital systems highlight the quality awards they have received.¹⁵⁸

137. Commercial payers have also expressed concerns that the proposed cooperative agreement is likely to have a negative impact on the Parties' incentives to improve quality, suggesting that the Parties compete on quality from payers' perspective. For example, in his Declaration, Colin Drozdowski, Vice President for National Provider Solutions at Anthem, a large commercial payer at both hospital systems, expresses Anthem's concern that the proposed cooperative agreement would eliminate competition, and hence, Parties' incentives to improve quality¹⁵⁹, even though both MSHA and Wellmont currently participate in Anthem's Quality-In-Sight®: Hospital Incentive Program (Q-HIP®), which "promotes adherence to evidence-based medicine and best practices that lead to

¹⁵⁶ "Patients and Visitors." Wellmont Health System, <http://www.wellmont.org/Patients-and-Visitors/>, accessed on December 16, 2016.

¹⁵⁷ "2014 Community Report." Mountain State Health Alliance, https://www.mountainstateshealth.com/sites/default/files/documents/MTN-150141_050815_2015%20Community%20Report_WEB.pdf, accessed on December 16, 2016, p. 12,

¹⁵⁸ "Search Results." Mountain States Health Alliance, <https://www.mountainstateshealth.com/search/site/quality>, accessed on December 16, 2016; [REDACTED].

¹⁵⁹ Drozdowski Declaration, ¶¶ 58, 61.

improvements in patient outcome and affordability.”¹⁶⁰ Mr. Drozdowski states that the Q-HIP® alone will not be enough to offset the Parties’ decreased incentives to increase quality post-merger.¹⁶¹

138. In summary, as shown in Section VII, WHS and MSHA are each other’s closest competitor. The competition between them to attract patients incentivizes each hospital to provide high quality. The proposed cooperative agreement will likely to reduce the evident quality competition between the parties, thereby decreasing their incentives to provide higher quality healthcare services.

B. Economic Studies Largely Indicate that Competition among Hospitals Results in Higher Quality

139. There exists a large body of literature demonstrating that hospital competition generally improves quality. The literature is separated into two groups: studies that address the effect of competition on quality when prices are regulated, and studies that address the effect of competition on quality when prices are negotiated, i.e., determined by market forces. Assuming they are effective at limiting price increases, the price cap commitments included in the proposed cooperative agreement can be likened to the imposition of regulated pricing on the NHS. Thus, the relationship between the NHS and the commercial payers covered by the proposed cooperative agreement, if approved and implemented, would be closer to the regulated pricing setting than the negotiated pricing setting. Accordingly, the literature addressing the quality and hospital competition

¹⁶⁰ Drozdowski Declaration, ¶¶ 57, 59.

¹⁶¹ Drozdowski Declaration, ¶ 61.

relationship in regulated pricing environments is more relevant for the proposed cooperative agreement.

140. When hospital prices are set administratively—such as in the case of the British National Health Service or the U.S. Medicare program, economic theory predicts that competition among hospitals leads to higher quality, so long as the regulated price is set above the marginal cost (that is, the incremental cost of treating an additional patient). When revenues from treating additional patients exceed the incremental cost of treating them, a hospital can earn additional profits by attracting more patients. When prices are fixed, the hospital cannot decrease its prices to attract more patients; therefore, it improves the quality of services instead.¹⁶²

141. Empirical studies of the impact of hospital competition on quality under a regulated price regime are based on either the U.S. Medicare program or the English National Health Service, which instituted administered prices in 2006. Most Medicare program-based studies find a positive relationship between hospital competition and quality, while there are some studies demonstrating either no relationship or a negative

¹⁶² Gaynor, Martin, Kate Ho, and Robert J. Town, “The Industrial Organization of Health-Care Markets,” *Journal of Economic Literature*, 2015, 53(2): 235–284, p. 243.

relationship for Medicare patients.¹⁶³ Two of these studies—namely, a study by Kessler and McClellan and a study by Kessler and Geppert—use national samples, rely on changes in market concentration to identify the effect of competition on quality, and formulate competition measures that are less prone to reverse causality (that is, an increase in a hospital’s quality may cause changes in market concentration), which may occur if patients are more likely to go to high quality hospitals.¹⁶⁴ These two studies show that hospital competition improves quality.

142. The studies based on the English National Health Service principally show that the introduction of hospital competition in the U.K. increased quality.¹⁶⁵ While it is not possible to draw direct conclusions about the U.S. hospital markets based on evidence

¹⁶³ For example, a study by Kessler and McClellan and a study by Kessler and Geppert find that hospital competition improves quality, measured by mortality rate, for Medicare patients. My own study, on the other hand, shows that mortality rate is higher for Medicare patients receiving care in less concentrated markets. Another study by Mukamel et al. finds no effect of market concentration on mortality rate for Medicare patients. *See* Kessler, Daniel P., and Mark B. McClellan, “Is Hospital Competition Socially Wasteful?” *Quarterly Journal of Economics*, 2000, 115(2): 577–615; Kessler, Daniel P. and Geppert, Jeffrey J., “The effects of competition on variation in the quality and cost of medical care,” *Journal of Economics and Management Strategy*, 2005, 14(3): 575–589; Gowrisankaran, Gautam, and Robert J. Town, “Competition, Payers, and Hospital Quality,” *Health Services Research*, 2003, 38(6): 1403–1422, p. 1403; Mukamel, Dana B., Jack Zwanziger, and Anil Bamezai, “HMO Penetration, Competition, and Risk-Adjusted Hospital Mortality,” *Health Services Research*, 2011, 36(6): 1019–1035, p. 1019. I provided a summary of these four studies, as well as other relevant studies, in my recent paper on the subject. *See* Vogt, William B. and Robert J. Town, “How Has Hospital Consolidation Affected the Price and Quality of Hospital Care?” *The Synthesis Project*, February 2006, p. 8.

¹⁶⁴ Vogt, William B. and Robert J. Town, “How Has Hospital Consolidation Affected the Price and Quality of Hospital Care?” *The Synthesis Project*, February 2006, p. 8.

¹⁶⁵ I provided a summary of the recent studies based on the English National Health Service in Table 3 of Gaynor, Martin and Robert Town, “The Impact of Hospital Consolidation—Update,” *The Synthesis Project*, Robert Wood Johnson Foundation, June 2012; and Table 9.10 of Gaynor, Martin and Robert J. Town, “Competition in Health Care Markets,” *Handbook of Health Economics*. Vol. 2, ed. Mark V. Pauly, Thomas G. McGuire and Pedro P. Barros (Massachusetts: North Holland 2012), 499–537. In addition, a recent study by Gaynor et al, also shows that competition increased quality in U.K. *See* Gaynor, Martin, Rodrigo Moreno-Serra, and Carol Propper, “Death by Market Power: Reform, Competition and Patient Outcomes in the National Health Service,” *American Economic Journal: Economic Policy*, 2013, 5(4): 134–166.

from the U.K., these studies add to the conclusion that competition generally leads to enhanced quality under administered prices.¹⁶⁶

143. To the extent that the proposed cooperative agreement is likened to a setting where prices are negotiated, economic theory predicts ambiguous results for the impact of competition on quality. In environments where hospitals can compete on both price and quality, the result depends on how responsive a patient's hospital choice to price versus quality is. The reason is that when hospitals face increased competition, they will choose to compete by lowering price, increasing quality, or a combination of both. If patients are considerably more responsive to price than quality, then enhanced competition can lead to lower prices, but also less attention to quality. On the other hand, if quality is particularly prominent, then increased competition can enhance quality.¹⁶⁷ However, if one can assume that patient choice is not responsive to price (which, as I mentioned in Section VI, can be reasonable for hospital care where patients are largely insulated from prices by the presence of MCOs), then one can conclude that greater competition leads to higher quality.

144. While the results from the empirical studies focusing on the competition and quality relationship under negotiated prices are unequivocally more mixed than the literature on the competition and quality relationship under administered prices, an overwhelming majority of empirical studies indicate a positive hospital competition and

¹⁶⁶ Gaynor, Martin and Robert Town, "The Impact of Hospital Consolidation—Update," The Synthesis Project, Robert Wood Johnson Foundation, June 2012.

¹⁶⁷ See Gaynor, Martin and Robert Town, "The Impact of Hospital Consolidation—Update," The Synthesis Project, Robert Wood Johnson Foundation, June 2012, p. 4; See Gaynor, Martin, Kate Ho, and Robert J. Town, "The Industrial Organization of Health-Care Markets," *Journal of Economic Literature*, 2015, 53(2): 235–284, p. 244.

quality relationship,¹⁶⁸ suggesting that the lessened competition between WHS and MSHA is likely to reduce the quality that the Parties provide.

C. Empirical Studies on Previous Hospital Mergers Generally Indicate that Mergers Do Not Improve Quality

145. Like the literature focusing on the hospital competition-quality relationship, studies that address the impact of past hospital mergers on quality find that many mergers have had negative impact on quality, although some mergers have had no impact or positive impact based on certain quality measures.¹⁶⁹

146. For example, Ho and Hamilton¹⁷⁰ study the impact of hospital mergers in California over the period from 1992 through 1995 on various quality measures such as mortality rate, readmission rate, and early discharge rate. They find that mergers did not have an impact on mortality rate, but increased readmission and early discharge rates.

147. Another study, authored by Capps,¹⁷¹ compares 25 merging hospitals to non-merging hospitals in New York State during 1995–2000 based on various quality and

¹⁶⁸ In my recent academic work, I reviewed and summarized eleven such studies from the U.S. See Table 9. 11 in Gaynor, Martin and Robert J. Town, “Competition in Health Care Markets,” Handbook of Health Economics. Vol. 2, ed. Mark V. Pauly, Thomas G. Mcguire and Pedro P. Barros (Massachusetts: North Holland 2012), 499–537. These studies address the relationship between various quality indicators (such as mortality rate, readmission rate, or patient safety measures) and hospital competition (measured by HHI, number of competitors, price deregulation, hospital operating margin, or entry). Of the eleven U.S. studies, eight find a positive hospital competition-quality relationship. See also Table 4 in Gaynor, Martin and Robert Town, “The Impact of Hospital Consolidation–Update,” The Synthesis Project, Robert Wood Johnson Foundation, June 2012.

¹⁶⁹ I reviewed and summarized several such studies in my recent academic work. See Table 9.11 in Gaynor, Martin and Robert J. Town, “Competition in Health Care Markets,” Handbook of Health Economics. Vol. 2, ed. Mark V. Pauly, Thomas G. Mcguire and Pedro P. Barros (Massachusetts: North Holland 2012), 499–537.

¹⁷⁰ Ho, Vivian and Barton H. Hamilton, “Hospital mergers and acquisitions: Does market consolidation harm patients?” Journal of Health Economics, 2000, 19(5): 767–791.

¹⁷¹ Capps, Corey, “The Quality Effects of Hospital Mergers,” 2005, Unpublished Manuscript.

patient safety indicators. The study finds that the mergers reduced quality based on two mortality rate measures and did not improve quality based on all other measures.

148. A recent study by Romano and Balan¹⁷² investigates the impact on clinical quality of a consummated merger between two hospitals in the Chicago suburbs (the acquisition of Highland Park Hospital by Evanston Northwestern Healthcare). They analyze inpatient death and complications rates for a number of clinical conditions and find no support that quality improved substantially at Highland Park as a result of the merger.

149. Another recent study, Mutter et al.,¹⁷³ examines the impact of 42 hospital mergers in 16 states from 1999 to 2000 on numerous different measures of quality. The study finds that consolidations have no consistent effect on quality, although there is suggestive evidence that acquiring hospitals may achieve some limited quality improvement, based on a limited number of quality measures.

150. In addition, studies analyzing the impact of Mission Health Cooperative Agreement in North Carolina, which the parties deem as “successful,”¹⁷⁴ indicate no apparent quality improvements. For example, Bovbjerg and Berenson note that “neither the parties nor outside observers have addressed to what extent Mission’s prices, overall health costs, or quality have been affected by the COPA oversight.”¹⁷⁵

¹⁷² Romano, P. and David J. Balan, “A Retrospective Analysis of the Clinical Quality Effects of the Acquisition of Highland Park Hospital by Evanston Northwestern Healthcare,” *International Journal of the Economics of Business*, 2011, 18(1): 45–64.

¹⁷³ Mutter, Ryan L., Patrick S. Romano, and Herbert S. Wong, “The Effects of U.S. Hospital Consolidations on Hospital Quality,” *International Journal of the Economics of Business*, 2011, 18(1): 109–126.

¹⁷⁴ Applicants’ Response to FTC, p.34.

¹⁷⁵ Bovbjerg, Randall R. and Robert A. Berenson, “Certification of Public Advantage: Can They Address Provider Market Power?” Urban Institute Research Report, February 2015, p. 16.

D. Quality Enhancement Commitments of the Proposed Cooperative Agreement Are Unlikely to Compensate for the Agreement's Likely Harm on Quality

151. As I discussed above, the likely effect of the lessened competition resulting from the proposed cooperative agreement is to reduce quality relative to the levels that would be achieved absent the proposed cooperative agreement. In order to counterbalance this, the Parties have proffered a number of quality enhancements that they claim would be achieved as a result of the proposed cooperative agreement. The Parties' claimed quality enhancement initiatives include, as discussed in Section V.C above, consolidation of certain clinical services (e.g., the area's two Level I Trauma Centers, some specialty pediatric services, certain co-located ambulatory facilities, and repurposing of acute care beds), standardization of management and clinical practice policies and procedures, establishing a Common Clinical IT Platform, and expanding quality reporting. In my opinion, the claimed quality benefits resulting from these initiatives are not supported, are largely not merger specific and even if they are merger specific, likely to be achieved by a merger with an out-of-region hospital system that is less of a competitive threat, nor likely to offset the agreement's negative impact on the level of quality offered by the Parties. I evaluate these quality enhancement claims in turn below.

152. With respect to the consolidation of certain clinical services, there exists, indeed, a large body of academic literature indicating a positive relationship between volume and

clinical outcomes for certain surgical and other complex procedures.¹⁷⁶ The literature indicates that increasing the number of patients who receive a specific treatment in a specific hospital tends to improve the clinical outcomes of that treatment in that hospital. This is due to “learning by doing” in which physician and non-physician staff would become more skilled the more they do certain procedures.¹⁷⁷

153. Among the four services that the Parties will supposedly consolidate, the only service with a likely positive volume-outcome relationship is Level I Trauma.¹⁷⁸ I understand, based on the Kizer Report, that the Parties’ claimed volume-outcome improvement is unlikely if the two Level I Trauma Centers are consolidated because the existing centers are already treating a sufficiently large number of cases that are above volume-outcome threshold at which outcomes have been shown to improve. Thus, the existing centers have already achieved significant improvements in outcomes, and

¹⁷⁶ See, for example, Gowrisankaran, Gautam, Vivian Ho, and Robert J. Town, “Causality, Learning and Forgetting in Surgery,” 2006, Working Paper, 1–43, p. 1; Gaynor, Martin, Harald Seider, and William B. Vogt, “The Volume-Outcome Effect, Scale Economies, and Learning-by-Doing,” *American Economic Review*, 2005, 95(2): 243-247, p. 246; Halm, Ethan A., Clara Lee, and Mark R. Chassin, “Is Volume Related to Outcome in Health Care? A Systematic Review and Methodologic Critique of the Literature,” *Annals of Internal Medicine*, 2002, 137(6): 511–520.

¹⁷⁷ See Gowrisankaran, Gautam, Vivian Ho, and Robert J. Town, “Causality, Learning and Forgetting in Surgery,” 2006, Working Paper, 1–43, p. 1.

¹⁷⁸ The others (specialty pediatric service, repurposing acute care beds, and co-located ambulatory facilities) have not been identified adequately to evaluate, or to my knowledge, do not have an established volume-outcome relationship.

increasing volumes further is not likely to result in a meaningful outcome improvement.^{179, 180}

154. Regarding the Parties' standardization claims, a merger may improve quality at one hospital if the other merging hospitals have superior practices or institutions that can be readily imported. If the pre-merger management of a hospital is sufficiently ineffective, the acquiring system can achieve large gains by substituting better management.¹⁸¹ However, this is not the case for WHS and MSHA. Publicly reported data indicate that the Parties have similar quality levels, rendering this potential source of quality improvement inapplicable for the proposed cooperative agreement.¹⁸² Even if it were applicable, the Parties have not established that the proposed cooperative agreement is necessary to achieve the claimed standardization. In the Virginia Application, the Parties argue that the claimed standardization requires "sharing of proprietary information" and "significant contribution of resources" by the Parties. However, they

¹⁷⁹ See Kizer Report, p. 18.

