

Supplementary Online Content

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This supplementary material has been provided by the authors to give readers additional information about their work.

eAppendix 1: Public Reporting Survey

Part One: Clinical and Demographic Information

Several of the questions in this survey ask you about characteristics of the facility where you perform cardiac catheterizations. If you perform catheterizations at more than one facility, please consider the facility where you perform the largest number of cardiac catheterizations to be your "primary practice site."

1. Do you perform cardiac catheterizations at more than one facility?
 - a. Yes
 - b. No

2. How old are you?

3. What is your gender?
 - a. Male
 - b. Female

4. In what zip code do you practice?

5. Did you complete a dedicated interventional cardiology fellowship in the US?
 - a. Yes
 - b. No

6. For how many years since completion of fellowship have you been practicing Interventional Cardiology?

7. Which of the following best describes the type of facility where you perform cardiac catheterizations?
 - a. Free Standing Catheterization Lab
 - b. Cardiac Specialty Hospital
 - c. General Medical and Surgical Acute Care Hospital

A free standing catheterization lab is a catheterization lab which is not part of an acute care hospital. A free standing catheterization lab may be affiliated with a hospital, but the catheterization procedures take place in a catheterization suite which is not physically located at the hospital, and does not have an inpatient ward onsite.

A cardiac specialty hospital is a hospital which specializes in the care of patients with cardiovascular diseases. Cardiac specialty hospitals are typically small facilities, with fewer than 100 inpatient beds. They may have the ability to manage non-cardiovascular conditions, but they do not offer a full array of subspecialty services. They typically only admit patients who need inpatient care for a cardiovascular disease problem.

A general medical and surgical acute care hospital is a full service acute care hospital which offers a wide array of general and subspecialty medical and surgical services.

8. What is the approximate number of inpatient beds at your primary practice site?
 - a. 0 inpatient beds
 - b. 1-99 beds
 - c. 100-299 beds
 - d. 300-499 beds
 - e. 500-999 beds
 - f. ≥ 1000 beds

9. Does your primary practice site participate in the training of medical students, residents, fellows, and/or nurses?
 - a. Yes
 - b. No

10. Does your primary practice site have fully accredited fellowship training programs for:

General Cardiology?
 - a. Yes
 - b. No
Interventional Cardiology?
 - a. Yes
 - b. No

11. In an average month, how many times do you take overnight and/or weekend call for emergencies (e.g. patients with ST-Elevation Myocardial Infarction or Cardiogenic Shock) at the facility where you perform cardiac catheterizations?
 - a. ≥ 4 days or nights per month
 - b. 1-3 days or nights per month
 - c. < 1 day or night per month
 - d. I never take STEMI/emergency call

12. Approximately how many PCIs were performed at your practice facility in 2015?
 - a. ≥ 100
 - b. 101-200
 - c. 201-300

- d. 301-400
- e. 401-500
- f. 501-600
- g. 601-700
- h. 701-800
- i. 801-900
- j. 901-1000
- k. 1001-1100
- l. 1101-1200
- m. 1201-1300
- n. 1301-1400
- o. 1401-1500
- p. 1501-1600
- q. 1601-1700
- r. 1701-1800
- s. 1801-1900
- t. 1901-2000
- u. >2000

13. About how many how many PCIs did you perform during 2015?

14. In an average week, how many days per week do you perform procedures in the cardiac catheterization lab (please answer in half day increments, e.g. 0.5, 1, 1.5, etc.)?

15. Does your practice facility have cardiac surgical services on-site?

- a. Yes
- b. No

16. Does your practice facility have at least one scheduled heart team meeting per month?

- a. Yes
- b. No

Part Two: Risk Tolerance

Directions: Please choose the answer that best approximates the degree to which you agree with the following statement(s) as they apply to you as a person in general life (and not just to you as a doctor in clinical practice).

- 1. I enjoy taking risks.
 - a. Strongly Agree
 - b. Agree
 - c. Slightly Agree
 - d. Slightly Disagree
 - e. Disagree

- f. Strongly Disagree
-
- 2. I try to avoid situations that have uncertain outcomes.
 - a. Strongly Agree
 - b. Agree
 - c. Slightly Agree
 - d. Slightly Disagree
 - e. Disagree
 - f. Strongly Disagree
-
- 3. Taking risks does not bother me if the gains involved are high.
 - a. Strongly Agree
 - b. Agree
 - c. Slightly Agree
 - d. Slightly Disagree
 - e. Disagree
 - f. Strongly Disagree
-
- 4. I consider security an important element in every aspect of my life.
 - a. Strongly Agree
 - b. Agree
 - c. Slightly Agree
 - d. Slightly Disagree
 - e. Disagree
 - f. Strongly Disagree
-
- 5. People have told me that I seem to enjoy taking chances.
 - a. Strongly Agree
 - b. Agree
 - c. Slightly Agree
 - d. Slightly Disagree
 - e. Disagree
 - f. Strongly Disagree
-
- 6. I rarely, if ever, take risks when there is another alternative.
 - a. Strongly Agree
 - b. Agree
 - c. Slightly Agree
 - d. Slightly Disagree
 - e. Disagree
 - f. Strongly Disagree

Part Three: Clinical Practice

1. How often have you been pressured by colleagues to avoid performing an indicated PCI in a patient due to a concern that the patient was at high risk of death during and/or following PCI?
 - a. Often
 - b. Sometimes
 - c. Rarely
 - d. Never

2. How often have you been pressured by colleagues to perform PCI in a patient who you thought had a high risk of death with or without PCI?
 - a. Often
 - b. Sometimes
 - c. Rarely
 - d. Never

3. Have you, or a colleague at your facility, ever transferred a sick patient who needed coronary angiography and/or PCI to another facility in order to avoid taking on the risk of performing PCI in this patient?
 - a. Yes
 - b. No

4. How often do you delay CORONARY ANGIOGRAPHY or PCI in a cardiac arrest patient because of worry that the patient's risk of death is high regardless of whether or not you perform PCI?
 - a. Often
 - b. Sometimes
 - c. Rarely
 - d. Never

5. How often do your colleagues at your facility delay CORONARY ANGIOGRAPHY or PCI in a cardiac arrest patient because of worry that the patient's risk of death is high regardless of whether or not they perform PCI?
 - a. Often
 - b. Sometimes
 - c. Rarely
 - d. Never

6. When considering whether to perform an indicated PCI in a critically ill patient, how much do you worry about whether your supervisor(s) will support your decision to perform PCI if the patient dies later in their hospitalization of:

A complication related to the PCI?

- a. A Lot

- b. Some
- c. Very Little
- d. Not at All

A condition unrelated to the PCI?

- a. A Lot
- b. Some
- c. Very Little
- d. Not at All

7. How much do you worry about...

...how a potential complication of one of your procedures will impact your OWN professional reputation?