¹⁸⁰ The relevant literature indicates that there is an association between trauma center volume and outcomes, when volume exceeds 650 cases per year. See Nathans, Avery B. et al., "Relationship Between Trauma Center Volume and Outcomes," *Journal of the American Medical Association*, 2001, 285(9):1164–1171. The parties have exceeded this threshold individually in the past, and thus, the proposed cooperative agreement is unlikely to result in a meaningful outcome improvement. For example, MSHA's Trauma Level I Center at Johnson City Medical Center had 1883 admits in 2007. WHS's Trauma Level I Center at Holston Valley Medical Center had 1695 admits in the same year. See Trauma Care Advisory Council, "Trauma Care in Tennessee: A Report to the 2010 107th General Assembly." Tennessee Department of Health, November 8, 2010, https://www.tn.gov/assets/entities/health/attachments/2010_Trauma_Care_in_TN_Report.pdf, accessed on December 16, 2016.

¹⁸¹ Romano, P. and David J. Balan, "A Retrospective Analysis of the Clinical Quality Effects of the Acquisition of Highland Park Hospital by Evanston Northwestern Healthcare," *International Journal of the Economics of Business*, 2011, 18(1): 45–64, pp. 47–48.

¹⁸² According to CMS Hospital Compare Program, which includes information about the quality of care at over 4,000 Medicare-certified hospitals in the U.S., three WHS hospitals have scored 3 out of 5 and one WHS hospital has scored 4. Similarly, four MSHA hospitals have scored 3, two have scored 4, and one has scored 2. See "Find a hospital." Medicare.gov, <https://www.medicare.gov/hospitalcompare/search.html>, accessed on December 16, 2016.

have not articulated the nature of the propriety information, nor have they explained why the proposed cooperative agreement is required to share that information.

155. In addition, the Parties also claim an investment of approximately \$150 million over ten years to establish a Common Clinical IT Platform for electronic medical records among the combined hospitals, employed physicians, and other services. The Parties argue that the Platform would provide the ability to quickly obtain full access to patient records at the point of care, and hence, improve quality of care.¹⁸³ The Parties, however, do not offer any channel through which this consolidated health record system would improve quality of care, nor do they establish whether or to what extent there are any incremental benefits of the new electronic health record system, compared to the Parties' existing electronic health record systems. Nevertheless, while academic literature recognizes that consolidated electronic health record systems can yield quality benefits by increasing portability of data across sites of care and decreasing incidence of medication-related errors, it also cautions that electronic health record systems do not require geographic proximity and thus cannot be considered merger specific.^{184, 185}

156. As for the Parties' claim that public reporting of certain quality metrics "impact[s] choice and further incentivize[s] the provision of high quality care,"¹⁸⁶ there are a number

¹⁸³ Virginia Application, pp. 52, 84.

¹⁸⁴ Romano, P. and David J. Balan, "A Retrospective Analysis of the Clinical Quality Effects of the Acquisition of Highland Park Hospital by Evanston Northwestern Healthcare," *International Journal of the Economics of Business*, 2011, 18(1): 45–64, p. 48.

¹⁸⁵ Indeed, [REDACTED]

¹⁸⁶ Virginia Application, p. 75.

of issues with this commitment. First, the Parties have not established why they cannot commit to public reporting of quality measures absent the proposed cooperative agreement. Second, even if there are benefits that might be realized from public reporting of quality, those benefits will be limited upon the consummation of the cooperative agreement, as consumers will not have meaningful alternatives to the NHS. Indeed, empirical literature shows that public reporting of quality does not have a meaningful effect on the incentives for healthcare providers to provide higher quality, and that providers facing greater competition improved their quality more than providers in less competitive markets.¹⁸⁷

X. The Claimed Cost Efficiencies Are Unsubstantiated, Can Largely be Achieved through Alternative Transactions, and Unlikely to Compensate for the Likely Harm Resulting from the Proposed Cooperative Agreement

157. As I discussed above, the Parties claim that the proposed cooperative agreement will generate annual cost savings of \$121 million.¹⁸⁸ I note that the Compass Report restates this claim and characterizes it as “well-documented and conservative.”¹⁸⁹

However, the Compass Report does not present an independent assessment of the claimed efficiencies and, thus, does not affect my opinions as expressed below.

158. These claimed cost efficiencies must be weighed against the anticompetitive harm likely to result from the proposed cooperative agreement to assess whether they would be sufficient to offset the likely harm. The *Merger Guidelines* provide a set of criteria as to

¹⁸⁷ See, for example, Grabowski, David C. and Robert J. Town, “Does information matter? Competition, Quality, and the impact of Nursing Home Report Cards,” *Health Services Research*, 2011, 46(6): 1698-1719.

¹⁸⁸ See Section V.A.

¹⁸⁹ Compass Report, p. 12.

how to evaluate cost efficiencies in assessing a proposed merger.¹⁹⁰ First, cost efficiencies must be non-speculative and measurable. Second, cost efficiencies must be merger-specific, i.e., they would not have been achieved by merging parties in the normal course of business, absent their merger, or they would not have been achieved through an alternative transaction with comparable antitrust concerns. And third, cost efficiencies must be passed through to consumers.¹⁹¹ After applying these criteria, it is my opinion that the Parties' claimed cost efficiencies are unverifiable and can largely be achieved through alternative transactions for the reasons I explain below.

159. With respect to the speculative nature of the claimed cost efficiencies, the Parties state in their application that efficiencies will be achieved through savings in the area of purchased services, reduction in labor expenses, and alignment of clinical services such as the area's two Level I Trauma Centers.¹⁹² However, they have not provided any specific details on how the claimed cost savings are estimated or any roadmap as to how they will be achieved. Therefore, it is not possible to verify whether the proposed cost efficiencies are accurate, or likely to be achieved.

160. Regarding the merger-specific nature of the projected costs savings, the Parties have not established that they are specific to the proposed cooperative agreement or incremental to costs savings the Parties would have achieved in the ordinary course of business, or through an alternative transaction. In their Virginia Application, the Parties

¹⁹⁰ *Merger Guidelines*, §10.1.

¹⁹¹ *Merger Guidelines* § 10.

¹⁹² Virginia Application, pp. 44-47.

simply claim that non-labor efficiencies “would not be possible but for the merger.”¹⁹³ They also claim that the labor and clinical efficiencies “require an institutional process among the stakeholders in the community through the proposed Alignment Policy”¹⁹⁴ and that “it is not possible for the Parties to engage in this process without the protection of the State Agreements.”¹⁹⁵ That is, these efficiencies, the Parties claim, would not be accomplished without the proposed cooperative agreement. But, they have not offered any explanation or evidence to substantiate those claims. Further, the Parties have not explained how they quantified the labor and clinical efficiencies when they depend upon this institutional process that has not yet occurred.

161. Indeed, there is evidence that some of the claimed cost efficiencies can be achieved through merging with alternative hospital systems that are likely to raise fewer competitive concerns. I understand that the WHS Strategic Special Options Committee considered six organizations in Phase II. Among these organizations, [REDACTED]

[REDACTED]¹⁹⁶ Based on my competitive effects analysis in Section VII, [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED] For example, [REDACTED] [REDACTED]

[REDACTED]

¹⁹³ Virginia Application, p. 45.

¹⁹⁴ Virginia Application, p. 46.

¹⁹⁵ Virginia Application, p. 46.

¹⁹⁶ [REDACTED]

[REDACTED]

[REDACTED].¹⁹⁷ Nevertheless, the Parties have not offered any explanation, or any basis as to why the proposed cooperative agreement is superior to this alternative that is unlikely to raise antitrust concerns.

162. Further, the Parties suggest that they will pass through part of these claimed cost savings to consumers by investing certain portion of those cost savings in improving health care quality, improving population health in the region, and preserving rural hospitals that would otherwise have been closed, among others. Indeed, the Parties state that “the monetary commitments are possible solely based on savings to be realized from merger efficiencies, and cannot be made without the merger.”¹⁹⁸ In other words, the Parties confirm that the claimed benefits of the proposed cooperative agreement are contingent on achieving the projected cost efficiencies. Thus, to the extent that the Parties cannot achieve the \$121 million annual efficiencies, or can achieve only a portion of those projected efficiencies, the Parties would not be able to fulfill their commitments and fully achieve the claimed benefits. Moreover, even assuming the claimed cost efficiencies would be realized, if the proposed cooperative agreement is approved and implemented, the proposed cooperative agreement is unlikely to enhance the quality of hospital care, unlikely to improve the population health of the region, and unlikely to prevent the closure of the Parties’ rural hospitals (see Sections V.C, V.D, and V.E). As a result, the Parties’ pass through claims cannot be plausibly verified.

¹⁹⁷ [REDACTED]

¹⁹⁸ Applicants’ Response to FTC, p. 33.

163. Finally, even assuming that the claimed cost efficiencies are verifiable, merger-specific, and can be passed through to consumers, neither the Parties nor their experts have established that they are sufficiently large to offset the anticompetitive harm likely to result from the proposed cooperative agreement. The *Merger Guidelines* require that the Parties show extraordinary efficiencies to overcome potential anticompetitive harm.¹⁹⁹ To the extent that the Parties cannot achieve the claimed cost efficiencies, they will not be able to fully achieve the claimed benefits and thus, are unlikely to mitigate the likely anticompetitive impact of the proposed cooperative agreement.

XI. The Proposed Cooperative Agreement Is Not Necessary to Improve the Population Health of the Region

164. The proposed cooperative agreement is not necessary to improve the population health of the region.²⁰⁰ MSHA and WHS have already made significant amount of investment in population health programs, and they are likely to continue to invest in these programs even without the proposed cooperative agreement for at least two reasons. First, MSHA and WHS are large integrated systems with large market shares, which makes them well positioned to participate in value-based contracting that incentivizes population health initiatives. In fact, MSHA and WHS have already engaged in various forms of value-based contracting with payers and are likely to continue to engage in these programs

¹⁹⁹ *Merger Guidelines*, § 10.

²⁰⁰ Population health is defined as “the overall health status or health outcomes of a specified group of people resulting from the many determinants of health, including healthcare, public health interventions, and social and environmental factors.” See Kizer Report, p. 20. MSHA defines population health [REDACTED]

[REDACTED]

due to emerging value-based healthcare economy. Such programs encourage healthcare providers to manage the care of their population with chronic conditions and encourage health-promoting behaviors. Second, health outcomes of populations are determined more by social factors than by medical care.²⁰¹ Therefore, to fully influence the health of their population, the hospital systems participate—and are likely continue to participate—in partnerships with community based organizations, such as nutrition support programs and housing authorities, to influence the social determinants of health. Participation in such partnerships does not require a merger. I do not find the claims made in the Advisory Board Report that the Parties lack the scale to provide value-based services to be probative given the information below and the lack of support for these claims in the Advisory Board Report, as described in Section XIII.C.

165. Further, due to the increasing trend in value-based healthcare and the increasing trend in providers' partnerships with social institutions to improve social and environmental aspects of care, any other system, including an out-of-region hospital system, is likely to engage in value-based contracting or likely to participate in partnerships with community based organizations. Thus, the claimed population health benefits can be achieved through merging with an out-of-region hospital system that is likely to be less of an antitrust concern.

²⁰¹ Taylor, Lauren, Andrew Hyatt, and Megan Sandel, "Defining the Health System's Role in Addressing Social Determinants And Population Health," Health Affairs Blog, November 17, 2016, <http://healthaffairs.org/blog/2016/11/17/defining-the-health-care-systems-role-in-addressing-social-determinants-and-population-health>, accessed on December 16, 2016.

A. MSHA and WHS Have Already Made Significant Investments in Population Health Programs

166. MSHA and WHS have already been engaged in various population health investments, without the proposed cooperative agreement, that benefit the region.²⁰² For example:

- a. MSHA owns and operates drop-by Health Resources Centers that support chronic disease prevention and management;²⁰³
- b. WHS owns and operates mobile health buses that are equipped to offer immunizations, cardiovascular and cancer screenings, mammograms, and physicals;²⁰⁴
- c. In addition, WHS created Wellmont LiveWell, a free web-based program designed to improve the region's health status. This initiative encourages people to commit to important habits, such as regular exercise, healthy diets, maintaining proper blood pressure and cholesterol levels, and not smoking.²⁰⁵
- d. Both MSHA and WHS operate nurse call centers that can engage with populations for the development of wellness and prevention coaching and disease management programs;²⁰⁶ and

²⁰² A list of existing MSHA and WHS population health programs is presented in the HCI Report, pp. 17-19.

²⁰³ Virginia Application, p. 50.

²⁰⁴ Virginia Application, p. 50.

²⁰⁵ "Wellmont Medical Associates Collaborates With Cigna In Initiative That Advances Quality of Patient Care," Wellmont Health System, <https://www.wellmont.org/News/Our-Providers/Wellmont-Physicians/Wellmont-Medical-Associates/2014/Wellmont-Medical-Associates-Collaborates-With-Cigna-In-Initiative-That-Advances-Quality-Of-Patient-Care.aspx>, accessed on December 16, 2016.

²⁰⁶ Virginia Application, pp. 50-51.

- e. Both hospital systems have worked with the College of Public Health at East Tennessee State University (“ETSU”) to organize community health groups (such as mental health and addiction, population health and healthy communities, etc.) to focus on the root causes of poor health in the region and identify actionable interventions. In fact, ETSU has been jointly engaged by the Parties to develop a 10-year plan for addressing these community health improvements in the region.²⁰⁷

167. Further, both MSHA and WHS have made a significant amount of healthcare investment to benefit their communities. For example:

- a. In FY 2013, MSHA made direct community benefits of more than \$92 million, such as community health improvement services, health profession education, subsidized health services (such as skilled nursing facilities, mental health, and various outpatient services), and contributions to health promotion programs;²⁰⁸
- b. MSHA invested in the healthcare of a rural community by constructing Unicoi County Memorial Hospital, a full service community hospital. The grand opening is scheduled for Spring 2018;²⁰⁹

²⁰⁷ Virginia Application, pp. 6, 88-90.

²⁰⁸ “Building Health Communities: 2014 Community Report.” Mountain State Health Alliance, https://www.mountainstateshealth.com/sites/default/files/documents/MTN-150141_050815_2015%20Community%20Report_WEB.pdf, accessed on December 16, 2016.

²⁰⁹ “Building Health Communities: 2014 Community Report.” Mountain State Health Alliance, https://www.mountainstateshealth.com/sites/default/files/documents/MTN-150141_050815_2015%20Community%20Report_WEB.pdf, accessed on December 16, 2016.

- c. In 2014, WHS invested in the community healthcare of Russell County with the opening of Wellmont Urgent Care in Lebanon, Virginia;²¹⁰
- d. In 2015, Wellmont Cancer Institute unveiled a new facility at Island Road in Bristol, Virginia, giving patients another access for a variety of medical services;²¹¹
- e. In 2015, Wellmont Cancer Institute and Wellmont Medical Associates jointly launched a lung nodule program, which places additional emphasis on finding nodules as quickly as possible so Wellmont pulmonologists can immediately begin the evaluation process for lung cancer;²¹² and
- f. In 2015, Wellmont Medical Associates expanded its delivery of innovative care for diabetes patients with the opening of a dedicated center in Abingdon.²¹³

²¹⁰ “Report to Our Communities,” Wellmont Health System, [http://www.wellmont.org/uploadedFiles/Content/Our_Mission/Community_Benefit/Wellmont-Report-to-Our-Communities-fy15\(1\).pdf](http://www.wellmont.org/uploadedFiles/Content/Our_Mission/Community_Benefit/Wellmont-Report-to-Our-Communities-fy15(1).pdf), accessed on December 16, 2016.

²¹¹ “Report to Our Communities,” Wellmont Health System, [http://www.wellmont.org/uploadedFiles/Content/Our_Mission/Community_Benefit/Wellmont-Report-to-Our-Communities-fy15\(1\).pdf](http://www.wellmont.org/uploadedFiles/Content/Our_Mission/Community_Benefit/Wellmont-Report-to-Our-Communities-fy15(1).pdf), accessed on December 16, 2016.

²¹² “Report to Our Communities,” Wellmont Health System, [http://www.wellmont.org/uploadedFiles/Content/Our_Mission/Community_Benefit/Wellmont-Report-to-Our-Communities-fy15\(1\).pdf](http://www.wellmont.org/uploadedFiles/Content/Our_Mission/Community_Benefit/Wellmont-Report-to-Our-Communities-fy15(1).pdf), accessed on December 16, 2016.

²¹³ “Report to Our Communities,” Wellmont Health System, [http://www.wellmont.org/uploadedFiles/Content/Our_Mission/Community_Benefit/Wellmont-Report-to-Our-Communities-fy15\(1\).pdf](http://www.wellmont.org/uploadedFiles/Content/Our_Mission/Community_Benefit/Wellmont-Report-to-Our-Communities-fy15(1).pdf), accessed on December 16, 2016.

B. MSHA and WHS Are Likely to Continue to Invest in Population Health Programs Even without the Proposed Cooperative Agreement Due to the Emerging Value-Based Healthcare Economy

1. MSHA and WHS Have Already Been Engaged in Various Forms of Value-Based Contracting with Payers

168. WHS recently expanded its collaboration with Cigna by participating in Cigna's Collaborative Health program, which aims to prevent chronic conditions from worsening and to direct patients to appropriate programs for illness management and lifestyle modification.²¹⁴ Central to this program are registered nurse clinical care coordinators employed by Wellmont Medical Associates who use patient-specific data from Cigna to help identify patients being discharged from a hospital who might be at risk for readmission.²¹⁵ These coordinators also coordinate patient referrals to clinical support programs available from Cigna and WHS, such as chronic condition management for diabetes and heart disease, and lifestyle programs to assist with tobacco cessation and weight and stress management.²¹⁶ Cigna compensates Wellmont Medical Associates for

²¹⁴ "Report to Our Communities," Wellmont Health System, [http://www.wellmont.org/uploadedFiles/Content/Our_Mission/Community_Benefit/Wellmont-Report-to-Our-Communities-fy15\(1\).pdf](http://www.wellmont.org/uploadedFiles/Content/Our_Mission/Community_Benefit/Wellmont-Report-to-Our-Communities-fy15(1).pdf), accessed on December 16, 2016.

²¹⁵ "Wellmont Medical Associates Collaborates With Cigna In Initiative That Advances Quality of Patient Care," Wellmont Health System, <https://www.wellmont.org/News/Our-Providers/Wellmont-Physicians/Wellmont-Medical-Associates/2014/Wellmont-Medical-Associates-Collaborates-With-Cigna-In-Initiative-That-Advances-Quality-Of-Patient-Care.aspx>, accessed on December 16, 2016.

²¹⁶ "Wellmont Medical Associates Collaborates With Cigna In Initiative That Advances Quality of Patient Care," Wellmont Health System, <https://www.wellmont.org/News/Our-Providers/Wellmont-Physicians/Wellmont-Medical-Associates/2014/Wellmont-Medical-Associates-Collaborates-With-Cigna-In-Initiative-That-Advances-Quality-Of-Patient-Care.aspx>, accessed on December 16, 2016.

providing these coordination services and meeting targets to improve quality and lower costs through a pay-for-value reimbursement structure.²¹⁷

169. WHS also had an agreement with United Healthcare that includes competitive reimbursement rates for WHS and additional incentive payments for demonstrating improved health outcomes for United Healthcare members.²¹⁸

170. MSHA launched the region's first accountable care organization ("ACO"), AnewCare, "bringing together community healthcare providers to create better health outcomes and improved patient satisfaction at a lower cost."²¹⁹ An ACO is a group of doctors, hospitals, and health care providers that work together to provide higher quality coordinated care to their patients, while helping to slow health care cost growth. Health care providers are accountable for the quality and cost of care they deliver to patients, and have a financial incentive to coordinate care for their patients – who are therefore less likely to have duplicative and unnecessary care.²²⁰ MSHA also entered into several value-

²¹⁷ "Wellmont Medical Associates Collaborates With Cigna In Initiative That Advances Quality of Patient Care," Wellmont Health System, <https://www.wellmont.org/News/Our-Providers/Wellmont-Physicians/Wellmont-Medical-Associates/2014/Wellmont-Medical-Associates-Collaborates-With-Cigna-In-Initiative-That-Advances-Quality-Of-Patient-Care.aspx>, accessed on December 16, 2016.

²¹⁸ "Wellmont UnitedHealthcare Issue Joint Statement About New Three-Year Agreement, Effective June 18." Wellmont Health System, <http://www.wellmont.org/Patients-And-Visitors/Billing-And-Insurance/Attention-UnitedHealthcare-Insurance-Customers/>, accessed on December 16, 2016.

²¹⁹ "Building Health Communities: 2014 Community Report." Mountain State Health Alliance, https://www.mountainstateshealth.com/sites/default/files/documents/MTN-150141_050815_2015%20Community%20Report_WEB.pdf, accessed on December 16, 2016.

²²⁰ "Better, Smarter, Healthier: In historic announcement, HHS sets clear goals and timeline for shifting Medicare reimbursements from volume to value," HHS.gov, January 26, 2015, <https://www.hhs.gov/about/news/2015/01/26/better-smarter-healthier-in-historic-announcement-hhs-sets-clear-goals-and-timeline-for-shifting-medicare-reimbursements-from-volume-to-value.html>, accessed on December 16, 2016.

based contracts with payers [REDACTED]

[REDACTED].²²¹

171. Further, both MSHA and WHS currently participate in some value-based, shared savings and risk sharing payment arrangements with their existing insurance providers. For example, Anthem Virginia completed its most recent negotiations with MSHA for a new 5-year contract effective Nov 1, 2015, which included Q-HIP® incentive payments.²²² It also concluded negotiations with WHS resulting in a three-year contract, which also included Q-HIP® incentive payments.²²³ Q-HIP® promotes adherence to evidence-based medicine and best practices that lead to improvements in patient outcomes and affordability.²²⁴ MSHA and WHS regularly submit data to Anthem related to the Q-HIP® inpatient measures.²²⁵ Anthem reduces the base reimbursement rate of a provider that participates in Q-HIP® with the expectation that the provider has the ability to obtain a higher rate if it meets certain thresholds.²²⁶

2. MSHA and WHS Are Likely to Continue to Engage in Value-Based Contracting

172. MSHA and WHS are likely to continue to transition to value-based payment systems. [REDACTED]

²²¹ [REDACTED].

²²² Drozdowski Declaration, ¶ 42.

²²³ Drozdowski Declaration, ¶ 44.

²²⁴ Drozdowski Declaration, ¶ 57.

²²⁵ Drozdowski Declaration, ¶ 59.

²²⁶ Drozdowski Declaration, ¶ 60.

[REDACTED] .²²⁷

WHS's desire for everyone in the region to achieve good health inspired the creation of Wellmont LiveWell, a free web-based program designed to improve the region's health status.²²⁸ One of MSHA's core strategies outlined in its "Balanced Strategic Plan" submitted in response to the Authority's request on MSHA's existing and future business plans is to "[t]ransform the delivery of care...from a fee-for-service model to a population health management model using evidence based practices designed towards improving cost and quality."²²⁹ MSHA's population health strategy [REDACTED]

[REDACTED]
[REDACTED]
[REDACTED]

[REDACTED] .²³⁰

173. Further, there is a trend towards value-based payment systems among hospital systems and insurers nationwide and CMS is also mandating such systems in certain circumstances. The Health and Human Services ("HHS") Secretary announced a timeline to move the Medicare program, and the health care system at large, toward paying

²²⁷ [REDACTED]

²²⁸ "Wellmont Medical Associates Collaborates With Cigna In Initiative That Advances Quality of Patient Care," Wellmont Health System, <https://www.wellmont.org/News/Our-Providers/Wellmont-Physicians/Wellmont-Medical-Associates/2014/Wellmont-Medical-Associates-Collaborates-With-Cigna-In-Initiative-That-Advances-Quality-Of-Patient-Care.aspx>, accessed on December 16, 2016.

²²⁹ Virginia Application, Exhibit 10.3, p. 75.

²³⁰ [REDACTED].

providers based on the quality, rather than the quantity of care they give patients.²³¹ The Secretary also announced the creation of a Health Care Payment Learning and Action Network through which HHS will work with private payers, employers, providers, states, and other stakeholders to expand alternative payment models into their programs.²³²

174. The new value-based health care models (e.g., value-based payment systems, ACOs) being implemented, and that are likely to continue to be implemented, encourage healthcare providers to manage the care of their patient population with chronic conditions in coordination with all stakeholders, encourage health-promoting behaviors, and ensure that care is provided in the most least costly settings. As a consequence, the Parties' incentives in investments in population health programs are unlikely to change upon the consummation of the proposed cooperative agreement, rendering the agreement unnecessary to improve the population health of the region.

C. MSHA and WHS are Likely to Continue to Invest in Population Health Programs Even without the Proposed Cooperative Agreement Due to the

²³¹ “Better, Smarter, Healthier: In historic announcement, HHS sets clear goals and timeline for shifting Medicare reimbursements from volume to value,” January 26, 2015, HHS Press Release, available at <https://www.hhs.gov/about/news/2015/01/26/better-smarter-healthier-in-historic-announcement-hhs-sets-clear-goals-and-timeline-for-shifting-medicare-reimbursements-from-volume-to-value.html> .

²³² “Better, Smarter, Healthier: In historic announcement, HHS sets clear goals and timeline for shifting Medicare reimbursements from volume to value,” January 26, 2015, HHS Press Release, available at <https://www.hhs.gov/about/news/2015/01/26/better-smarter-healthier-in-historic-announcement-hhs-sets-clear-goals-and-timeline-for-shifting-medicare-reimbursements-from-volume-to-value.html>

Emerging Partnerships with Social Serviced Providers to Improve Population Health

175. Health outcomes of populations are determined more by social factors than by medical care.²³³ Therefore, a health system cannot by itself improve the population health of a region. In fact, a recent study on social determinants of population health demonstrates the value of healthcare providers partnering with community based organizations such as housing authorities and nutrition support programs.²³⁴ Thus, by collaborating with social service providers, healthcare providers, such as hospital systems, would be able to keep patients away from costly care and improve health outcomes.

Indeed, MSHA and WHS have stated [REDACTED]

[REDACTED].²³⁵

176. To be able to influence the social determinants of health, and hence, the population health of a region, a hospital system needs to participate in these partnerships. I understand that a health system merger is not needed to participate in these partnerships.²³⁶ As a consequence, the Parties' post-merger incentives in participating in these partnerships are unlikely to change. Thus, the proposed cooperative agreement is unnecessary to improve the population health of the region.

²³³ Taylor, Lauren, Andrew Hyatt, and Megan Sandel, "Defining the Health System's Role in Addressing Social Determinants And Population Health," Health Affairs Blog, November 17, 2016, <http://healthaffairs.org/blog/2016/11/17/defining-the-health-care-systems-role-in-addressing-social-determinants-and-population-health>, accessed on December 16, 2016.

²³⁴ Taylor, Lauren, Andrew Hyatt, and Megan Sandel, "Defining the Health System's Role in Addressing Social Determinants And Population Health," Health Affairs Blog, November 17, 2016, <http://healthaffairs.org/blog/2016/11/17/defining-the-health-care-systems-role-in-addressing-social-determinants-and-population-health>, accessed on December 16, 2016.

²³⁵ [REDACTED]

²³⁶ Kizer Report, p. 21.

XII. Assessment of the Preservation of Rural Hospital Facilities

177. The Parties have not substantiated their claim that it would be difficult to maintain rural hospital facilities but-for the proposed cooperative agreement. In particular, they have not provided any analysis as to the profitability of each of these hospitals or any ordinary course document showing that the closure of some hospitals has, in fact, been considered absent the proposed cooperative agreement. As I explain in Section XIII, the Parties’ experts have not adequately addressed these points, either. Further, the Parties’ commitments to preserve the rural hospitals are vague and limited at best, casting doubt on the necessity and the benefits of this commitment.

A. The Parties Do Not Provide Adequate Analysis to Substantiate Their Claim That the Rural Hospitals Would Likely Close Absent the Merger

178. The Parties claim that their rural hospitals operate at low or negative margins and that it would be difficult to maintain these facilities absent the proposed cooperative agreement.²³⁷ The Parties, however, have not provided adequate analysis as to the low or negative profitability of each of these hospitals.

179. The Parties’ arguments rely on profitability measures that reveal only part of the picture regarding the viability of MSHA’s and WHS’s rural hospitals. Profitability measures depend on how the hospital system, which is profitable overall, allocates costs across its individual hospitals.²³⁸ Moreover, maintaining a facility may increase the appeal of a hospital system to payers and/or consumers and generate indirect income from visits by loyal clients to other facilities. Indeed, a 2016 study finds that while 70% of the

²³⁷ Virginia Application, pp. 53, 80-81; Compass Report, pp. 11-12.

²³⁸ [REDACTED]

rural hospitals analyzed had a negative operating margin, only 31% of them could be categorized as being “vulnerable or at risk for closure.”²³⁹

180. My review of publicly available financial and utilization information for MSHA and WHS hospitals suggests that more in-depth, case-by-case analysis is required to evaluate the likelihood that any particular hospital will close and the optimal future use of these facilities.²⁴⁰ Notably, not all rural hospitals present poor profitability measures. For example, Norton Community Hospital, one of the rural hospitals that the Parties claim has an “uncertain future,” reported net operating income of over \$7 million in 2015.²⁴¹ On the other hand, some urban hospitals, such as Holston Valley Hospital, reported large losses during the period.²⁴² Furthermore, some rural hospitals reporting losses appear to be in better condition when one analyzes other metrics that studies cited in the Compass Report have found to be linked to the risk of hospital closures.²⁴³ For example, Smyth County Community Hospital had a net operating loss in 2015 of over \$4.4 million but other indicators (77% equity ratio and 240 days of cash on hand) compare favorably to those for profitable rural MSHA and WHS hospitals.²⁴⁴ Similarly, some unprofitable hospitals

²³⁹ iVantage Health Analytics, “Rural Relevance – Vulnerability to Value, A Hospital Strength Index Study,” 2016, pp. 5, 7.

²⁴⁰ Financial and utilization information is sourced from the Healthcare Cost Report Information System (“HCRIS”), administered by the Centers for Medicare & Medicaid Services (CMS). Note that no information for Mountain View Hospital is available on HCRIS. In what follows, rural hospitals are defined as those classified as such by the Parties in Virginia Application, p. 81.

²⁴¹ Healthcare Cost Report Information System (“HCRIS”); Virginia Application, p. 81.

²⁴² HCRIS.

²⁴³ Compass Report, FN11; Brystana G. Kaufman et al., “The rising Rate of Rural Hospital Closures,” *The Journal of Rural Health*, 32 (2016), July 14, 2015, pp. 35–43 at pp. 37–40.

²⁴⁴ HCRIS.

report relatively healthy operating metrics, such as surgery volume and occupancy rates.²⁴⁵ Smyth County Community Hospital reports an occupancy rate of 45% and surgery volume of 14%, which are higher than the average of 36% and 5% respectively for the profitable rural hospitals operated by MSHA and WHS.²⁴⁶

181. Documents prepared by the Parties that discuss the state of their rural facilities suggest that they plan to invest [REDACTED] A study prepared for MSHA [REDACTED]

[REDACTED].²⁴⁷ In addition, WHS acknowledged that [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]²⁴⁸ Nevertheless, the Parties have not provided any analysis as to what has changed since these strategic plans that would lead to closure of these rural facilities absent the proposed cooperative agreement. Studies have shown that investment in rural hospitals is not uncommon. Indeed, one of the studies cited in the Compass Report notes that “the eight hospitals that we consider ‘legitimate’ high-openers tend to be very small, and in rural locations. This suggests that some small and rural hospitals are responding to

²⁴⁵ HCRIS.

²⁴⁶ HCRIS.

²⁴⁷ [REDACTED]

²⁴⁸ [REDACTED]

potential financial vulnerability by expanding, rather than contracting, their service offering.”²⁴⁹

182. The Parties have not presented an analysis of the costs and benefits of keeping rural hospitals open. If the rural hospitals covered by this commitment were indeed in danger of closing due to their poor financial performance, it is possible that a commitment to keep them open indefinitely is not in the public interest. While I do not take a position on whether the Parties’ commitments in this regard are in the public interest, losses may indicate that a hospital is not viable; for instance, there may not be a large enough patient base to cover the fixed costs generated by the facility. In such cases, it may be preferable to close or convert the facility, and to redirect resources to more efficient uses, and to redirect patients to other hospitals.

B. The Parties Provide a Limited Commitment to Preserve Rural Hospitals

183. The Parties commit upon the consummation of the proposed cooperative agreement that all hospitals in operation at the effective date of the merger will remain operational as clinical and health care institutions for at least five years, but the NHS may adjust scope of services or repurpose hospital facilities.²⁵⁰ In the event that the Parties repurpose any hospital, it will continue to provide “essential services” such as emergency room stabilization for patients, emergent obstetrical care, primary care services, access to a behavioral health network of services through a coordinated system of care, etc.²⁵¹

²⁴⁹ Kirby, P. et al., “Hospital Service Changes in California: Trends, Community Impacts and Implications for Policy,” The Nicholas C. Petris Center on Health Care Markets & Consumer Welfare, 2005, p. 41.

²⁵⁰ Virginia Application, p. 81.

²⁵¹ Virginia Application, Commitments Chart, Commitment No. 20.