- a. A Lot
- b. Some
- c. Very Little
- d. Not at All

...how a potential complication of one of your procedures will impact your primary practice facility's reputation in the community?

- a. A Lot
- b. Some
- c. Very Little
- d. Not at All

8. To what extent do doctors at your facility use more health care resources than they should to try to save critically ill patients who have undergone PCI earlier in their hospitalization?

- a. To a Great Extent
- b. To Some Extent
- c. Very Little
- d. Not at All

Part Four: Perceptions of Public Reporting

Note: "Public Reporting of PCI Outcomes" refers to the public reporting of in-hospital and 30 day mortality following percutaneous coronary intervention (PCI). Reported outcomes would be risk-adjusted for patients' clinical comorbidities.

1. How strongly do you believe that public reporting identifies substandard interventional cardiologists?

- a. Very Strongly
- b. Somewhat Strongly
- c. Less Strongly

d. Not Strongly at All

2. In states that have public reporting of PCI outcomes, I think that outcomes of patients who present with _____ and undergo PCI should be publicly reported:

Blank = Cardiogenic shock

- a. Strongly Agree
- b. Agree
- c. Slightly Agree
- d. Slightly Disagree
- e. Disagree
- f. Strongly Disagree

Blank = Out-of-hospital cardiac arrest

- a. Strongly Agree
- b. Agree
- c. Slightly Agree
- d. Slightly Disagree
- e. Disagree
- f. Strongly Disagree

Blank = Out-of-hospital cardiac arrest complicated by coma

- a. Strongly Agree
- b. Agree
- c. Slightly Agree
- d. Slightly Disagree
- e. Disagree
- f. Strongly Disagree

3. To what extent does public reporting of PCI outcomes help patients to make more informed decisions about...

...whether or not to undergo elective PCI?

- a. To a Great Extent
- b. To Some Extent
- c. Very Little
- d. Not at All

...whether or not to undergo emergency/urgent PCI?

- a. To a Great Extent
- b. To Some Extent
- c. Very Little
- d. Not at All

...which healthcare facility they want to go to for their elective coronary angiogram and/or PCI?

- a. To a Great Extent
- b. To Some Extent
- c. Very Little
- d. Not at All

...which interventional cardiologist they want to perform their elective coronary angiogram and/or PCI?

- a. To a Great Extent
- b. To Some Extent
- c. Very Little
- d. Not at All

4. To what extent does public reporting of PCI outcomes help hospitals to improve quality of care for...

...all patients who undergo PCI?

- a. To a Great Extent
- b. To Some Extent
- c. Very Little
- d. Not at All

...all patients with coronary artery disease (NOT JUST THOSE WHO UNDERGO PCI)?

- a. To a Great Extent
- b. To Some Extent
- c. Very Little
- d. Not at All

...patients with coronary artery disease who do not undergo PCI (including those managed medically and who undergo CABG surgery)?

- a. To a Great Extent
- b. To Some Extent
- c. Very Little
- d. Not at All

Part Five: Questions for Clinicians Who Practice in States with Public Reporting (MA and NY)

1. In the last five years, has your facility been identified as one that underperforms its peers on publically reported outcomes for PCI?
- a. Yes

- b. No
2. How often have you decided not to perform PCI in a patient due, AT LEAST IN PART, to a concern that a bad outcome would negatively impact your own, or your facility's, publicly reported outcomes?
 - a. More Than 5 Times
 - b. 2-5 times
 - c. Once
 - d. Never
 3. How often do you think that other interventional cardiologists in your state decide not to perform PCI in a patient due, AT LEAST IN PART, to a concern that a bad outcome would negatively impact their own, or their facility's, publicly reported outcomes?
 - a. Often
 - b. Sometimes
 - c. Rarely
 - d. Never
 4. To what extent do interventional cardiologists or hospitals in your state purposefully "up code" the comorbidities of PCI patients in an effort to "game the system" and make their outcomes appear better than they actually are?
 - a. To a Great Extent
 - b. To Some Extent
 - c. Very Little
 - d. Not at All
 5. To what extent does public reporting of PCI outcomes lead interventional cardiologists at your facility to avoid performing PCI in patients with high anticipated mortality regardless of whether PCI is performed, and...
 - ...who may derive significant clinical benefits from PCI?
 - a. To a Great Extent
 - b. To Some Extent
 - c. Very Little
 - d. Not at All
 - ...who are unlikely to benefit from PCI (e.g. multiple comorbidities, competing illness or disability)?
 - a. To a Great Extent
 - b. To Some Extent
 - c. Very Little
 - d. Not at All

...in whom the benefit of PCI is uncertain?

- a. To a Great Extent
- b. To Some Extent
- c. Very Little
- d. Not at All

Part Six: Risk Adjustment Methods

1. Overall, how much do you know about the methods used by public reporting systems to risk adjust outcomes for patients' severity of illness?
 - a. Nothing
 - b. Very Little
 - c. Some
 - d. A Lot

2. How much do you trust that risk adjustment methodologies used by public reporting systems for PCI outcomes accurately account for patients' severity of illness and risk of death?
 - a. A Lot
 - b. Some
 - c. Very Little
 - d. Not at All

eAppendix 2: Detailed Overview of Study Methods

Survey Design

Two authors (DMB and RWY) drafted the survey and revised it in consultation with the study's co-authors. Five interventional cardiologists unaffiliated with the study reviewed it for length and clarity of content. The final survey instrument included questions in the following areas: clinicodemographic characteristics and practice facilities; public reporting practices and risk aversion; influence of public reporting on quality improvement and informed patient decision making; and knowledge and trust of risk adjustment methods. Questions employed free-text, 4- or 6-point Likert scale, yes-no, and categorical responses.

Survey Sample

We used a comprehensive database of licensed US physicians maintained by Doximity, an online networking site for US physicians, to identify all cardiologists in NY and MA who were board certified in interventional cardiology by the American Board of Internal Medicine (ABIM) as of July 7, 2015. We cross-referenced this list with three data sources to verify accuracy: 1) physician-level inpatient PCI billing volumes for Medicare beneficiaries, obtained from the 2014 Centers for Medicare and Medicaid Services (CMS) 20% Carrier file; 2) publicly available data on PCI volumes for NY interventional cardiologists in 2011-2013 (available at: www.health.ny.gov), and 3) the websites of all MA and NY hospitals with catheterization labs. The CMS Carrier file contains a random 20% sample of inpatient procedure claims for Medicare fee-for-service beneficiaries organized by the National Provider Identifier (NPI) of the rendering physician and

Healthcare Common Procedure Coding System (HCPCS) code **(Appendix C)**.

Interventional cardiologists practicing in NY or MA were added to the study cohort. E-mail addresses were obtained from the Society for Cardiovascular Angiography and Interventions (SCAI), the Cardiovascular Research Foundation, and via internet searches and personal contacts. Cardiologists who were part of the study team, affiliated with hospitals in multiple states, or who lacked a working e-mail address (N=40; 36 from NY, 4 from MA) were excluded from the study cohort.

Additional Data Sources

Additional data on physician characteristics were obtained from the Doximity database. Doximity creates accounts for all physicians included in the National Plan and Provider Enumeration System National Provider Identifier (NPPES) registry. These doctors may register as users, and doctors without active NPI numbers can self-register. As of July 7, 2015, 24% (246,786 of 1,029,088) of US physicians had registered with Doximity. The Doximity database includes name; NPI number; age; sex; allopathic (MD) versus osteopathic (DO) training; location and year of graduation from medical school, residency and fellowship; ABIM certification; number of publications; National Institute of Health (NIH) grants; and clinical trial participation. A description of the database and validation of its accuracy has been published previously.¹⁻³ We augmented these data with each physician's volume of inpatient PCI claims billed to Medicare in 2014 and hospital characteristics from the 2012-13 American Hospital Association US hospital surveys. Medicare claims for PCI were defined as claims which included any of the following ICD-9 or current procedural terminology codes (CPT): 1) ICD-9 codes 00.66,

36.00, 36.06, 36.07, or 36.09; and 2) CPT: 92920, 92921, 92924, 92925, 92928, 92929, 92933, 92934, 92937, 92938, 92941, 92943, or 92944. We used several methods to affiliate physicians with primary practice facilities. Among physicians who billed Medicare for PCIs in 2014, the primary practice facility was defined as the hospital where the majority of these PCIs were performed. For those physicians who did not bill Medicare for PCI in 2014, we identified the primary practice facility by using personal contacts and knowledge, publicly-reported data on physician PCI volumes from 2011-13 by hospital (NY only), and, in select circumstances, through internet searches. The survey also asked respondents to provide the zip code of their primary practice facility; for respondents who did not bill Medicare for at least five PCIs in 2014, we used this zip code to identify their primary practice facility in the American Hospital Association Annual Survey database.

We estimated each physician's years of experience from their date of board exam completion from the ABIM website (www.abim.org; methods described in **Appendix D**). We used unique identifiers to de-identify survey responses and link them to physicians' Doximity profiles and primary practice facility characteristics

Analysis

We compared the personal and facility characteristics of respondents and non-respondents using the t-test, Wilcoxon rank-sum test, chi-square test, the Fisher's exact test, ANOVA, and the Kruskal-Wallis test as appropriate. Survey responses were then aggregated and summarized. We evaluated associations between responses and physician and facility characteristics, including: gender; years of experience; physician and primary practice facility PCI volumes; publication number; performance of cardiac

catheterizations at >1 facility; number of half-day cardiac catheterization lab sessions per week; whether the primary facility trains resident physicians and/or nurses or has an interventional cardiology fellowship; whether the facility offers cardiac surgery and heart transplants; and number of cardiac intensive care unit (CICU) beds. We dichotomized Likert scale responses to facilitate these analyses. We also performed selected, hypothesis-driven investigations of associations between responses to multiple survey questions. For example, because trust of risk adjustment methods plausibly influences willingness to perform high-risk PCI, we tested for associations between these variables. Finally, we constructed multivariable logistic regression models to identify predictors of responses to questions about risk aversion. These models controlled for all patient and facility level covariates evaluated in the univariable analyses, and evaluated question-specific associations between responses and up to seven covariates with P-values ≤ 0.10 in univariable analysis (we limited the number of covariates being actively evaluated in order to avoid overfitting). Two covariates – age and completion of an interventional cardiology fellowship – were excluded due to multicollinearity with years of experience. A two-tailed P-value of ≤ 0.05 was considered statistically significant. Analyses were performed using SAS, 9.4 (Cary, NC).

Sensitivity Analysis To evaluate whether non-response bias influenced our survey findings, we constructed a logistic regression model with survey completion as the outcome and physician and hospital characteristics as predictors. We used the beta coefficients from this model to estimate each physician's predicted probability of survey completion. Respondents' answers to six questions about risk aversion and knowledge

and trust of risk adjustment methods were weighted with the inverse of their predicted probability of survey completion.⁴ This increased the weight of responses from physicians with lower probabilities of survey completion. We then evaluated for differences between the distributions of unweighted and weighted responses.

eAppendix 3: Healthcare Common Procedural Coding System (HCPCS) Codes for Percutaneous Coronary Intervention (PCI)

HCPCS Code	Definition
92920	Percutaneous transluminal coronary angioplasty; single major coronary artery or branch
92924	Percutaneous transluminal coronary atherectomy, with coronary angioplasty when performed; single major coronary artery or branch
92928	Percutaneous transcatheter placement of coronary stents, with coronary angioplasty when performed; single major coronary artery or branch
92933	Percutaneous transluminal coronary atherectomy, with intracoronary stent, with coronary angioplasty when performed; single major coronary artery or branch
92937	Percutaneous transluminal revascularization of or through coronary artery bypass graft (internal mammary, free arterial, venous), any combination of intracoronary stent, atherectomy and angioplasty, including distal protection when performed; single vessel
92941	Percutaneous transluminal revascularization of acute total/subtotal occlusion during acute myocardial infarction, coronary artery or coronary artery bypass graft, any combination of intracoronary stent, atherectomy and angioplasty, including aspiration thrombectomy when performed, single vessel
92943	Percutaneous transluminal revascularization of chronic total occlusion, coronary artery, coronary artery branch, or coronary artery bypass graft, any combination of intracoronary stent, atherectomy and angioplasty; single vessel

eAppendix 4: Methods Used to Calculate Each Physician's Years Practicing Interventional Cardiology

We used the following methods to estimate the number of years that physicians in the study cohort had been practicing interventional cardiology. At the outset, we obtained each physician's year of initial American Board of Internal Medicine (ABIM) board certification in interventional cardiology and general cardiology by sequentially entering each physician's National Provider Identification (NPI) number into the ABIM website's board certification search tool, which can be accessed online at www.abim.org. We then used the data to calculate years of experience practicing interventional cardiology. In making these calculations, we made the following assumptions in an effort to optimize the accuracy of our estimates.

The ABIM began offering board certification in interventional cardiology in 1999.

We assumed that interventional cardiologists who completed a formal interventional cardiology fellowship during or after 1999 took their ABIM board exams within one year of finishing their interventional cardiology fellowship and began practicing interventional cardiology within one year of passing their ABIM interventional cardiology boards.

Thus, we assumed that the year when these physicians initially passed the ABIM interventional cardiology boards closely approximates when they began independently practicing interventional cardiology (e.g. became attending interventional cardiologists).

We calculated these physicians' years of experience by subtracting the year when they passed the interventional cardiology boards from the year 2017.