184. The Parties' commitments are vague and limited at best. First, there is no commitment that these facilities will remain open after the consummation of the proposed cooperative agreement in their current form. The Parties can close them after 5 years or adjust the scope of the services in these facilities. Second, the "essential services" that would be maintained in the event of repurposing any of these facilities do not include other services such as secondary care services and hospital-based outpatient services.

XIII. Rebuttal of Parties' Expert Reports

185. The Parties submitted three expert reports in April 2017:

- a. The Compass Report claims to evaluate "whether the likely benefits of the proposed merger ... outweigh the potential disadvantages of displacing competition."²⁵²
- b. The Advisory Board Report claims to evaluate "the likelihood that the merged integrated delivery system, known as Ballad Health, will be able to achieve its stated goals related to navigating the 'narrow corridor' of successfully transitioning toward population health management and risk-based contracting."²⁵³
- c. The HCI Report claims to assess "the capacity of Ballad Health to develop and implement an effective population health strategy to improve community health in this region over the next ten years."²⁵⁴

²⁵² Compass Report, p. 1.

²⁵³ Advisory Board Report, p. 4.

²⁵⁴ HCI Report, p. 3.

186. As I explain below, none of these alters the opinions I developed in this report. In particular, the Compass Report does not provide adequate economic analysis of the competitive effects of the merger or its potential benefits. It does not analyze the Parties' claimed benefits or the competitive effects of the proposed merger and cannot, on the basis of the information it presents, determine whether the benefits of the proposed merger outweigh its disadvantages.

187. The Compass Report purports to have "reviewed the information on plausible alternative out-of-area transactions" and concludes that "[t]hese do not appear to be able to accomplish the same benefits as the in-market approach proposed by the Parties."²⁵⁵ These assertions relate to the Parties' incentives to efficiently deliver high quality care and to the Parties' capacity to achieve cost savings.²⁵⁶ However, these claims are not supported by analysis. The information presented does not affect the opinions developed in this report (below and in Sections X-XII) that the benefits of the proposed cooperative agreement could largely be achieved through merging with alternative hospital systems that are likely to raise fewer competitive concerns.

188. I present my responses to the Parties' expert reports in eight subsections corresponding to topics addressed in these reports: the potential closure of hospitals in rural areas, complementarity of the merging parties, economies of scale, the effects of the merger on the Parties' incentives, cost-savings from the merger, the impact of the merger

²⁵⁵ Compass Report, p. 23.

²⁵⁶ Compass Report, pp. 5, 10, 13, 23.

of competition in physician services, the Parties’ price cap commitments, and initiatives to improve the population’s health in the region.²⁵⁷

A. Challenging Market Conditions and the Potential Closure of Hospitals in Rural Areas

189. The Compass Report claims that difficult market conditions put financial strain on Wellmont and MSHA and could lead to closures of rural hospitals. The Compass Report argues that, “[f]or these and other reasons discussed below, the [Geographic Service Area or ‘GSA’] is a very challenging environment in which to sustain a healthcare delivery system.”²⁵⁸ The Compass Report further conjectures that, “[i]f Mountain States and Wellmont were to remain independent or combine with out-of-area entities and therefore not capture the cost-savings available from the proposed merger, downsizing or fundamental changes to one or more hospital operations is likely.”²⁵⁹ To support its claims, The Compass Report points to general facts about the Appalachian region such as that it “has an aging population with flat [population] growth, suffers from pervasively poor health and low incomes, and faces declining inpatient admissions,” and declining Medicare payments for labor.²⁶⁰

190. The Compass Report makes no attempt to document the specific characteristics of the communities where the allegedly at-risk facilities are located, much less hospital-level statistics and characteristics that may inform an assessment of the risk of closure. This is despite the fact that such analysis is a central component of the academic literature it cites.

²⁵⁷ The Compass Report addresses topics in subsections A, D, E, F, G, and H. The Advisory Board Report addresses topics in subsections B, C, D. The HCI Report addresses topics addressed in subsection H.

²⁵⁸ Compass Report, p. 3.

²⁵⁹ Compass Report, p. 5.

²⁶⁰ Compass Report, pp. 3–5.

One study cited in the Compass Report finds that, “[i]n general, differences in market factors between open and closed hospitals were smaller than differences in hospital factors. The markets of open and closed hospitals had a similar proportion of population age 65 and older, poverty rate, and unemployment rate.”²⁶¹ The study points to factors such as hospital margins, liquidity, capital structure, revenues, utilization, and staffing.²⁶² Another study cited in the Compass Report finds that hospital size, measured by the number of beds, is a predictor of closure.²⁶³

191. There is no guarantee that the proposed cooperative agreement would improve the situation of the Parties’ rural hospitals. Indeed, the academic articles cited by the Compass Report suggest that the transaction may harm rural hospitals. For example, one article points out that, “[m]erging hospitals experienced a decrease in operating margin—meaning they were even less profitable—and generally they had lower salary expenses, likely as a result of eliminated management positions. Thus, even though a challenged hospital may find that a merger is a viable option, its finances generally worsen after a merger, and some of the best-paying management positions—and, likely, the community-mindedness of the hospital—may evaporate. It is too early to tell whether these merged hospitals are more likely to close.”²⁶⁴ Another article cited in the Compass Report notes that mergers may lead to fewer services being offered while keeping hospitals separate

²⁶¹ Kaufman, B. et al., “The Rising Rate of Rural Hospital Closures,” *The Journal of Rural Health*, 2016, 32: 35–43, pp. 40–41.

²⁶² Kaufman, B. et al., “The Rising Rate of Rural Hospital Closures,” *The Journal of Rural Health*, 2016, 32: 35–43, p. 37–40.

²⁶³ Kirby, P. et al., “Hospital Service Changes in California: Trends, Community Impacts and Implications for Policy,” *The Nicholas C. Petris Center on Health Care Markets & Consumer Welfare*, 2005, p. 36.

²⁶⁴ Holmes, M., “Financially Fragile Rural Hospitals: Mergers and Closures,” *North Carolina Medical Journal*, 2015, 76 (1): 1–4, p. 2.

may cause them to expand their services. In a passage particularly relevant to the current situation, where the Parties reserve the right to “repurpose” rural facilities, the authors explain that, “[a] significant portion of the hospitals that most dramatically changed their service mix ... did so as a result of mergers with nearby facilities or because of reorganizations among already affiliated hospitals.”²⁶⁵

192. As I point out in Section XII of this report, the financial analysis and documentary record in this matter do not clearly support the notion that rural hospitals are likely to close absent the merger. Furthermore, even if one were to take this claim at face value, the Parties’ commitment to keep rural facilities open is vague and limited at best.

B. Complementarity of the Merging Parties

193. The Advisory Board Report claims that the Parties “have complementary skill sets that give us confidence the merged entity will be successful in its stated aim of pursuing population health management and achieving optimal risk-based contracting performance.”²⁶⁶ Specifically, the Advisory Board Report claims that MSHA brings strengths in ambulatory care management, “navigators,” participation in CMS’s Comprehensive Primary Care Plus (CPC+) program, experience with value-based contracting, and risk, claims, and contracting analytics through AnewCare Collaborative.²⁶⁷ Wellmont, in turn, brings strengths in inpatient case management function and experience with medical informatics.²⁶⁸ The Advisory Board further argues

²⁶⁵ Kirby, P. et al., “Hospital Service Changes in California: Trends, Community Impacts and Implications for Policy,” The Nicholas C. Petris Center on Health Care Markets & Consumer Welfare, 2005, p. 29–30.

²⁶⁶ Advisory Board Report, p. 6.

²⁶⁷ Advisory Board Report, pp. 15, 21, 25.

²⁶⁸ Advisory Board Report, pp. 15, 21, 25.

that the parties will benefit from access to each other's' facilities and network of relationships.²⁶⁹

194. The Advisory Board Report provides no analysis of the expected benefits of such complementarities and does not explain how such purported complementarities are expected to lead to cost-savings or improvements in the quality of the Parties' services. For example, the Advisory Board Report appears to applaud MSHA's use of "navigators" who "guide patients through the health care system ... [b]y going into the patient's home."²⁷⁰ Clearly, this strategy, even if effective in some contexts, is quite resource-intensive. However, the Advisory Board Report presents no assessment of the likely costs and benefits of Wellmont adopting this strategy, no evidence that Wellmont has plans for incorporating this strategy into its operations, and no evidence that Wellmont could not do so without the proposed cooperative agreement.

195. Given the lack of analyses or information supporting claimed expected benefits of complementarities between the Parties, the Advisory Board Report's discussion of this topic does not affect the opinions expressed in this report.

C. Economies of Scale

196. The Advisory Board Report claims that "the merged entity's scale is critical to pursue population health management in a financially sustainable manner."²⁷¹ The Advisory Board Report further claims that "[p]ursuit of population health management

²⁶⁹ Advisory Board Report, p. 18.

²⁷⁰ Advisory Board Report, p. 15.

²⁷¹ Advisory Board Report, p. 6.

and risk-based contracting requires significant fixed cost investments ... [and e]ach system lacks sufficient scale on its own.”²⁷²

197. The Advisory Board Report offers neither an explanation as to what measure of “scale” to consider nor any support for its claim that “[e]ach system lacks sufficient scale on its own.”²⁷³ In one instance, the Advisory Board Report notes that the Parties would have more than 90 primary care physicians, “a sufficient primary care group to begin engaging in even more value-based contracts.”²⁷⁴ Yet, the report goes on to claim that the transition to value-based care requires “a meaningful number of attributed patients,” taking a seemingly contradictory position on what metric should be used to evaluate the Parties’ scale.²⁷⁵ Moreover, as I explain in Section XI of this report, MSHA and WHS are large integrated systems with large market shares and have already engaged in various forms of value-based contracting with payers.

198. Purportedly to illustrate the Parties’ lack of scale, the Advisory Board Report’s claims that MSHA experienced losses operating CrestPoint Health because they lacked sufficient scale, covering only 6,000 Medicare Advantage lives. Similarly, the Advisory Board Report claims that Wellmont failed in its attempt to participate in the Medicare Shared Savings Program (“MSSP”) because it lacked the necessary scale.²⁷⁶ The Advisory Board Report does not explain why the Parties pursued these initiatives in the first place; the fact that the Parties attempted these projects suggests that they did not see

²⁷² Advisory Board Report, p. 6.

²⁷³ Advisory Board Report, p. 6.

²⁷⁴ Advisory Board Report, p. 17.

²⁷⁵ Advisory Board Report, p. 17.

²⁷⁶ Advisory Board Report, pp. 6, 27.

their scale as a constraint. Moreover, it is not clear that the failure of CrestPoint is a particularly relevant example given that operating an in-house insurance company is not necessary for providing value-based care — the alternative arrangements I describe in Section XI.B. Even if one assumes that providing value-based care requires large fixed costs investments that the Parties cannot undertake independently, a merger with an out-of-region hospital system likely to raise fewer competitive concerns would provide the desired scale as effectively as the proposed cooperative agreement.²⁷⁷

199. Given the lack of analysis supporting the claim that the Parties lack the scale required to offer population health management and risk-based contracting, or that the cooperative agreement would generate the required scale, the Advisory Board Report’s discussion of this topic does not affect the opinions expressed in this report.

D. Impact of the Merger on the Parties’ Incentives

200. The Compass Report and the Advisory Board Report make a series of unsupported claims about the Parties’ incentives:

- a. “[T]he Parties, when merged, will have greater incentives to make necessary investments to sustain their operations than either would have independently or through an out-of-area merger.”²⁷⁸ Specifically, this refers to incentives to “achieve cost savings, allocate resources more efficiently and effectively, and

²⁷⁷ Balan, D., “Merger-Specificity of Quality and Cost Efficiencies in Hospital Merger Cases,” *Antitrust Chronicle*, 2017, 1: 1–6, p. 6. (“One commonly claimed efficiency in this category is that higher total patient volume makes it easier for the merged entity to enter into risk-based contracts. This benefit comes from size alone, which means that these efficiencies would be realized through a merger with *any* willing alternative partner of the same size.”)

²⁷⁸ Compass Report, p. 10.

improve care coordination to reduce cost trends and improve the efficacy of care delivery.”²⁷⁹

- b. “It is our understanding that Ballad Health has incentives to expand, rather than restrict, the number of physicians providing care in the region.”²⁸⁰
- c. “As separate systems, there is no collaborative management relationship, single point of accountability or financial alignment that would allow the type of collective investment or operational efficiencies needed to pursue the merged integrated delivery system’s goals.”²⁸¹

201. The Compass Report and the Advisory Board do not undertake an analysis of MSHA’s or Wellmont’s incentives or how they would be affected by the proposed merger or an out-of-area merger. Moreover, their statements about incentives ignore a series of factors that indicate that the merged entity’s incentives could, in fact, be less aligned with pro-competitive and socially desirable ends. Competition provides incentives to reduce costs, improve efficiency, provide high quality services, and innovate.²⁸² These incentives may be reduced if the proposed merger were to close and neither the Compass Report nor the Advisory Board Report provide any assessment of whether an out-of-area merger could increase incentives to reduce costs, improve efficiency, and provide high quality services as new management and ownership would demand improvements in performance. Finally, regulated firms, as Ballad Health would be under the cooperative

²⁷⁹ Compass Report, p. 10.

²⁸⁰ Compass Report, p. 19.

²⁸¹ Advisory Board Report, p. 7.

²⁸² “Antitrust Enforcement and the Consumer,” U.S. Department of Justice, December 18, 2015, <https://www.justice.gov/atr/antitrust-enforcement-and-consumer>.

agreement, do not have a favorable track record of delivering cost reductions, efficiency, or high quality.²⁸³ Indeed, costly regulation would be required by the cooperative agreement as is clear from the “active supervision structure,” including the creation of a “COPA Ombudsman Office,” described in Exhibit G to the Parties’ proposed Terms of Certification.²⁸⁴

202. Given the lack of analyses or information that the Parties’ incentives to provide efficient and high quality care would improve as a consequence of the proposed cooperative agreement, discussions of incentives in the Compass Report and the Advisory Board Report do not affect the opinions expressed in this report.

E. Cost-Savings from the Merger

203. The Compass Report opines that the cost-savings projected by the FTI study would not be available if MSHA and Wellmont continued to operate independently or merged with an out-of-area entity.²⁸⁵ Moreover, the Compass Report claims that “[m]any of these efficiencies would not be available to out-of-area acquirers.”²⁸⁶

204. The Compass Report does not conduct an independent evaluation of the efficiencies claimed in the FTI Report. The Compass Report does not provide additional evidence that the claimed cost efficiencies are substantiated, merger-specific, or that they would be sufficient to outweigh the competitive harm that would likely result from the proposed cooperative agreement. As I explain in Section X of this report, it is my opinion

²⁸³ Joskow, P. L., and N. L. Rose. "The Effects of Economic Regulation." Handbook of Industrial Organization, vol. 2 (1989): 1449-1506.

²⁸⁴ Terms of Certification, Exhibit G.

²⁸⁵ Compass Report, p. 5.

²⁸⁶ Compass Report, p. 13.

that the Parties' claimed cost efficiencies are unverifiable and can largely be achieved through alternative transactions.

F. Impact of the Merger on Competition in Physician Services

205. The Compass Report claims that “[t]he merger will not create a highly concentrated market for physician or outpatient services, and substantial alternatives to Ballad Health will remain within each category.”²⁸⁷ Specifically, the Compass Report argues that “Ballad Health will employ approximately 30% of the physicians in the GSA, while 70% percent of physicians will remain independent.”²⁸⁸

206. This assessment of the concentration in physician services resulting from the proposed cooperative agreement is incomplete because physicians with different specializations provide different services to patients that are not substitutes for one another. While NHS may employ 30% of physicians in the GSA, their share would be significantly larger in several areas. As I discuss in Section IV.A.4, the combined shares of WHS and MSHA will be 50% or higher in several physician services. Specifically, the NHS would have a 51% share in Pain Management, a 57% share in Cardiothoracic Surgery, a 62% share in Pulmonology, an 80% share in Occupational Medicine, an 85% share in Hematology/Oncology, an 86% share in Cardiology, and a 83% share in Hospital Medicine.²⁸⁹

²⁸⁷ Compass Report, p. 19.

²⁸⁸ Compass Report, p. 19.

²⁸⁹ Virginia Application, Exhibit 14.1, Section E. The NHS shares are calculated as the sum of WHS, MSHA, and MSHA Affiliate shares.

G. The Parties' Price Cap Commitments

207. The Compass Report claims that the Parties' price cap commitments will lead to savings by payers that, over time, will be passed on to patients.²⁹⁰ The Compass Report relies heavily on a study of the COPA for Mission Health System ("MHS"), a hospital system operating in Asheville, North Carolina authored by Dr. Cory Capps ("Capps Report").²⁹¹ The Capps Report is a retrospective analysis of the MHS COPA, which has been in place since 1995 and was last modified in 2005.²⁹²

208. The Capps Report does not assess the tradeoffs between adopting a COPA and rejecting a cooperative agreement to preserve competition, which is the choice facing the Commonwealth of Virginia. Rather, it takes a "loss of competition that resulted from the 1995 merger," which led to "a state-sanctioned and regulated monopoly," as given and evaluates the COPA's regulatory structure.²⁹³ In particular, the Capps Report compares a price growth cap similar to the cap proposed by the Parties to alternative margin and cost growth caps, seeking to "address the pricing power attributable to the market power created by the 1995 merger."²⁹⁴ The need for regulation to replace competitive discipline is a costly second-best solution.

209. As I explain in Section VIII of this report, the Parties' price cap commitments are unlikely to eliminate the likely anticompetitive harm resulting from the proposed

²⁹⁰ Compass Report, p. 22.

²⁹¹ Cory Capps, "Revisiting the Certificate of Public Advantage Agreement between the State of North Carolina and Mission Health System: A Review of the Analysis of Dr. Greg Vistnes, with Additional Recommendations for Lessening Opportunities for Regulatory Evasion by Mission Health System," May 2, 2011.

²⁹² Capps Report, p. 1.

²⁹³ Capps Report, pp. 1, 32.

²⁹⁴ Capps Report, p. 3.

cooperative agreement. Notably, even though the Parties endorse the proposed cooperative agreement as “greatly accelerat[ing] the move from volume-based health care to value-based health care,” the proposed price cap commitments do not apply to value-based and risk-based contracts.²⁹⁵

H. Initiatives to Improve the Population’s Health in the Region

210. The Compass Report asserts that the Parties’ commitments “are consistent with supporting the scope of population health improvement goals outlined to date by the Department.”²⁹⁶ Similarly, the HCI Report notes that “although MSHA and WHS have had successful efforts individually, neither has been able to achieve population-level health outcomes, as this requires a more comprehensive approach and larger investment.”²⁹⁷

211. Neither the Compass Report nor the HCI Report explain why the proposed cooperative agreement is necessary for the Parties to continue and/or expand their existing community health programs or why they could not partner with each other in order to expand the most successful of these programs. The HCI report mentions the Parties’ current (i.e., pre-merger) limitations in terms of scale only when articulating its conclusion. In contrast, but consistent with my own assessment, its evaluation of existing programs is favorable.²⁹⁸

²⁹⁵ Virginia Application, p. 9.

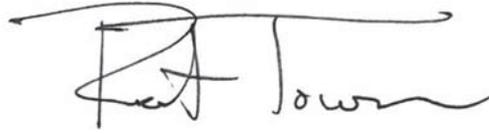
²⁹⁶ Compass Report, p. 15.

²⁹⁷ HCI Report, p. 4.

²⁹⁸ HCI Report, pp. 17-19. For example, the HCI notes that the Parties’ programs “demonstrate the knowledge and experience of MSHA and WHS separately in the region.” Specifically, Wellmont Business Health Solutions (WBHS) “has documented improvements in health outcomes among members such as a 5% reduction in BMI and 40% reduction in high blood pressure.” The HCI Report goes on to list 32 existing examples of MSHA and WHS population health initiatives. Notably, both Parties have programs in each of the “four key focus areas: Obesity, Physical Inactivity, Tobacco Use, and Substance Abuse” identified in the HCI Report.

212. As I explain in Section XI of this report, the proposed cooperative agreement is not necessary to improve the population health of the region.

Executed this 29th of August 2017:

A handwritten signature in black ink, appearing to read "Robert Town". The signature is written in a cursive style with a large, sweeping initial "R" and "T".

Robert Town

EXHIBIT 1

Diversion Analyses Show that MSHA and WHS Hospitals Compete with Each Other

Hospital	Closest Competitor			Second Closest Competitor		
	Competitor Hospital	Competitor Hospital System	Diversion Ratio	Competitor Hospital	Competitor Hospital System	Diversion Ratio
MSHA						
Dickenson Community Hospital	Norton Community Hospital	MSHA	43.0%	Outside Good	Outside Good	11.4%
Franklin Woods Community Hospital	Johnson City Medical Center	MSHA	49.1%	Wellmont - Holston Valley Medical Center, Inc.	WHS	12.3%
Indian Path Medical Center	Wellmont - Holston Valley Medical Center, Inc.	WHS	26.3%	Johnson City Medical Center	MSHA	23.0%
James H. and Cecile Quillen Rehabilitation Hospital	Johnson City Medical Center	MSHA	39.5%	Franklin Woods Community Hospital	MSHA	16.0%
Johnson City Medical Center	Franklin Woods Community Hospital	MSHA	29.5%	Wellmont - Holston Valley Medical Center, Inc.	WHS	19.6%
Johnson County Community Hospital	Johnston Memorial Hospital	MSHA	34.5%	Wellmont Bristol Regional Medical Center	WHS	20.9%
Johnston Memorial Hospital	Wellmont Bristol Regional Medical Center	WHS	36.2%	Wellmont - Holston Valley Medical Center, Inc.	WHS	10.0%
Laughlin Memorial Hospital	Johnson City Medical Center	MSHA	23.5%	Takoma Regional Hospital	WHS	18.2%
Norton Community Hospital	Wellmont Lonesome Pine Hospital	WHS	41.9%	Wellmont - Holston Valley Medical Center, Inc.	WHS	13.7%
Russell County Medical Center	Johnston Memorial Hospital	MSHA	38.8%	Clinch Valley Medical Center	Lifepoint	21.1%
Smyth County Community Hospital	Johnston Memorial Hospital	MSHA	43.7%	Wythe County Community Hospital	Lifepoint	14.1%
Sycamore Shoals Hospital	Johnson City Medical Center	MSHA	44.4%	Franklin Woods Community Hospital	MSHA	16.4%
Unicoi County Memorial Hospital, Inc.	Johnson City Medical Center	MSHA	45.3%	Franklin Woods Community Hospital	MSHA	16.9%
Woodridge Psychiatric Hospital	Johnson City Medical Center	MSHA	50.9%	Wellmont - Holston Valley Medical Center, Inc.	WHS	11.3%

REDACTED FOR PUBLIC DISCLOSURE

REDACTED FOR PUBLIC DISCLOSURE

EXHIBIT 1

Diversion Analyses Show that MSHA and WHS Hospitals Compete with Each Other

Hospital	Closest Competitor			Second Closest Competitor		
	Competitor Hospital	Competitor Hospital System	Diversion Ratio	Competitor Hospital	Competitor Hospital System	Diversion Ratio
WHS						
Takoma Regional Hospital	Laughlin Memorial Hospital	MSHA	38.4%	Johnson City Medical Center	MSHA	16.4%
Wellmont - Holston Valley Medical Center, Inc.	Johnson City Medical Center	MSHA	31.2%	Indian Path Medical Center	MSHA	17.1%
Wellmont Bristol Regional Medical Center	Johnson City Medical Center	MSHA	24.3%	Johnston Memorial Hospital	MSHA	21.1%
Wellmont Hancock County Hospital	Morristown - Hamblen Healthcare System	Covenant	19.5%	Wellmont - Holston Valley Medical Center, Inc.	WHS	10.8%
Wellmont Hawkins County Memorial Hospital	Wellmont - Holston Valley Medical Center, Inc.	WHS	27.7%	Laughlin Memorial Hospital	MSHA	11.9%
Wellmont Lonesome Pine Hospital	Norton Community Hospital	MSHA	43.6%	Wellmont - Holston Valley Medical Center, Inc.	WHS	21.2%
Wellmont Mountain View Regional Medical Center	Norton Community Hospital	MSHA	43.6%	Wellmont Lonesome Pine Hospital	WHS	14.1%

Source: State Discharge Data for Tennessee and Virginia, 2015

Note: See Appendix C for details of the patient choice model used to calculate diversion ratios. Analysis is limited to commercial GAC discharges associated with patients from the 21-county Area, excluding newborns, seniors, and transfers from other hospitals and facilities. "Outside Good" includes hospitals outside the 21-county area with less than 20 discharges. WHS does not include Wellmont Ridgeview Pavilion Bristol, an adult inpatient psychiatric hospital which is included in "Outside Good."

REDACTED FOR PUBLIC DISCLOSURE

REDACTED FOR PUBLIC DISCLOSURE

May 2017

Robert J. Town

Department of Economics
 University of Texas-Austin
 2225 Speedway
 Austin, TX 78712

(512) 475-8542
 email: robert.town@austin.utexas.edu

(mobile) (612) 636-1497
 Citizenship: USA

CURRENT POSITIONS:

James L and Nancy Powell Centennial Professor of American Economic Principles, University of Texas-Austin, Department of Economics, 2016-present.
 Research Associate, National Bureau of Economic Research, Cambridge, MA, 2006-present
 Senior Fellow, Leonard Davis Institute for Health Economics, University of Pennsylvania, Philadelphia, PA, 2011-present.
 Board of Editors, *American Economic Journal: Policy*
 Chair, Board of Directors, Health Care Cost Institute, Washington DC 2016--present
 Co-Founder, Picwell, Inc., 2013
 Partner/Co-Founder, Austin-Berkeley Data Labs

EDUCATION:

Ph.D., Economics, University of Wisconsin-Madison, 1990
 M.S., Economics, University of Wisconsin-Madison, 1987
 B.A., Economics (with distinction), University of Washington, 1984

PAST-POSITIONS:

Gilbert and Shelley Harrison Professor of Health Care Management, Health Care Management Department, Wharton School at the University of Pennsylvania, 2015-2016.
 Visiting Professor, Einaudi Institute for Economics and Finance, Rome, Italy, 2015
 Associate Professor, Health Care Management Department, Wharton School at the University of Pennsylvania, 2011-2014.
 James A. Hamilton Professor of Health Economics, Division of Health Policy and Management, School of Public Health, University of Minnesota, 2007-2011
 Associate Professor, Division of Health Policy and Management, School of Public Health, University of Minnesota, 2005-2011
 Faculty Research Fellow, National Bureau of Economic Research, Cambridge, MA, 2004-2006
 Adjunct Associate Professor, Department of Economics, University of Minnesota, 2007-2011
 Director, Master of Science Program, Division of Health Policy and Management, School of Public Health, University of Minnesota, 2007-2011
 Assistant Professor, Division of Health Services Research and Policy, School of Public Health, University of Minnesota, 2001-2005.
 Assistant Professor, Graduate School of Management, University of California, Irvine, 1996-2001.
 Co-Editor, *International Journal of Health Economics and Management*, 2011-2016.

May 2017

Visiting Scholar, Boston University, Department of Economics, 2001
 Staff Economist, U.S. Department of Justice, Antitrust Division, 1990-1996
 Victor Kramer Fellow, Yale University, 1993-1994

RESEARCH INTERESTS:

Health Economics, Industrial Organization, Applied Econometrics

PUBLICATIONS IN PEER-REVIEWED JOURNALS:

1. Bajari, P., Hong, H., Park, M. and Town, R. (2017) “Regression Discontinuity Designs with an Endogenous Forcing Variable and an Application to Contracting in Health Care.” Forthcoming *Quantitative Economics*.
2. Karaca-Mandic, P., Wilcock, A., Town, R. (2017) “The Effect of Physician and Hospital Market Structure on Medical Technology Diffusion,” *Health Services Research*, 52(2): 579-598.
3. Wong, C., Polsky, D., Jones, A., Weiner, J., Town, R. and Baker, T (2016) “For Third Enrollment Period Marketplaces Expand Decision Support Tools to Assist Consumers,” *Health Affairs*, 35(4):680-687.
4. McCullough, J., Parente, S. and Town, R. (2016) “Health Information Technology and Patient Outcomes: The Role of Organizational and Information Complementarities,” *RAND Journal of Economics*, 47(1):207-236.
5. Wong, C., Nirenburg, G. Polsky, D. Town, R. and Baker, T. (2015) “Insurance Plan Presentation and Decision Support on HealthCare.gov and State-Based Websites Created for the Affordable Care Act,” *Annals of Internal Medicine*, 163(4): 327-328.
6. Wong, C, Asch, D., Ford, C., Baker, T., Town, R and Merchant, R. (2015) “Seeing Health Insurance and Healthcare.gov Through the Eyes of Young Adults,” *Journal of Adolescent Health*, 57(2): 137-143.
7. Wong, C., Sap, M., Schwartz, M., Town, R., Baker, T. and Unger, L. (2015) “Twitter Sentiment Predicts Affordable Care Act Marketplace Enrollment,” *Journal of Medical Internet Research*, 17(2): e51.
8. Choi, J-Y, Baumgartner J., Alexander, B., Town, R., D’Souza, G., and Ramachandran G. (2015) “Increased Risk of Respiratory Illness Associated with Kerosene Fuel Use Among Women and Children in Urban Bangalore, India,” *Occupational and Environmental Medicine*, 72:114-122.
9. Sojourner, A., Town, R., Grabowski, D., Chen, M. and Frandsen, B. (2015) “Impacts of Unionization on Employment, Product Quality, and Productivity: Regression Discontinuity Evidence From Nursing Homes,” *ILR Review*, 68(4):
10. Gowrisankaran, G., Nevo, A. and Town, R. (2015) “Estimating the Price Impact of Hospital Mergers: An Analysis of Inova’s Proposed Acquisition of Prince William Hospital,” *American Economics Review*, 105(1): 172 -203.
11. Gaynor, M, Ho, K. and Town, R. (2015) “The Industrial Organization of Health Care Markets,” *Journal of Economic Literature*, 53(2): 235-84.

May 2017

12. Wong, C., Asch, D., Vinoya, C., Ford, C., Baker, T., Town, R. and Merchant, R. (2014) “The Experience of Young Adults on Healthcare.org: Suggestions for Improvement,” *Annals of Internal Medicine*, 161(3): 231-232.
13. Lee, J., McCullough, J., and Town, R. (2013) “The Impact of Health Information Technology on Hospital Productivity.” *RAND Journal of Economics*, 44(3): 545-568.
14. Park, M. and Town, R. (2014) “Industry Shock Expectations, Interindustry Linkages, and Merger Waves: Evidence from the Hospital Industry,” *Journal of Economics and Management Strategy*, 23(3):548-567.
15. Spetz, J., Parente, S., Bazarko, D. and Town, R. (2013) “Scope Of Practice Laws For Nurse Practitioners Limit Cost Savings That Can Be Achieved In Retail Clinics,” *Health Affairs*, 32(11): 1977-84.
16. Herrera, C., Newman, D., Gaynor, M., Parente, S. and Town, R. (2013) “What’s happening to health care costs for the privately insured? Trends in employer-sponsored health insurance (2007–2011),” *Health Affairs*, 32(10):1715-1722.
17. Pauly, M. and Town, R. (2012) “Counterpoint: Maryland Exceptionalism? All-Payers Regulation and Health Care System Efficiency” *Journal of Health Politics, Policy and Law*, 37(4): 697-707.
18. Adair, R., Christianson, J., Wholey, D., White, K., Town, R., Lee, S, Britt, H., Lund, P., Lukasewycz, A., and Elumba, D. (2012), “Care Guides: Employing Nonclinical Laypersons to Help Primary Care Teams Manage Chronic Disease,” *Journal of Ambulatory Care Management*, 35(1): 27-37.
19. Grabowski, D. and Town, R. (2011) “Does Information Matter? Competition, Quality and the Impact of Nursing Home Report Cards.” *Health Services Research*, 46(6): 1689-1719.
20. Feldman, R., Town, R. and Kralewski, J. (2011) “Market Power and Contract Form: Evidence from Physician Practices.” *International Journal of Health Care Finance and Economics*, 11(2): 327-342.
21. Gowrisankaran, G., Lucarelli, C., Schmidt-Dengler, P. and Town, R. (2011) “The Impact of the Medicare Rural Hospital Flexibility Program on Patient Choice.” *International Journal of Industrial Organization*, 29 (3): 342-344.
22. Town, R. (2011) “The Effects of Consolidations on Hospital Quality: A Comment,” *International Journal of the Economics of Business*, 18(1): 127-131.
23. Gowrisankaran, G., Town, R. and Barrette, E. (2011) “Drug Benefits, Managed Care and Mortality: An Analysis of Elderly Mortality,” *The B.E. Journal of Economic Analysis & Policy*, 11(2) (Advances), Article 3.
24. Sojourner, A., Grabowski, D., Chen, M. and Town, R. (2010) “Trends in Unionization of Nursing Homes,” *Inquiry*, 47: 331–342 (Winter 2010/2011).
25. Chernew, M., DeCicca, P. and Town, R. (2008) “Managed Care and Medical Expenditures of Medicare Beneficiaries,” *Journal of Health Economics*, 27: 1451-1461.
26. Hirsch, A., Virnig, B., Hartman, L. and Town, R. (2008) “National Healthcare Cost of Peripheral Arterial Disease in the Medicare Population, *Vascular Medicine*, 13(3): 209-215.