Second, for interventional cardiologists who trained before board certification in interventional cardiology was available, we assumed that year of board certification in interventional cardiology would not accurately estimate the number of years that they had been practicing interventional cardiology. The ABIM has been offering the general cardiology board examination for more than 50 years, and the majority of practicing cardiologists took and passed this exam after completing their cardiology fellowship. Furthermore, many of these cardiologists learned how to perform cardiac catheterizations during their general cardiology fellowships, and did not complete a dedicated interventional cardiology fellowship. We therefore assumed that these older cardiologists—whom we defined as having first passed their general cardiology boards before 1997—began practicing interventional cardiology within one year of completing their general cardiology fellowship and passing the general cardiology ABIM board examination. We therefore calculated their years of experience by subtracting the year when they passed the general cardiology boards from the year 2017.

Third, we assumed that any older interventional cardiologists (e.g. who had been practicing interventional cardiology before the ABIM interventional cardiology boards were offered) who chose to take the ABIM interventional cardiology boards initially did so during the first three years that the ABIM offered this board exam (e.g. between 1999-2001). We therefore needed to distinguish between these older interventional cardiologists and younger interventional cardiologists who also passed their interventional cardiology board exams during this time period. Thus, for all interventional cardiologists who completed their ABIM interventional cardiology boards in 1999-2001,

we compared the year of ABIM board certifications in interventional cardiology and general cardiology. For cardiologists with at least a four year gap between completion of the general cardiology and interventional cardiology boards—for example, if a cardiologist passed the general cardiology boards in 1995 and the interventional cardiology boards in 2000—we assumed that the cardiologist had been practicing interventional cardiology since completing general cardiology fellowship, and calculated this physician's years of experience accordingly. For physicians with three or fewer years between passage of the general cardiology and interventional cardiology boards, we assumed that the year of completion of the interventional cardiology boards corresponded to the year when the physician began practicing interventional cardiology, and calculated years of experience using the year when the physician passed the general cardiology boards.

We assessed the accuracy of our estimation of years of experience practicing interventional cardiology by comparing survey respondents' estimated mean years of experience (i.e. our own calculated estimates) with their self-reported years of experience practicing interventional cardiology, which they provided in the survey. No significant differences were observed between the mean years of experience calculated using these two different experience estimates. We see no reason why the accuracy of our method for estimating experience should differ systematically between survey respondents and non-respondents, and therefore believe that this method for estimating experience should be equally valid and reliable for both respondents and non-respondents.

eTable 1: Hospital Characteristics of Respondents and Non-Respondents

Variable	Respondent Hospitals (N=149)	Non-Respondent Hospitals (N=307)	P-value*
Hospital Size—N (%)			
< 100 beds	10 (6.7)	14 (4.6)	.034
100-299 beds	32 (21.5)	40 (13.0)	
300-499 beds	34 (22.8)	63 (20.5)	
≥ 500 beds	73 (49.0)	190 (61.9)	
Hospital Profit Status—N (%)			
For-Profit	8 (5.4)	9 (2.9)	.50
Non-Profit	127 (85.2)	260 (84.7)	
Public	12 (8.1)	32 (10.4)	
Other	2 (1.3)	6 (2.0)	
Race/Ethnicity of Hospital's Inpatient Admissions—mean (SD)[†]			
White	82.1 (20.3)	78.3 (21.3)	.010
Black	8.4 (13.0)	9.8 (14.8)	.029
Hispanic	3.6 (9.2)	4.4 (9.8)	.13
Other	4.8 (4.5)	6.2 (5.6)	.024
CICU Present—N (%)			
Yes	107 (79.3)	243 (84.4)	.22
No	28 (20.7)	45 (15.6)	
Missing [‡]	14	19	
Cardiothoracic Surgery Available On-Site—N (%)	115 (85.2)	255 (88.5)	.35
Performs Heart Transplants—N (%)	41(30.4)	93 (32.3)	.74

SD – standard deviation; CICU: cardiac intensive care unit

*P-values calculated using T-tests, chi-square tests, Wilcoxon rank-sum tests, or ANOVAs as appropriate.

[†]Proportions for all hospital admissions, not just patients admitted for management of cardiovascular or coronary artery disease indications. [‡]An administrator at these hospitals did not respond to the question in the American Hospital Association Annual Survey about whether or not the hospital had a cardiac intensive care unit.

eTable 2: Comparison of Unweighted Survey Responses with Responses Weighted for Predicted Likelihood of Survey Response

UNWEIGHTED RESPONSES					WEIGHTED RESPONSES				
	Frequency	Percent	Cumulative Frequency	Cumulative Percent		Frequency	Percent	Cumulative Frequency	Cumulative Percent
QUESTION: How often have you decided not to perform PCI in a patient due, AT LEAST IN PART, to a concern that a bad outcome would negatively impact your own, or your facility's, publicly reported outcomes?									
More than 5 Times	56	37.6	56	37.6	More than 5 Times	107	34.5	107	34.5
2-5 Times	41	27.5	97	65.1	2-5 Times	89	28.6	196	63.2
Once	15	10.1	112	75.2	Once	25	8.1	221	71.3
Never	37	24.8	149	100.0	Never	89	28.7	311	100.0
QUESTION: To what extent do interventional cardiologists or hospitals in your state purposefully "up code" the comorbidities of PCI patients in an effort to "game the system" and make their outcomes appear better than they actually are?									
	Frequency	Percent	Cumulative Frequency	Cumulative Percent		Frequency	Percent	Cumulative Frequency	Cumulative Percent
To a Great Extent	37	24.8	37	24.8	To a Great Extent	88	28.3	88	28.3
To Some Extent	56	37.6	93	62.4	To Some Extent	120	38.5	207	66.8
Very Little	43	28.9	136	91.3	Very Little	85	27.5	293	94.3
Not at All	13	8.7	149	100.0	Not at All	18	5.8	311	100.0
QUESTION: How often have you been pressured by colleagues to perform PCI in a patient who you thought had a high risk of death with or without PCI?									
	Frequency	Percent	Cumulative Frequency	Cumulative Percent		Frequency	Percent	Cumulative Frequency	Cumulative Percent
Often	12	8.1	12	8.1	Often	26	8.3	26	8.3
Sometimes	45	30.2	57	38.3	Sometimes	72	23.3	98	31.7
Rarely	53	35.6	110	73.8	Rarely	130	41.8	228	73.4
Never	39	26.2	149	100.0	Never	83	26.6	311	100.0
QUESTION: How often do you think that other interventional cardiologists in your state decide not to perform PCI in a patient due, AT LEAST IN PART, to a concern that a bad outcome would negatively impact their own, or their facility's, publicly reported outcomes?									