May 2017

27. Ricciardi, R. Harriman, K., Baxter, N. Hartman, L., Town, R., and Virnig, B. (2008) "Predictors of Clostridium Difficile Colitis Infections in Hospitals," *Epidemiology and Infection*, 136(7): 913-921.
28. Foote, S., Virnig, B., Town, R. and Hartman, L. (2008) "The Impact of Medicare Coverage Policies on Health Care Utilization," *Health Services Research*, 43(4): 1285-1301.
29. Foote, S. and Town, R. (2007) "Managing Technology: Achieving Evidence-Based Medicine through Medicare Coverage Policy Implementation," *Health Affairs*, 26(6): 1634-1642.
30. Town, R., Wholey, D., Feldman, R. and Burns, L.R. (2007) "Hospital Consolidation Increases Racial and Income Disparities in Health Insurance Coverage" *Health Affairs*, 26(4): 1170-1180.
31. Town, R., Wholey, D., Feldman, R. and Burns, L.R. (2007) "Revisiting the Relationship between Managed Care and Hospital Consolidation," *Health Services Research*, 42(1): 219-238.
32. Hayes, J., Shapiro, C. and Town, R. (2007) "Market Definition in Crude Oil: Estimating the Effects of the BP/ARCO Merger," *The Antitrust Bulletin*, 52(2): 179-204.
33. Ho, V., Town, R. and Heslin, M. (2006) "Regionalization versus Competition in Complex Cancer Surgery" *Health Economics, Policy and Law*, 2(1): 51-71.
34. Dowd, B., Feldman, R., Nyman, J. and Town, R. (2006-2007) "Setting Physicians' Prices in Fee-for-Service Medicare" *Health Care Financing Review*, 28(2): 97-111.
35. Ricciardi, R., Town, R., Kellogg, T. and Baxter, N. (2006) "Outcomes after Open versus Laparoscopic Gastric Bypass," *Surgical Laparoscopy Endoscopy and Percutaneous Techniques*, 6(5): 317-20.
36. Town, R. Kane, R., Johnson, P., and Butler, M. (2005) "The Effect of Economic Incentives on Physicians' Preventive Behavior," *American Journal of Preventive Medicine*, 28(2): 234-240.
37. Town, R., Feldman, R. and Wholey, D. (2004) "The Impact of Ownership Conversions on HMO Performance," *International Journal of Health Finance and Economics*, 4(4): 327-342.
38. Kane, R., Johnson, P., Town, R. and Butler, M. (2004) "A Structured Review of the Effect of Economic Incentives on Consumers' Preventive Behavior," *American Journal of Preventive Medicine*, 27(4): 327-352.
39. Antonovics, K. and Town, R. (2004) "Are All the Good Men Married: Uncovering the Sources of the Marital Wage Premium" *American Economic Review*, May, 94(2):317-321.
40. Town, R., Wholey, D., Dowd, B. and Kralewski, J. (2004) "Assessing the Influence of Incentives on Physicians and Medical Groups," *Medical Care Research and Review*, 61: 80S - 118S.
41. Town, R. and Liu, S. (2003) "The Welfare Impact of Medicare HMOs," *The RAND Journal of Economics*, 34(4): 719-736.
42. Gowrisankaran, G., and Town, R. (2003) "Competition, Payers and Hospital Quality," *Health Services Research*, 38(6): 1403-1421.
43. Geweke, J, Gowrisankaran, G., and Town, R. (2003) "Inferring Hospital Quality from Patient Discharge Records Using a Bayesian Selection Model," *Econometrica*, 71(4):1215-1238.
44. Town, R. and Currim, I. (2002) "Hospital Advertising in California: 1991-1997" *Inquiry*, 39(3): 298-313.

May 2017

45. Town, R. (2001) “The Welfare Effects of HMO Mergers,” *Journal of Health Economics*, 20(6), 2001, 967-90.
46. Elvira, M. and Town, R. (2001) “Employment Outcome Differentials and Performance for Employees in a Racially Diverse U.S. Firm,” *Industrial Relations*, 40(4), 571-50.
47. Town, R. and Vistnes, G. (2001) “Hospital Competition in HMO Networks,” *Journal of Health Economics*, 20(4), 733-53.
48. Gowrisankaran, G. and Town, R. (1999) “Estimating the Quality of Care in Hospitals Using Instrumental Variables,” *Journal of Health Economics*, 18(6), 1999, 747-767
49. Gowrisankaran, G. and Town, R. (1997) “Dynamic Equilibrium in the Hospital Industry,” *Journal of Economics and Management Strategy*, 6(1), 1997, 45-74
50. Town, R. (1992) “Merger Waves and the Structure of Merger and Acquisition Time Series,” *Journal of Applied Econometrics*, Vol. 7, S83-100, December. Reprinted in *Nonlinear Dynamics, Chaos and Econometrics*, H. Pesaran and S. Potter, ed., Wiley Press, 1993.

SUBMITTED MANUSCRIPTS:

51. Carlin, C. and R. Town (2010) “Adverse Selection, Welfare and Optimal Pricing of Employer-Sponsored Health Plans.” Revision requested at *American Economic Journal: Applied Economics*.
52. Gowrisankaran, G., Lucarelli, C., Schmidt-Dengler, P., and Town, R. (2013) “Can Amputation Save the Hospital? The Impact of the Medicare Rural Flexibility Program on Demand and Welfare,” Revision requested and resubmitted *Journal of Health Economics*.
53. Grennan, M. and Town, R. (2015) “Regulating Innovation with Uncertain Quality: Information, Risk, and Access in Medical Devices,” NBER Working Paper # w20981. Revision requested at *American Economic Review*.
54. Gowrisankaran, G., Marsh, T. and Town, R. (2015) “Myopia and Complex Dynamic Incentives: Evidence from Medicare Part D,” Revision requested at *Review of Economic Studies*.
55. Starc, A. and Town, R. (2015) “Internalizing Behavioral Externalities: Benefit Integration in Health Insurance,” Under review at *Review of Economic Studies*..

BOOK CHAPTERS:

56. Gaynor, M and Town, R. (2011) “Provider Competition,” in *Handbook of Health Economics*, Vol 2, Borras, P., McGuire, T. and Pauly, M., eds., Amsterdam: Elsevier.
57. Town, R. and Milliman, S. (1989) “Competition in Deregulated Airlines,” in *Concentration and Price*, Leonard Weiss, ed., MIT Press.

REPORTS AND MONOGRAPHS:

58. Gaynor, M and Town, R. (2012) “The Impact of Hospital Consolidation – Update,” Robert Wood Johnson Synthesis Report.
59. Vogt, William and Town, R. (2006) “How has Hospital Consolidation Affected the Price and Quality of Hospital Care?” Robert Wood Johnson Synthesis Report.

May 2017

60. Dowd, B. and Town, R. (2002) *Does X Cause Y*, HCFO Monograph.

WORKING PAPERS:

- 61. Gowrisankaran, G. Ho, V. and Town, R. (2008) “Causality, Learning-by-Doing and Forgetting in Surgery.”*
- 62. Gowrisankaran, G., Lucarelli, C., Schmidt-Dengler, P. and Town, R. (2011) “Government Policy and the Dynamics of Market Structure: Evidence from Critical Access Hospitals.”*
- 63. Parente, S. and Town, R. (2010) “The Welfare Impact of Retail Clinics.”*

WORK IN PROGRESS:

- Chernew, M., Miller, K. Petrin, A., and Town, R. “The Impact of Medicare Payment Rates on the Structure of Medicare Advantage Markets.”
- Barrette, E. and Town, R. “Geographic Variation in Medicare Advantage Expenditures.”
- Leger, P-T. and Town, R. “Geographic Variations in Health Care,”
- Gowrisankaran, G., Nevo, A., and Town, R. “Airline Mergers, Capacity and Price”
- Grennan, M, Collard-Wexler, A. and Town, R. “Private Incentives for Information Provision”

PRESENTATIONS:

Plenary, Keynotes, and Invited Lectures

- “Private Provision of Public Health Insurance,”
Heller-Hurwicz Lecture, Department of Economics, University of Minnesota, 11/16
- “Regulation, Uncertainty and Risk: Evidence from Medical Devices”
Plenary Lecture, North American Meetings of Econometrics Society, University of Pennsylvania, Philadelphia, PA 7/16
- “Product Regulation in Health Care Settings: Evidence and Policy”
Georgia Health Economics Research Day, Emory University, Keynote Address, 12/15
- “Policy Analysis of Healthcare Markets: Recent Applications of Structural Approaches,”
Plenary Presentation, North American Meetings of the Econometrics Society, Carnegie-Mellon University, Pittsburgh, PA, 6/08

Seminars and Conference Presentations

- “Externalities and Benefit Design in Health Insurance,”
Cornell University, Ithaca, NY, 11/16
Yale University, Department of Economics, 4/16
- “Myopia and Complex Dynamic Incentives: Evidence from Medicare Part D”
University of Texas-Austin, Department of Economics, 12/14

“Regulation, Uncertainty and Risk: Evidence from Medical Devices”

Pennsylvania State University, Department of Economics, 10/15
University of Texas-Austin, Department of Economics, 9/15
University of California Los Angeles, Department of Economics, 6/15
University of Washington, Department of Economics, 5/15
Clemson University, Department of Economics, 11/14
Oho State University, Department of Economics, 4/14

“Mergers When Prices are Negotiated: Evidence from the Hospital Industry”

TIGER Conference, Toulouse, France, 6/14
University of Minnesota, Department of Economics, 11/13
University of California-Berkeley, Department of Economics 4/13
Yale University, Department of Economics, 3/13
University of Washington, Department of Economics/Health Services, 5/12
University of Wisconsin, Department of Economics, 4/12

“Health Information Technology and Patient Outcomes: The Role of Organizational and Information Complementarities”

University of Arizona, Department of Economics, 4/13
University of Pennsylvania, 5/12
University of Southern California, Leonard Schaeffer Institute, 11/11
US Census, Bureau of Economic Analysis, 10/11

“Competition Between Health Care Providers”

Handbook of Health Economics Authors Meeting, Lisbon, Portugal, 11/10

“Government Policy and the Dynamics of Market Structure: Evidence from Critical Access Hospitals”

Harvard University, Dept. of Economics, 12/10
American Society of Health Economists Meeting, Ithaca, NY, 6/10
CEPR Conference, Toulouse, France. 5/10
Stanford University, Graduate School of Business, Stanford, CA, 11/09
Indiana University, Carey School of Management, Bloomington, IN, 11/09
NBER Summer Institute, Cambridge MA, 7/08
The Industrial Organization of Health Care Conference, HEC, Montreal, Canada, 11/07
Kellogg School of Management, Northwestern University, Evanston, IL, 12/07

“Estimating the Impact of Hospital Mergers on Prices,”

Charles Rivers and Associates, Washington, DC 2/10

“The Welfare Impact of Retail Clinics”

National Bureau of Economic Research, Summer Institute, Cambridge, MA 7/10
University of Alabama-Birmingham, School of Public Health, Birmingham, AL 12/09
American Health Economics Conference, Boston, MA, 10/09

“New Evidence on the Relationship between Managed Care and Hospital Consolidation,”

International Health Economics Conference, Beijing, China, 7/09

“Bundled Payments,”

May 2017

Conference on Global Healthcare Reform Experiences, Rinmen University, Beijing, China, 7/09

“Provider Agency in Transplants,”

American Society of Health Economists Annual Meetings, Duke University, Durham, NC 6/08

“Adverse Selection, Welfare and the Optimal Pricing of Health Plans,”

RAND Corporation, Santa Monica, CA 6/09
Annual Allied Social Science Meetings, San Francisco, CA 01/09
Wharton School, Philadelphia, PA 12/08
Northwestern University, Evanston, IL, 11/08
University of Chicago, Chicago, IL 8/08
Cornell University, Ithaca, NY, 4/08

“Review of ‘The Effect of Direct-to-Consumer Advertising on Prescription Drug Prices’”

Annual Health Economics Conference, University of Chicago, Chicago, IL, 3/08

“The Welfare Consequences of Hospital Mergers,”

University of Illinois-Chicago, Chicago, IL, 04/07
American Society of Health Economist Meetings, Madison, WI, 6/06
International Health Economics Association Meetings, Copenhagen, Denmark, 6/07
Medical University of South Carolina, Charleston, SC 5/06
University of Michigan, Ann Arbor, MI, 10/05

“Did The HMO Revolution Cause Hospital Consolidation?”

NBER Health Care Program Fall Meetings, Cambridge, MA, 9/04.

“Causality, Learning by Doing and the Volume Outcome Relationship,”

University of Michigan, Ann Arbor, MI, 11/06
American Economic Association Meetings, Boston, MA 1/06
HEC Montreal, Montreal, Canada, 10/03.
AHRQ/FTC Conference on Competition and Quality in Health Care, 5/03.

“Managed Care, Drug Benefits and Mortality: An Analysis of the Elderly,”

Rice University, Houston, TX, 02/07
NBER Summer Institute Healthcare Meetings, Cambridge, MA 7/04
Centers for Medicare and Medicaid Services, Baltimore, MD, 10/03

“Market Power and Contract Form: Evidence from Minnesota Physician Practices,”

International Economics Association Meetings, San Francisco, CA, 6/03.
International Health Economics Association Conference, Barcelona, Spain, 7/05.

“Hospitals - Horizontal Networks and Vertical Arrangements,”

Federal Trade Commission/ Department of Justice Hearings on Health Care and Competition Law and Policy, Washington, DC, 4/03

“The Welfare Impact of Medicare HMOs”

13th Annual Health Economics Conference, Carnegie Mellon University, 6/02
Graduate School of Management, Stanford University, 5/02
5th Biennial Industrial Organization of Health Care, Boston University, 9/01

May 2017

Graduate School of Public Policy, University of Chicago, 12/02.

“Productivity and the PC Revolution”

*University of California-Los Angeles, Department of Economics, 10/00
CRITO, University of California—Irvine, 11/00*

“How Vigorous is HMO Competition—Evidence from the California's Small Group Market,”

*2nd Annual CEPR Conference on Empirical Industrial Organization, Lisbon, Portugal;
The Eleventh Annual Health Economics Conference, Washington, DC, 6/00; Econometric Society
North American Summer Meetings, Madison, WI, 7/99.*

“Inferring Hospital Quality from Patient Discharge Records Using a Bayesian Selection Model,”

*Boston University, Department of Economics, 3/01;
Georgetown University, Department of Economics, 3/01;
World Congress of the Econometric Society, Seattle, WA, 8/00;
UC-Riverside, 11/98.*

“Estimating Hospital Quality Using Instrumental Variables,”

*American Economics Association Meetings, New Orleans, LA, 1/97;
Annual Meetings of the Health Economics Association, Minneapolis, MN, 7/97.*

“Hospital Competition in HMO Networks,”

*NBER IO/Health Economics Winter Meetings, 1/98;
The Second Industrial Organization of Health Care Conference, Salem, MA, 9/97.*

“Dynamic Equilibrium in the Hospital Industry,”

*Yale University, 6/95;
New York University, 10/95.*

“Price Rigidity, the Firm, and the Market: Evidence from the Wholesale Gasoline Industry During the Iraqi Invasion of Kuwait,”

American Economics Association Meetings, Anaheim, CA, 1/95.

Discussion of Carla Gomes's “Treatment Effects of Selection Behavior in Managed Care Plans,”

*10th Biennial Conference on the Economics of Mental Health, National Institutes of Mental
Health, Washington, DC, 9/00.*

“Vertical Integration by Hospitals,” Annual Meetings of the American College of Emergency Physicians,
San Diego, CA, 10/98.

PROFESSIONAL ASSOCIATIONS:

American Economics Association
Econometric Society
International Health Economics Association
AcademyHealth
American Society for Health Economists (Member: Scientific Committee: 2007-Present)

REFERRING SERVICE:

May 2017

<i>Review of Economics and Statistics</i>	<i>The Economics of Transition</i>
<i>American Economic Review</i>	<i>Journal of Industrial Economics</i>
<i>Journal of Political Economy</i>	<i>Contemporary Economic Issues</i>
<i>Review of Economic Studies</i>	<i>Canadian Economics Review</i>
<i>RAND Journal of Economics</i>	<i>Federal Reserve Bank of New York Economic Policy Review</i>
<i>International Journal of Industrial Organization</i>	<i>Milbank Quarterly</i>
<i>Journal of Applied Econometrics</i>	<i>Inquiry</i>
<i>Journal of Economics and Management Science</i>	<i>Econometrica</i>
<i>Medical Care</i>	<i>American Journal of Managed Care</i>
<i>Journal of Health Economics</i>	<i>American Economic Journal: Economic Policy</i>
<i>Health Services Research</i>	

COURSES TAUGHT:

PhD Industrial Organization/Health Markets, University of Texas-Austin, Fall 2017,

PhD Health Economics, University of Texas-Austin, Spring 2017.