	Frequency	Percent	Cumulative Frequency	Cumulative Percent		Frequency	Percent	Cumulative Frequency	Cumulative Percent
To a Great Extent	74	49.7	74	49.7	To a Great Extent	155	49.9	155	49.9
To Some Extent	67	45.0	141	94.6	To Some Extent	145	46.6	300	96.5
Very Little	8	5.4	149	100.0	Very Little	11	3.5	311	100.0
QUESTION: Overall, how much do you know about the methods used by public reporting systems to risk adjust outcomes for patients' severity of illness?									
	Frequency	Percent	Cumulative Frequency	Cumulative Percent		Frequency	Percent	Cumulative Frequency	Cumulative Percent
Nothing or Very Little	28	18.8	28	18.8	Nothing or Very Little	51	16.5	51	16.5
Some or A Lot	121	81.2	149	100.0	Some or A Lot	259	83.5	311	100.0
QUESTION: How much do you trust that risk adjustment methodologies used by public reporting systems for PCI outcomes accurately account for patients' severity of illness and risk of death?									
	Frequency	Percent	Cumulative Frequency	Cumulative Percent		Frequency	Percent	Cumulative Frequency	Cumulative Percent
Some or A Lot	39	26.2	39	26.2	Some or A Lot	72	23.1	72	23.1
Very Little or Not at All	110	73.8	149	100.0	Very Little or Not at All	239	76.9	311	100.0

This table presents the results of a sensitivity analysis designed to evaluate whether non-response bias influenced survey outcomes. Unweighted responses are the actual survey responses the six questions about risk aversion and knowledge and trust of risk adjustment which were included in this analysis. Weighted survey responses were calculated using the following methods: First, a logistic regression model was estimated in which survey completion was the bimodal outcome and all physician and hospital characteristics described in Tables 1 and 2 in the main manuscript were included as covariates. Next, the beta coefficients from this model were used to estimate each respondent's and non-respondent's predicted probability of responding to the survey. Responses to the six questions in this analysis were then were then weighted by the inverse of each respondent's predicted probability of survey response—effectively reducing the weight responses from physicians with high probabilities of responding to the survey and increasing the weight (and impact on the overall distribution of responses) of responses from physicians with a low likelihood of survey completion. Unweighted responses were then evaluated alongside weighted responses to determine if weighting resulted in significant changes to the response distribution.

eTable 3: Predictors of Responses to Questions about Risk Aversion in Univariable and Multivariable Analysis

Question: “How often have you been pressured by colleagues to avoid performing an indicated PCI due to a concern that the patient was at high-risk of death?”				
Predictor Variable	Odds of responding Often / Sometimes vs. Rarely / Never			
	Unadjusted OR (95% CI)	P-value	Adjusted OR (95% CI)	P-value
Number of CICU beds at primary practice facility—per additional bed	0.46 (0.20, 1.06)	.07	0.46 (0.19, 1.09)	.08
Years of experience practicing interventional cardiology—per 1 year	0.94 (0.90, 0.98)	.003	0.94 (0.90, 0.98)	.002
Question: “Have you, or a colleague at your facility, ever TRANSFERRED A SICK PATIENT who needed coronary angiography and/or PCI to another facility in order to avoid taking on the risk of performing PCI in this patient?”				
Predictor Variable	Odds of responding Yes vs. No			
	Unadjusted OR (95% CI)	P-value	Adjusted OR (95% CI)	P-value
Publication number—per 1 publication	0.97 (0.93, 1.001)	.06	0.97 (0.94, 1.01)	.12
Number of PCI performed at primary practice facility in 2015—per 100 PCI	0.88 (0.82, 0.95)	.0004	0.90 (0.81, 0.99)	.02
Primary practice facility trains medical students, residents, fellows, and/or nurses	6.37 (1.56, 25.93)	.01	0.119 (0.01, 1.47)	.10
Question: “How often have you decided not to perform PCI in a patient due, AT LEAST IN PART, to a concern that a bad outcome would negatively impact your own, or your facility's, publicly reported outcomes?”				
Predictor Variable	Odds of responding > 5 times / 2-5 times vs. Once / Never			
	Unadjusted OR	P-value	Adjusted OR	P-value
Practice in MA (NY is reference)	0.52 (0.26, 1.04)	.07	--	--
Question: “How often do you think that other interventional cardiologists in your state decide not to perform PCI in a patient due, AT LEAST IN PART, to a concern that a bad outcome would negatively impact their own, or their facility's, publicly reported outcomes?”				
Predictor Variable	Odds of responding Often / Sometimes vs. Rarely / Never			
	Unadjusted OR (95% CI)	P-value	Adjusted OR (95% CI)	P-value
Years of experience practicing interventional cardiology—per 1 year	0.92 (0.85, 0.99)	.04	0.90 (0.83, 0.98)	.02
Number of PCI performed at primary practice facility in 2015—per 100 PCI	1.16 (0.99, 1.37)	.07	1.22 (1.01, 1.47)	.04

Question: <i>“To what extent does public reporting of PCI outcomes lead interventional cardiologists at your facility to avoid performing PCI in patients with high anticipated mortality, and who may derive significant clinical benefits from PCI?”</i>				
Predictor Variable	Odds of responding To a great extent / To some extent vs. Very little / Not at all			
	Unadjusted OR (95% CI)	P-value	Adjusted OR (95% CI)	P-value
Physician performs cardiac catheterizations at > 1 facility	0.51 (0.27, 0.99)	.05	--	--
Question: <i>“How often do you delay CORONARY ANGIOGRAPHY or PCI in a cardiac arrest patient because of worry that the patient's risk of death is high regardless of whether or not you perform PCI?”</i>				
Predictor Variable	Odds of responding Often / Sometimes vs. Rarely/Never			
	Unadjusted OR (95% CI)	P-value	Adjusted OR (95% CI)	P-value
Physician performs cardiac catheterizations at > 1 facility	2.32 (1.12, 4.82)	.01	2.42 (1.15, 5.08)	.02
Primary practice facility performs heart transplants	0.49 (0.23, 1.05)	.07	0.47 (0.21, 1.01)	.05
Question: <i>“To what extent do interventional cardiologists or hospitals in your state purposefully “up code” the comorbidities of PCI patients in an effort to “game the system” and make their outcomes appear better than they actually are?”</i>				
Predictor Variable	Odds of responding To a great extent / To some extent vs. Very little / Not at all			
	Unadjusted OR (95% CI)	P-value	Adjusted OR (95% CI)	P-value
Physician performs cardiac catheterizations at > 1 facility	1.85 (0.94, 3.61)	.07	--	--
Question: <i>“When considering whether to perform an indicated PCI in a critically ill patient, how much do you worry about whether your supervisor(s) will support your decision to perform PCI if the patient dies later in their hospitalization of a complication related to their PCI?”</i>				
Predictor Variable	Odds of responding A lot / Some vs. Very little / Not at all			
	Unadjusted OR (95% CI)	P-value	Adjusted OR (95% CI)	P-value
Years of experience practicing interventional cardiology—per 1 year	0.96 (0.93, 1.00)	.06	0.96 (0.93, 1.00)	.05
Primary practice facility performs cardiothoracic surgeries	2.46 (0.88, 6.84)	.09	2.46 (0.88, 6.93)	.09
Question: <i>“When considering whether to perform an indicated PCI in a critically ill patient, how much do you worry about whether</i>				

your supervisor(s) will support your decision to perform PCI if the patient dies later in their hospitalization of a condition unrelated to the PCI?"

Predictor Variable	Odds of responding A lot / Some vs. Very little / Not at all			
	Unadjusted OR (95% CI)	P-value	Adjusted OR (95% CI)	P-value
Years of experience practicing interventional cardiology—per 1 year	0.96 (0.92, 0.99)	.02	--	--

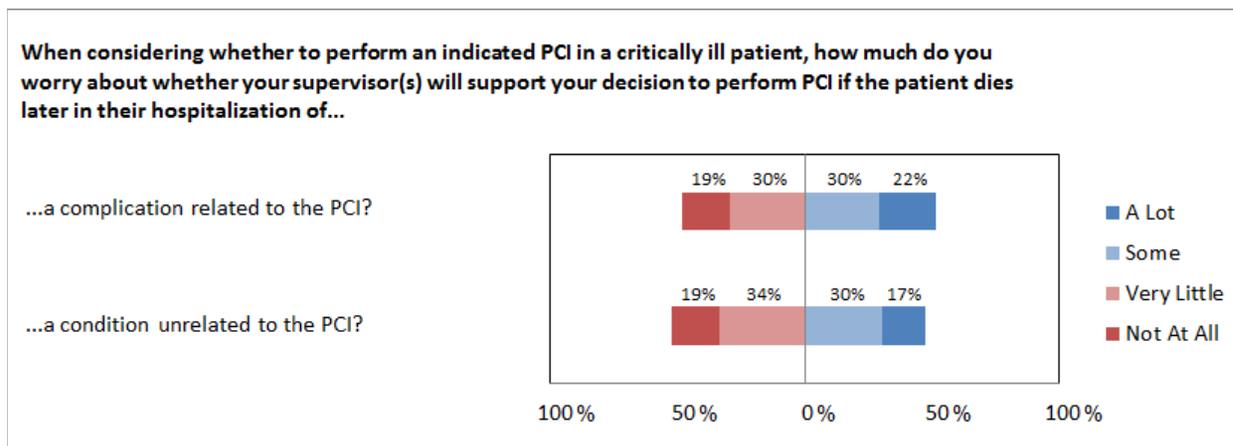
Question: *“How much do you trust that risk adjustment methodologies used by public reporting systems for PCI outcomes accurately account for patients’ severity of illness and risk of death?”*

Predictor Variable	Odds of responding A Lot / Some vs. Very little / Not at all			
	Unadjusted OR (95% CI)	P-value	Adjusted OR (95% CI)	P-value
Years of experience practicing interventional cardiology—per 1 year	1.04 (1.01, 1.09)	.03	1.05 (1.01, 1.09)	.01
Practice in MA (NY is reference)	2.50 (1.18, 5.26)	.02	2.17 (0.97, 4.76)	.06
Number of PCI performed at primary practice facility in 2015—per 100 PCI	0.99 (0.99, 1.00)	.02	0.99 (0.99, 1.00)	.05

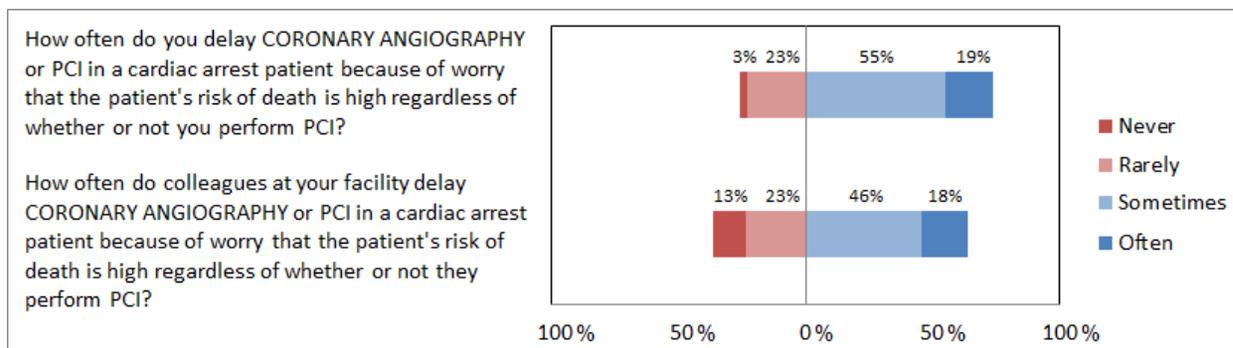
CI: confidence interval; MA: Massachusetts; NY: New York; OR: odds ratio; PCI: percutaneous coronary intervention; SD – standard deviation

This table presents unadjusted and adjusted odds ratios for selected physician- and primary practice facility-level covariates which were associated with responses to a specific question in univariable analyses (defined by a P-value ≤ 0.10). Covariates evaluated include: physician gender; years of experience practicing interventional cardiology; physician’s PCI volume in 2015; publication number; performance of cardiac catheterizations at > 1 facility; number of half-day sessions worked in the cardiac catheterization lab per week; primary practice facility PCI volume in 2015; whether the primary facility trains resident physicians and/or nurses; whether the primary facility has an interventional cardiology fellowship; whether the primary facility offers cardiac surgery; whether the primary facility performs heart transplants; and number of cardiac intensive care unit beds at the primary facility.