Medical Devices, The Wharton School, MBA Course, Fall 2011-present.

PhD Industrial Organization/Health Markets, The Wharton School, Fall 2012-2016.

PhD Health Economics, The Wharton School, Spring 2013-2016.

Health Economics II, (Advanced Ph.D. Health Economics), Division of Health Policy and Management, University of Minnesota, Spring 2006, 2008, 2010.

Topics in Health Economics, (M.H.A. Health Economics), H Division of Health Policy and Management, University of Minnesota, Fall 2005, 2006, 2007, 2008, 2009 (2 sections – one on-line).

Health Economics I, (Ph.D. Health Economics), Division of Health Policy and Management, University of Minnesota, Spring 2002-2004

Medical Technology Evaluation and Market Research, (MHA/MBA), HSRP/Carlson School of Management, University of Minnesota, Spring 2004-2010.

Microeconomics for Management for Full-time MBA Students, UCI: Fall 1996; Fall 1997 (2 sections); Fall 1999 (2 sections); Fall 2000 (3 sections), Fall 2001 (3 sections).

May 2017

Microeconomics for Management for Fully Employed, UCI, Executive MBA Students: Winter 1997; Winter 1998 (2 sections); Winter 1999 (2 sections).

Economics of Strategy, UCI: Spring 1997; Spring 1999; Spring 2000.

Ph.D. DISSERTATION ADVISING:

Yaran Yin, “Essays on Regulations in the Electricity Industry,” Committee Member, University of Texas-Austin, 2017.

Carlos Herrera, “Counterfactual Analysis of Compulsory Unitization as a Solution to the Common Pool Problem in the Oil and Gas Industry,” Committee Member, University of Texas-Austin, 2017.

Boris Vabson, “Essays in Health Economics and Public Finance” University of Pennsylvania, Thesis Advisor, 2015.

Aditi Sen, “The Effects of Physician Organization on the Disadoption of Low-Value Service: Evidence from PSA Testing and Mammography,” University of Pennsylvania, Thesis Advisor, 2015.

Daniel Sacks, “Physician Agency, Compliance and Patient Welfare: Evidence from Anti-Cholesterol Drugs,” University of Pennsylvania, Committee Member, 2014.

Eric Barrette, “Impact of Information Technology on Patient Choice,” Thesis Advisor, Division of Health Policy and Management, University of Minnesota, 2011.

Christina Marsh, “Estimating the Elasticity of Medical Care Demand,” Thesis Co-Advisor, Department of Economics, University of Minnesota, 2010.

Lindsay Bockstedt Santiago, “The Effect of Medicare's New Technology Add-on Payment,” Thesis Advisor, Division of Health Policy and Management, University of Minnesota, 2010.

Ranjan Banerjee, “Three Essays on the Application of Multi-tasking in Marketing Channels,” Committee Member, Department of Marketing, University of Minnesota, 2010

Julia Thorton Snider “Essays in Pharmaceutical Economics,” Committee Member, Department of Economics, University of Minnesota, 2010

Connan Snider, “Essays in Industrial Organization,” Committee Member, Department of Economics, University of Minnesota, 2010.

Daniel Miller, “Subcontracting and Competitive Bidding on Incomplete Procurement Contracts,” Committee Member, Department of Economics, University of Minnesota, 2009.

Yungwon Yeo, “Two Essays on FCC Spectrum Auctions,” Committee Member, Department of Economics, University of Minnesota, 2009.

May 2017

Jia Yuan, “Two Essays on Sponsored Search Auctions,” Committee Member, Department of Economics, University of Minnesota, 2009.

Nathlan Barleen, “The Effect of Health Insurance Coverage on Workers’ Compensation Claim Filing Behavior,” Committee Member, Division of Health Policy and Management, University of Minnesota, 2008.

Jinxiong Li, “Academic Couples and the Economics of the Co-location Problem,” Committee Member, Department of Economics, University of Minnesota, 2008.

Caroline Carlin, “Health Plan Choice, Adverse Selection and Optimal Premiums”, Thesis Advisor, Division of Health Policy and Management, University of Minnesota, 2006.

Sanghoon Lee, Ph.D. “Two Essays in Applied Microeconomics,” Committee Member, Department of Economics, University of Minnesota, 2005.

Holly Rodin, Ph.D. “Increasing the Supply of Certified Nursing Assistants,” Committee Member, Division of Health Policy and Management University of Minnesota, 2005.

Louise Anderson, Ph.D. “Health Care Utilization and Expenditure Associated with Physical Activity and Weight,” Committee Member, Division of Health Policy and Management University of Minnesota, 2005.

Yungie Song, Ph.D. “Determinants of the Administrative Costs of HMOs,” Committee Member, Division of Health Policy and Management University of Minnesota, 2005.

PROFESSIONAL/UNIVERSITY SERVICE:

- Program Chair, Competition in Health Care Markets, ASHEcon, 2016
- Appointments, Promotion and Tenure Committee, School of Public Health, University of Minnesota, 2007-Present
- Graduate Committee, AHEC Ph.D. Program, 2006-2007
- HSRP Seminar Series, Chair, University of Minnesota, 2004-2005
- Computer Committee, HSRP, University of Minnesota, 2005
- Awards Committee, School of Public Health, University of Minnesota, 2005-2006
- Medical Technology Initiative Committee, Carlson School of Management, University of Minnesota, 2004
- National Institute of Aging, Special Grants Review Section. 2003
- Research Committee, School of Public Health, University of Minnesota, 2002-2004
- Awards Committee, School of Public Health, University of Minnesota, 2005
- Master’s Committee, Graduate School of Management, UCI, 1997-1998
- AACSB Committee, Graduate School of Management, UCI, 1997-1998, 1998-1999, 2000-2001
- Computer Committee, Graduate School of Management, UCI, 2000-2001

CONSULTING SERVICES:

- US Department of Justice, Investigation of American Airlines / US Airlines Merger, 2013.
- Federal Trade Commission, *In the matter of ProMedica Health System*, expert testimony in the

May 2017

administrative law proceeding, 2011.

US Department of Justice, Investigation of United Airlines acquisition of Continental Airlines, 2010.

Federal Trade Commission, Investigation of Dartmouth-Hitchcock/ Catholic Health System affiliation, 2010.

Federal Trade Commission, Investigation of merger of Maine Medical Center/Maine Cardiology Associates/Cardiovascular Consultants of Maine. 2009.

Federal Trade Commission, Investigation of Scott-White’s acquisition of King’s Daughter Hospital, 2009.

Federal Trade Commission, Investigation of Carillion Health Systems, 2009.

US Department of Justice, Investigation of Delta Airline’s acquisition of Northwest Airlines, 2008.

Federal Trade Commission, FTC v. Inova Health Systems, 2008.

State of Pennsylvania, Office of the Attorney General, Investigation of the merger of Highmark and Independence Blue Cross, 2006.

North Memorial Hospital, Analysis of the Competitive Impact of Hospital Entry in Maple Grove, 2004.

US Department of Justice, Investigation of United Airlines/ US Airlines Merger, 2000-2001

PRIOR TESTIMONY:

FTC v. ProMedica Health System, Inc., Civ. No. 3:11-000cv-47-DAK (N.D. Ohio 2011)
 Report: January 12, 2011
 Rebuttal report: February 2, 2011
 Deposition: February 3, 2011

In the matter of ProMedica Health System, administrative law proceeding, FTC Docket No. 9346
 Expert report: April 12, 2011
 Rebuttal report: May 6, 2011
 Deposition: May 10, 2011
 Testimony: July 18, 2011-July 21, 2011

Name of Grant	Funding Agency	Period of Grant	Role in Grant	Amount
Market Organization Impact on Medical Technology Diffusion:	AHRQ	October 2014-October 2017	Investigator	\$512,00

May 2017

Outcomes and Value				
Monitoring the Affordable Care Act by creating publicly available datasets to document variation in characteristics of state marketplaces	Robert Wood Johnson Foundation	October 2014-October 2015	Co-PI	\$322,000
Toward HIX 2.0: Laying the Groundwork to Improve Choice Architecture on the New Health Insurance Exchanges	Sloan Foundation	October 2012 - October 2014	Investigator	\$281,000
Creating a Publicly Available Database on Exchange Characteristics	Robert Wood Johnson Foundation	October 2013 - October 2014	Co-PI	\$150,000
The Impact of Payment Policies on the Cost, Content and Quality of Care	Agency for Healthcare Research and Quality	May 2002 - November 2003	PI	\$249,000
Economic Incentives: Impact on Use/Outcomes of Preventive Health Services	Agency for Healthcare Research and Quality	November 2002 - November 2003	Investigator	\$279,000
Estimating the Impact of Indoor-Air Pollution on Indian Children	Minnesota Medical Foundation	May 2003 - April 2004	PI	\$25,000
Assessing the Impact of Managed Care on FFS Medicare Costs	Changes in Healthcare Financing and Organization	January 2004 - December 2004	Investigator	\$99,000
The Economic Burden of Critical Limb Ischemia	United Therapeutics Corp.	January 2004 - May 2004	PI	\$30,000
The Economic Burden of Peripheral Arterial Disease	Vasogen, LLC.	February 2004 - September 2004	PI	\$100,000
Impact of Medicare’s Local Medical Review Policies and National Coverage Policies on Utilization of Services	The Robert Wood Johnson Foundation	November 2003 - October 2005	Investigator	\$425,000
The Effect of Hospital Mergers on HMO Hospital Costs and Premiums, 1995-2001	Changes in Healthcare Financing and Organization	March 2004 - February 2005	PI	\$99,000
Welfare and the Optimal Public Subsidy for Medicare HMOs	University of Minnesota	September 2008 - May 2009	PI	\$28,000

May 2017

The Costs and Benefits of Health Information Technology: The Impact of Computerized Physician Order Entry	Changes in Healthcare Financing and Organization	August 2008 - August 2010	Investigator	\$299,000
The Economics and Psychology of Deductibles and the Coverage Gap in Medicare Part D	Medical Industry Leadership Institute	October 2009 - September 2010	PI	\$19,299
Hospital Choice, Hospital Quality and Patient Welfare for Rural Residents	AHRQ	August 2010- July 2012	Investigator	\$577,000

Materials Relied Upon for Expert Report of Robert Town

Pleadings, Legal Documents, and Expert Reports

Ballad Health Population Health Improvement Plan, Capacity and Preparedness Assessment and Recommendations, Conduent Community Health Solutions, Healthy Communities Institute.

Code of Virginia § 15.2-5384.1

Commonwealth of Virginia, Application for a Letter Authorizing Cooperative Agreement, Pursuant to Virginia Code § 15.2-5384.1 and the regulations promulgated thereunder at 12VAC5-221-10 et seq., submitted by Mountain States Health Alliance and Wellmont Health System, February 16, 2016

Declaration of Colin Drozdowski, December 18, 2015

Federal Trade Commission Staff Submission to the Southwest Virginia Health Authority and Virginia Department of Health Regarding Cooperative Agreement Application of Mountain States Health Alliance and Wellmont Health System, September 30, 2016

Federal Trade Commission Staff's Third Submission to the Tennessee Department of Health Regarding the Certificate of Public Advantage Application of Mountain States Health Alliance and Wellmont Health System, *FTC v. Freeman Hosp.*, 69 F.3d 260 (8th Circ 1995)

FTC v. Univ. Health Inc., 938 F.2d 1206, 1210-12 (11th Circ. 1991).

Independent Assessment of Ballad Health's Likelihood of Successfully Navigating the Narrow Corridor in a Merged Integrated Delivery System, Prepared for Mountain States Health Alliance and Wellmont Health System, Advisory Board Consulting, April 7, 2017.

Kenneth W. Kizer, MD., MPH., Independent Assessment of the Proposed Merger Between Mountain States Health Alliance and Wellmont Health System, November 21, 2016

Kenneth W. Kizer, MD., MPH., Supplemental Report Regarding the Proposed Merger Between Mountain States Health Alliance and Wellmont Health System, July 18, 2017.

Margaret Guerin-Calvert, Independent Assessment of the Benefits and Disadvantages in the Proposed Merger of Mountain States Health Alliance and Wellmont Health System, Compass Lexecon, LLC, April 11, 2017.

Opinion of the Commission, In the Matter of ProMedica Health System, Inc., Docket No. 9346

Response by Applicants to Federal Trade Commission Staff Submission on September 30, 2016 and Supporting Memorandum to the Southwest Virginia Health Authority and Virginia Department of Health Regarding Cooperative Agreement Application, October 14, 2016

Tennessee Terms of Certification Governing the Certificate of Public Advantage Issued for the Master Affiliation Agreement and Plan of Integration Between Mountain States Health Alliance and Wellmont Health System, July 25, 2017.

Produced Documents

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

Materials Relied Upon for Expert Report of Robert Town

- Capps, Cory, "The Quality Effects of Hospital Mergers," 2005, Unpublished Manuscript
- Cutler, David and Brigitte C. Madrian, "Labor Market Responses to Rising Health Insurance Costs: Evidence on Hours Worked," *RAND Journal of Economics*, 1998, 29(3): 509- 530
- Fournier, Gary M., and Yunwei Gai, "What does Willingness-to-Pay reveal about hospital market power in merger cases?" *iHEA 2007 6th World Congress: Explorations in Health Economics Paper*, 2007
- Garmon, Christopher, "The Accuracy of Hospital Merger Screening Methods," *FTC Working Paper no. 326*, 2015
- Gaynor, Martin and Robert Town, "The Impact of Hospital Consolidation–Update," *The Synthesis Project*, Robert Wood Johnson Foundation, June 2012
- Gaynor, Martin and Robert J. Town, "Competition in Health Care Markets," *Handbook of Health Economics*. Vol. 2, ed. Mark V. Pauly, Thomas G. McGuire and Pedro P. Barros (Massachusetts: North Holland 2012)
- Gaynor, Martin, Harald Seider, and William B. Vogt, "The Volume-Outcome Effect, Scale Economies, and Learning-by- Doing," *American Economic Review*, 2005, 95(2): 243-247
- Gaynor, Martin, Kate Ho, and Robert J. Town, "The Industrial Organization of Health-Care Markets," *Journal of Economic Literature*, 2015, 53(2): 235–284
- Gaynor, Martin, Rodrigo Moreno-Serra, and Carol Propper, "Death by Market Power: Reform, Competition and Patient Outcomes in the National Health Service," *American Economic Journal: Economic Policy*, 2013, 5(4): 134–166
- Gowrisankaran, Gautam and Robert J. Town, "Competition, Payers, and Hospital Quality," *Health Services Research*, 2003, 38(6): 1403–1422
- Gowrisankaran, Gautam, Vivian Ho, and Robert J. Town, "Causality, Learning and Forgetting in Surgery," 2006, Working Paper, 1–43
- Gowrisankaran, Gautam, Aviv Nevo, and Robert Town, "Mergers When Prices Are Negotiated: Evidence from the Hospital Industry," *The American Economic Review*, 2015, 105(1): 172–203
- Grabowski, David C. and Robert J. Town, "Does information matter? Competition, Quality, and the impact of Nursing Home Report Cards," *Health Services Research*, 2011, 46(6): 1698-1719.
- Gruber, Jonathan, "Health Insurance and the Labor Market," ed. Anthony J. Culyer and Joseph P. Newhouse, *Handbook of Health Economics Volume 1*, (Elsevier Science: Amsterdam 2000)
- Gruber, Jonathan, and Robin McKnight, "Why did employee health insurance contributions rise?" *Journal of Health Economics*, 2003, 22(6): 1085-1104
- Halm, Ethan A., Clara Lee, and Mark R. Chassin, "Is Volume Related to Outcome in Health Care? A Systematic Review and Methodologic Critique of the Literature," *Annals of Internal Medicine*, 2002, 137(6): 511–520
- Ho, Kate and Robin Lee, "Insurer Competition in Health Care Markets," October 2016, Working Paper (Forthcoming in *Econometrica*)
- Ho, Katherine, "The Welfare Effects of Restricted Hospital Choice in the U.S. Medical Care Market," *Journal of Applied Econometrics*, 2006, 21(7): 1039-1079
- Ho, Vivian and Barton H. Hamilton, "Hospital mergers and acquisitions: Does market consolidation harm patients?" *Journal of Health Economics*, 2000, 19(5): 767–791
- Holmes, Mark, "Financially Fragile Rural Hospitals: Mergers and Closures," *North Carolina Medical Journal*, 2015, 76(1): 37–40