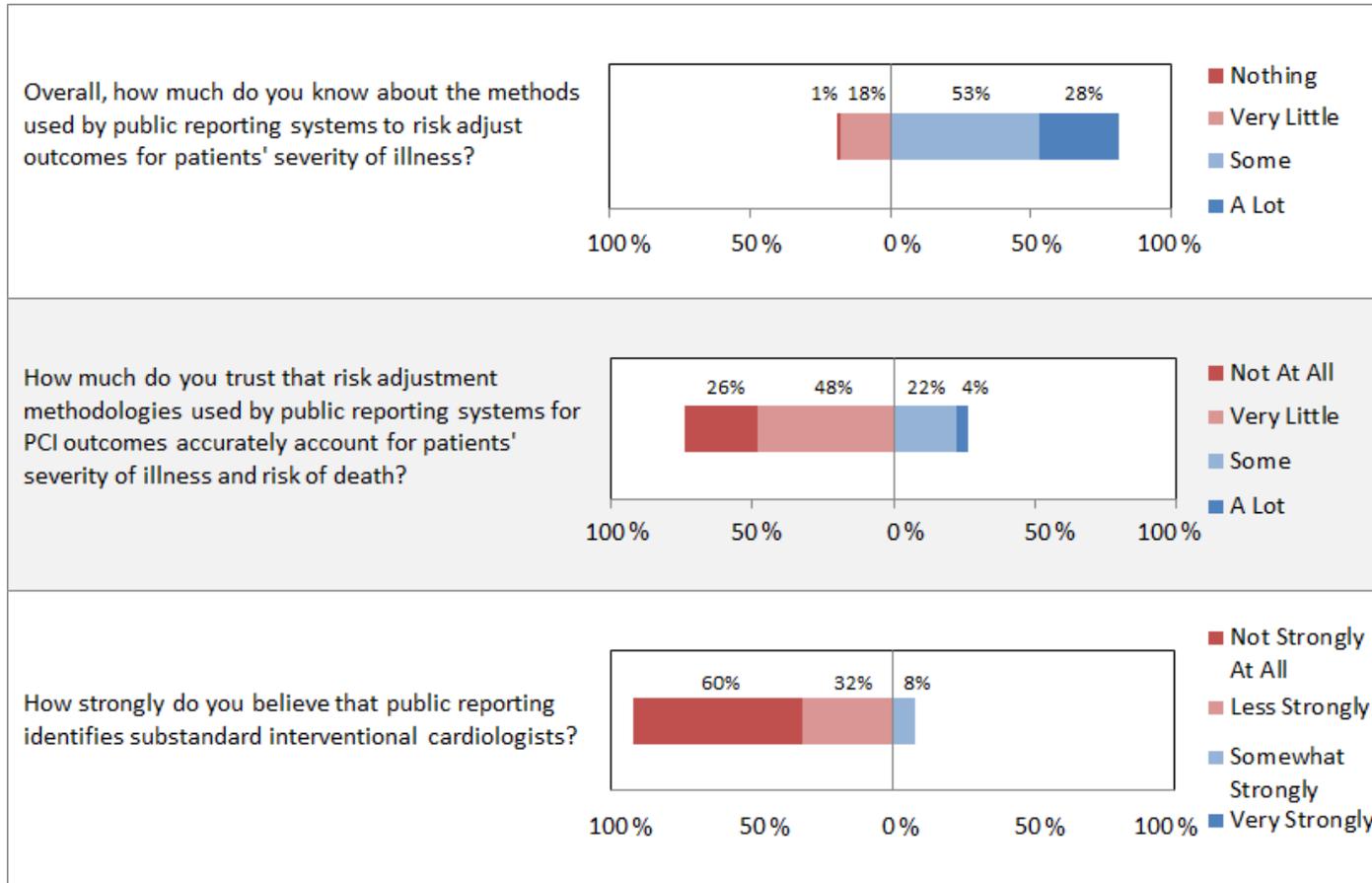
eFigure 1: Respondents' Views on Supervisory Support for Performing Percutaneous Coronary Interventions In Patients Who Die Later in Their Hospitalization



eFigure 2: Degree to Which Respondents Worry About How Procedural Complications Will Impact Their Own or Their Facility's Reputation

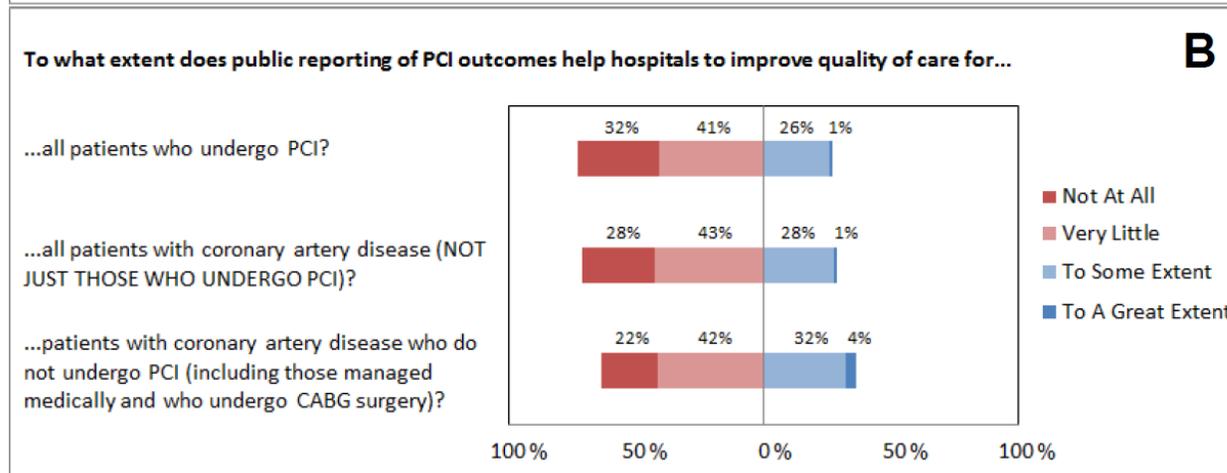
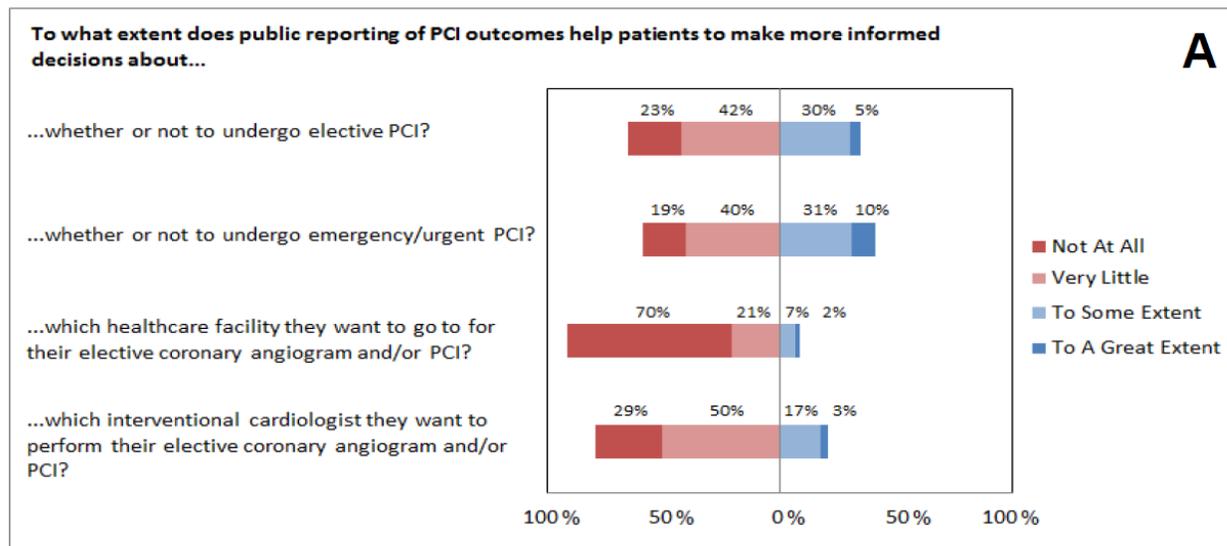


eFigure 3: Respondents' Knowledge and Trust of Risk-Adjustment Methods used by Public Reporting Systems



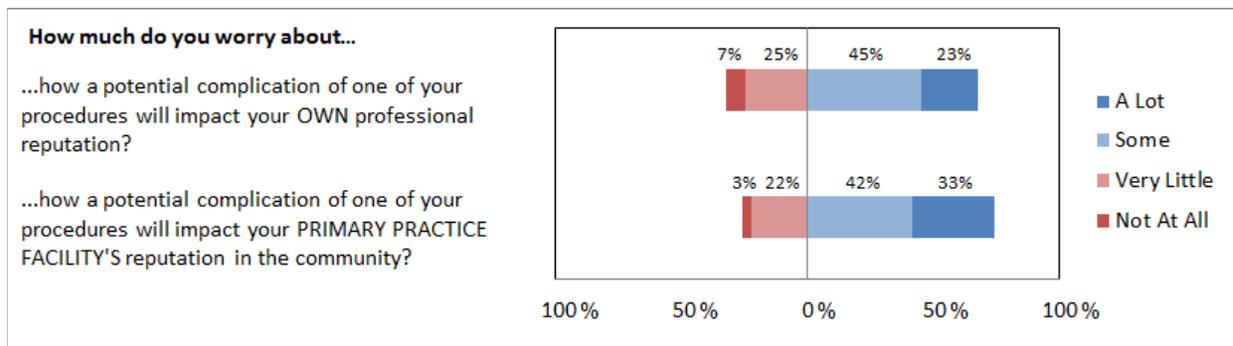
Legend: This figure presents the responses of 149 interventional cardiologists in Massachusetts and New York to questions about their knowledge of the risk adjustment methods used by public reporting systems; their trust of these risk-adjustment methods; and their beliefs about the ability of public reporting systems to identify substandard interventional cardiologists.

eFigure 4: Respondents' Beliefs About Whether and How PCI Public Reporting Facilitates Hospital Quality Improvement Efforts and Patient Informed Decision Making

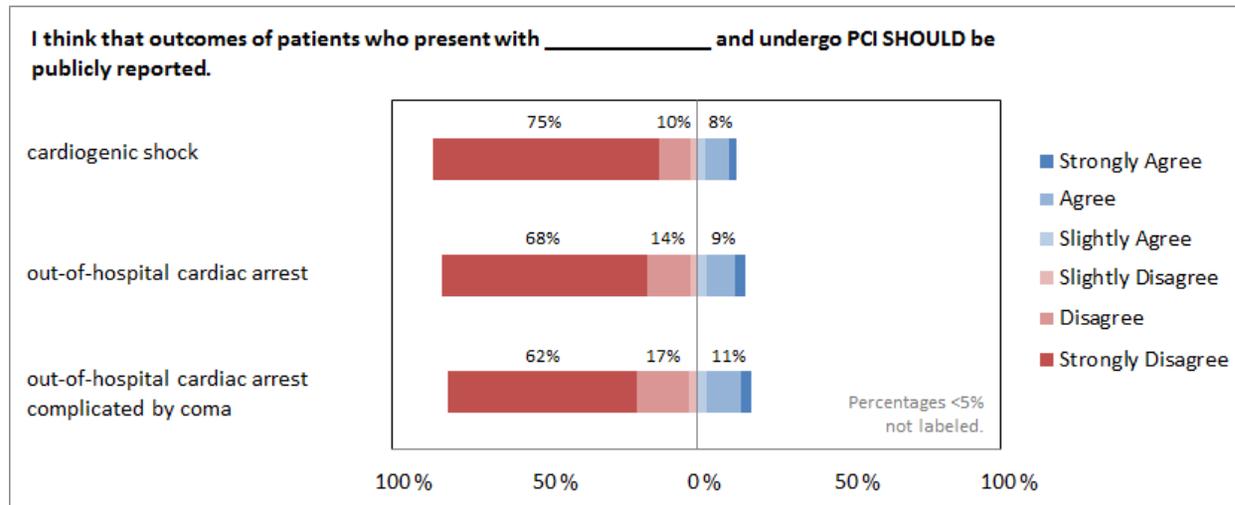


Legend: eFigure 4A presents the responses of 149 interventional cardiologists in Massachusetts and New York to three distinct questions about how public reporting of PCI outcomes facilitates hospital-level quality improvement efforts. eFigure 4B presents the responses of 149 interventional cardiologists in Massachusetts and New York to four questions about if and how public reporting of PCI outcomes helps patients make more informed decisions about undergoing PCI.

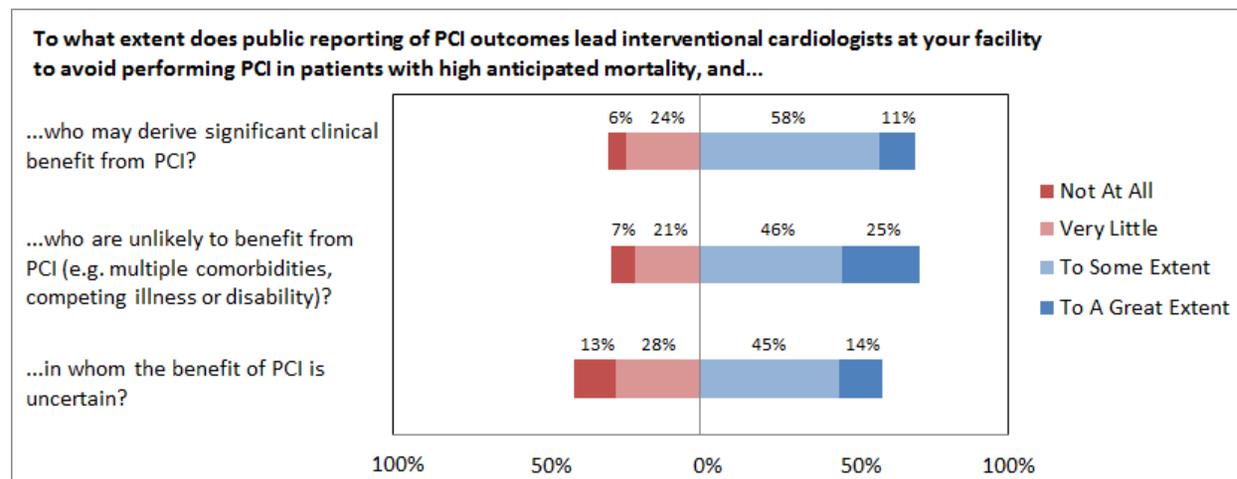
eFigure 5: Degree to Which Respondents Worry About A How Procedural Complications Will Impact Their Own or Their Facility’s Reputation



eFigure 6: Respondents' Views on Public Reporting of PCI Outcomes in Patients with Cardiogenic Shock, Cardiac Arrest, and Cardiac Arrest Complicated by Coma



eFigure 7: Influence of Public Reporting of PCI Outcomes on Avoidance of High-Risk Patients With Different Perceived Likelihoods of Benefiting from PCI



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