Materials Relied Upon for Expert Report of Robert Town

- Joskow, Paul L., and Nancy L. Rose. "The Effects of Economic Regulation." Handbook of Industrial Organization, vol. 2 (1989): 1449–1506
- Kaufman, Bryстана G., et al., "The Rising Rate of Rural Hospital Closures," The Journal of Rural Health, 32 (2016): 35–43
- Kessler, Daniel P. and Geppert, Jeffrey J., "The effects of competition on variation in the quality and cost of medical care," Journal of Economics and Management Strategy, 2005, 14(3): 575–589
- Kessler, Daniel P., and Mark B. McClellan, "Is Hospital Competition Socially Wasteful?" Quarterly Journal of Economics, 2000, 115(2): 577–615
- Kirby, Paul B., et al., "Hospital Service Changes in California: Trends, Community Impacts and Implications for Policy," The Nicholas C. Petris Center on Health Care Markets & Consumer Welfare, 2005
- Madrian, Bridget, "The U.S. Health Care System and Labor Markets," NBER Working Paper, w11980, 2006
- Mukamel, Dana B., Jack Zwanziger, and Znil Bamezai, "HMO Penetration, Competition, and Risk-Adjusted Hospital Mortality," Health Services Research, 2011, 36(6): 1019–1035,
- Mutter, Ryan L., Patrick S. Romano, and Herbert S. Wong, "The Effects of U.S. Hospital Consolidations on Hospital Quality," International Journal of the Economics of Business, 2011, 18(1): 109–126
- Nathans, Avery B. et al., "Relationship Between Trauma Center Volume and Outcomes," Journal of the American Medical Association, 2001, 285(9):1164–1171
- Romano, P. and David J. Balan, "A Retrospective Analysis of the Clinical Quality Effects of the Acquisition of Highland Park Hospital by Evanston Northwestern Healthcare," International Journal of the Economics of Business, 2011, 18(1): 45–64
- Town, Robert and Gregory Vistnes, "Hospital competition in HMO networks," Journal of Health Economics, 2001, 20(5): 733–753
- Vistnes, Gregory, "Hospitals, Mergers, and Two-Stage Competition," Antitrust Law Journal, 2000, 67(3): 671–692, pp. 673–674
- Vistnes, Jessica P., Philip F. Cooper, and Gregory S. Vistnes, "Employer Contribution Methods and Health Insurance Premiums: Does Managed Competition Work?" International Journal of Health Care Finance and Economics, 2001, 1(2): 159–187
- Vogt, William B. and Robert J. Town, "How Has Hospital Consolidation Affected the Price and Quality of Hospital Care?" The Synthesis Project, February 2006
- Wu, Vivian Y., "Managed Care's Price Bargaining with Hospitals," Journal of Health Economics, 2009, 28(2): 350–360

Websites and Other Publicly Available Materials

- "Antitrust Enforcement and the Consumer," U.S. Department of Justice, December 18, 2015, <https://www.justice.gov/atr/antitrust-enforcement-and-consumer>
- "Better, Smarter, Healthier: In historic announcement, HHS sets clear goals and timeline for shifting Medicare reimbursements from volume to value," HHS.gov, January 26, 2015, <https://www.hhs.gov/about/news/2015/01/26/better-smarter-healthier-in-historic-announcement-hhs-sets-cleargoals-and-timeline-for-shifting-medicare-reimbursements-from-volume-to-value.html>
- Blue Cross Blue Shield Blue Care Network of Michigan, <http://www.bcbsm.com>

Materials Relied Upon for Expert Report of Robert Town

CareChex, <http://carechex.com/>

Centers for Medicare & Medicaid Services, <https://www.cms.gov>

Department of Medical Assistance Services, <http://www.dmas.virginia.gov>

“FAMIS (Family Access to Medical Insurance Security) for Children.” Arlingtonva.us, <https://publicassistance.arlingtonva.us/famis-for-children/>

HR Guide, <https://www.hr-guide.com>

iVantage Health Analytics, “Rural Relevance – Vulnerability to Value, A Hospital Strength Index Study,” 2016

Kaiser Family Foundation and Health Research & Education Trust, “Employer Health Benefits 2012 Annual Survey,” Sept. 2012 , available at <https://kaiserfamilyfoundation.files.wordpress.com/2013/03/8345-employerhealth-benefits-annual-survey-full-report-0912.pdf>

Medicaid.gov, <https://www.medicaid.gov>

Medicare.gov, <https://www.medicare.gov>

Merger Guidelines

Mountain States Health Alliance, <https://www.mountainstateshealth.com>

Social Security Administration, <https://www.ssa.gov>

Taylor, Lauren, Andrew Hyatt, and Megan Sandel, “Defining the Health System’s Role in Addressing Social Determinants And Population Health,” Health Affairs Blog, November 17, 2016, <http://healthaffairs.org/blog/2016/11/17/defining-the-health-care-systems-role-in-addressing-social-determinantsand-population-health>

TennCare, <https://www.tn.gov/tenncare/article/tenncare-overview>

The Mountain Star, <http://www.mshanews.org>

Trauma Care Advisory Council, “Trauma Care in Tennessee: A Report to the 2010 107th General Assembly.” Tennessee Department of Health, November 8, 2010

Wellmont Health System, <http://www.wellmont.org>

Note: In addition to the materials on this list, I considered all materials cited in my report and my exhibits to form my opinions.

The Patient Choice Model

C1. My diversion ratios and WTP estimates are derived from a model of patient demand for different hospitals (“the patient choice model). In this model, information on patients, on the characteristics of different hospitals, and on the hospitals that patients actually chose in the real world are used to identify the factors that determine the patient’s value (“utility”) for the hospital. These factors ultimately affect which hospital a patient will choose to visit.

C2. There are three key components of a patient choice model, which I describe in this Appendix:

- a. the explanatory variables, which are the features of patients and hospitals that the model uses to explain the patients’ hospital choices
- b. the set of patients whose actual choices are examined
- c. the set of hospitals that patients are assumed to choose among.

C3. Table C1 lists all the factors that determine a patient’s hospital choice. These factors are commonly used in patient choice models and can be broadly grouped into two main categories. The first category depends on the proximity or closeness of a hospital, as determined by the drive time. Since drive time may not be valued equally by all types of patients, I allow the effect of drive time to vary by patient characteristic, such as the patients MDC and length of stay, by interacting the drive time variable with the patient’s characteristics. I also allow for the closest hospital to affect patient choices and include an indicator variable that characterizes the closest (in terms of drive time) hospital. The second category captures the overall hospital attractiveness and the attractiveness of a hospital in a given specialty. The overall attractiveness of the hospital is captured by hospital fixed-effect variables, and the specialty is captured by the hospital fixed effect variable interacted by a service line variable (MDC) and DRG weight.

C4. Although defining a geographic market is not required to identify the relevant set of patients to include in the model, it is still important that broad patient population be defined to include patients who might reasonably be expected to choose one of the two parties. I use patients from the 21-county area to estimate my choice model. I limit the sample to commercial GAC discharges associated with patients from the 21-county Area, excluding newborns, seniors, transfers from other hospitals and facilities, and discharges with missing ZIP codes (see

Appendix D for data definitions). These restrictions leave me with 19,605 patients of which 9,744 are MSHA patients and 5,301 are WHS patients.

C5. Another key input into a patient choice model is the set of hospitals between which patients are allowed to choose (the choice set). It is important that the choice set includes hospitals that patients would actually consider when deciding where to seek care. If a patient chooses any hospital outside a pre-specified list of hospitals, this choice is often modeled as the patient having chosen an “Outside Good.” In my model, I allow patients to choose from all hospitals in the 21-county area. If a patient chooses a hospital outside the 21-county area that had less than 20 discharges in 2015, the patient is assumed to have chosen the “Outside Good.”

C6. I use a standard econometric technique for estimating the choice model for estimating my choice model. The output from this estimation technique can be found in Table C2.

C7. Finally, in estimating the diversion by service line, I use the same patient choice model with the characteristics listed in Table C1 without the MDC interacted explanatory variables (see Table C3).

**Table C1:
Patient Choice Model Explanatory Variables**

Explanatory Variable Set I:	
Drive Time	Description
Drive Time ^[1]	Minimum drive time between patient zip code and the hospital zip code, excluding traffic
Drive Time Squared ^[1]	Squared minimum drive time between patient zip code and the hospital zip code, excluding traffic
Drive Time x Age	Drive time interacted with patient age
Drive Time x DRG Weight ^[2]	Drive time interacted with DRG weight
Drive Time x Emergency	Drive time interacted with indicator identifying whether the discharge was admitted for emergency or trauma
Drive Time x Length of Stay	Drive time interacted with patient's length of stay
Drive Time x MDC ^[3]	Drive time interacted with indicators of MDC category
Drive Time x Minor	Drive time interacted with indicator that identifies whether the patient is age 14 or less
Closest Hospital ^[1]	An indicator for the hospital with the lowest drive time between the patient zip code centroid and the hospital zip code
Closest Hospital x Age	Closest time indicator interacted with patient age
Closest Hospital x DRG Weight ^[2]	Closest time indicator interacted with DRG weight
Closest Hospital x Emergency	Closest time indicator interacted with indicator identifying whether the discharge was admitted for emergency or trauma
Closest Hospital x Length of Stay	Closest time indicator interacted with patient's length of stay
Closest Hospital x MDC ^[3]	Closest time indicator interacted with indicators of MDC category
Closest Hospital x Minor	Closest time indicator interacted with indicator that identifies whether the patient is age 14 or less
Explanatory Variable Set II:	
Hospital Attractiveness	Description
Hospital FE ^[4]	Hospital fixed effects
Hospital FE x DRG weight ^{[2] [5] [6]}	Hospital fixed effects interacted with DRG weight
Hospital FE x MDC ^[3]	Hospital fixed effects interacted with indicators of MDC category

Note:

[1] Drive times are obtained from Google Maps API.

[2] DRG weights are obtained from Virginia State Discharge Data, 2015. For Tennessee discharges recorded with CMS DRGs, a crosswalk between CSM DRGs and 2008 MS DRGs was used.

[3] Emergency is defined as discharges admitted for Emergency or Trauma. We do not interact the drive time variable on MDC categories with less than 20 discharges.

[4] We exclude hospital fixed effects for hospitals with less than 20 discharges.

[5] We exclude hospital fixed effects interacted with DRG weights for hospitals with less than 20 discharges.

[6] We exclude hospital fixed effects interacted with MDC categories for hospitals with less than 10 discharges in the respective MDC categories.

[7] Utility is set to zero for the outside good.

**Table C2:
Patient Choice Logit Estimates**

Variable	Estimates
Drive Time ^[1]	-0.0760*** (0.00433)
Drive Time Squared ^[1]	9.23e-05*** (2.79e-06)
Closest	-0.604*** (0.0876)
Closest x Age	0.00520*** (0.00176)
Closest x Minor	-0.268* (0.140)
Closest x Length of Stay	-0.0330*** (0.00582)
Closest x DRG Weight	4.76e-06*** (1.60e-06)
Closest x Emergency	0.566*** (0.0491)
Drive Time x Age	-3.75e-05** (1.86e-05)
Drive Time x Minor	0.00662*** (0.000974)
Drive Time x Length of Stay	0.000346*** (2.62e-05)
Drive Time x DRG Weight ^[2]	8.06e-08** (3.58e-08)
Drive Time x Emergency	-0.0132*** (0.000674)
Hospital FE x DRG weight ^{[2][4][5]}	YES
Hospital FE ^[3]	YES
Hospital FE x MDC Categories ^[3]	YES

Note: *** indicates statistical significance at the 1% level; ** indicates statistical significance at the 5% level; * indicates significance at the 10% level. Standard errors are reported in parentheses below the coefficient.

[1] Drive times are obtained from Google Maps API.

[2] DRG weights are obtained from Virginia State Discharge Data, 2015. For Tennessee discharges recorded with CMS DRGs, a crosswalk between CSM DRGs and 2008 MS DRGs was used.

[3] We exclude hospital fixed effects for hospitals with less than 20 discharges.

[4] We exclude hospital fixed effects interacted with DRG weights for hospitals with less than 20 discharges.

[5] We exclude hospital fixed effects interacted with MDC categories for hospitals with less than 10 discharges in the respective MDC categories.

[6] Utility is set to zero for the outside good.

**Table C3:
MDC-Level Patient Choice Model Explanatory Variables**

Explanatory Variable Set I:

Drive Time	Description
Drive Time ^[1]	Minimum drive time between patient zip code and the hospital zip code, excluding traffic
Drive Time Squared ^[1]	Squared minimum drive time between patient zip code and the hospital zip code, excluding traffic
Drive Time x Age	Drive time interacted with patient age
Drive Time x DRG Weight ^[2]	Drive time interacted with DRG weight
Drive Time x Emergency	Drive time interacted with indicator identifying whether the discharge was admitted for emergency or trauma
Drive Time x Length of Stay	Drive time interacted with patient's length of stay
Drive Time x Minor	Drive time interacted with indicator that identifies whether the patient is age 14 or less
Closest Hospital ^[1]	An indicator for the hospital with the lowest drive time between the patient zip code centroid and the hospital zip code
Closest Hospital x Age	Closest time indicator interacted with patient age
Closest Hospital x DRG Weight ^[2]	Closest time indicator interacted with DRG weight
Closest Hospital x Emergency	Closest time indicator interacted with indicator identifying whether the discharge was admitted for emergency or trauma
Closest Hospital x Length of Stay	Closest time indicator interacted with patient's length of stay
Closest Hospital x Minor	Closest time indicator interacted with indicator that identifies whether the patient is age 14 or less

Explanatory Variable Set II:

Hospital Attractiveness	Description
Hospital FE ^[4]	Hospital fixed effects
Hospital FE x DRG weight ^{[2] [5] [6]}	Hospital fixed effects interacted with DRG weight

Note:

[1] Drive times are obtained from Google Maps API.

[2] DRG weights are obtained from Virginia State Discharge Data, 2015. For Tennessee discharges recorded with CMS DRGs, a crosswalk between CSM DRGs and 2008 MS DRGs was used.

[3] Emergency is defined as discharges admitted for Emergency or Trauma.

[4] We exclude hospital fixed effects for hospitals with less than 10 discharges and for MDC category 24.

[5] We exclude hospital fixed effects interacted with DRG weights for hospitals with less than 10 discharges or if the DRG weight has less than 5 distinct values.

[6] Utility is set to zero for the outside good.

Notes on Data Definitions

D1. For all analyses, discharges with inconsistent information are excluded. Discharges with inconsistent information are: (a) obstetrics discharges where patient sex is male, or where patient age is under 10 or over 56; (b) newborn discharges where patient age is not 0; (c) gynecology discharges where the patient sex is male; and (d) discharges with MDCs related to the male reproductive system where patient sex is female.

D2. General Acute Care (“GAC”) discharges are identified as discharges with: (a) MDCs outside of 19 (Mental Illnesses), 20 (Alcohol & Drug Use), or 23 (Factors Influencing Health Status); and (b) DRGs outside of 981–989, 998, and 999 (these DRGs are unrelated to the patient’s primary diagnosis and therefore cannot be assigned to an MDC).

D3. Commercial discharges are identified as discharges with commercial payers.

D4. Seniors are identified as discharges where the patient’s age is 65 or over.

D5. Newborns are identified as discharges with MDC 15, discharges where patient age is equal to zero, or discharges where the admission type is newborn.

D6. Discharges associated with patients from the 21-county Area are identified in the state discharge data for Tennessee and Virginia as discharges where the patient ZIP code is in the 21-county Area. Discharges associated with patients from the 21-county Area are identified in the parties’ inpatient data as discharges where the patient county is one of the 23 counties or cities included in the 21-county Area.

D7. Payers are identified and grouped using the Parties’ inpatient data using information provided by the Parties themselves. Additional revision in payer identification is conducted based on the name of the payer as recorded in the data.

- a. Payer coding is based on the categorization provided by the Parties, with the exception of Non-Health Insurance, which includes auto insurance payers. Non-Health Insurance in the MSHA data includes payers such as All State, State Farm, and Travelers Auto Insurance. Non-Health Insurance in the WHS data includes payers such as GEICO and State Farm.
- b. Other governmental payers besides Medicare, Medicare Advantage, and Medicaid appear in the data for each hospital. Other Government in the

MSHA data includes payers such as CHAMP VA and TRICARE. Other Government in the WHS data is defined as payers where WHS classified the financial class as “Other Government,” which includes payers such as CHAMPVA, TRICARE, and Black Lung.

- c. MSHA data includes payers categorized as Other, which includes behavioral health plans and payers that MSHA classified as “Other.”