



# Public Perceptions of Overlapping Surgery

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- BACKGROUND:** Overlapping surgery is highly contentious, both in terms of the safety of the practice and the degree to which patients should be informed. However, no study has surveyed attitudes of the general public toward overlapping surgery and willingness to consent to such a procedure.
- STUDY DESIGN:** A survey on overlapping surgery was completed by participants using Amazon Mechanical Turk, an online crowd-sourcing worksite. Responders completed a 51-question survey on their knowledge of overlapping surgery, expectations on disclosure during the informed consent process, and their willingness to participate in such a procedure. In addition, responders completed the Health Care System Distrust Scale.
- RESULTS:** The survey was completed by 1,454 respondents. Median age was 33 years (range 21 to 74 years). Only 56 respondents (3.9%) had any knowledge of the practice of overlapping surgery. Overall, 440 respondents (31%) supported or strongly supported this practice. The majority of respondents believed that the attending surgeon should inform them in advance of overlapping surgery (94.7%), define what the critical components of the operation are (95.6%), and document what portion of the operation he or she was present for (91.5%).
- CONCLUSIONS:** A small minority of the general public is aware of the practice of overlapping surgery. The majority of responders were not supportive of the practice, although would consider it acceptable in specific circumstances. However, responders consistently reported that the practice of overlapping surgery should be disclosed during the informed consent process. (J Am Coll Surg 2017;224:771–778. © 2017 by the American College of Surgeons. Published by Elsevier Inc. All rights reserved.)

Overlapping surgery is a long-standing practice in academic medical centers.<sup>1</sup> This practice can be defined as 2 operations being performed in separate operating rooms under the supervision of 1 attending surgeon. Typically, a qualified surgical trainee is assigned to an individual room and might be asked to perform noncritical components of the operation without direct supervision of the attending surgeon. The safety of this practice is unknown, as it has not been the subject of rigorous scientific inquiry. Nonetheless, overlapping surgery is well established in many surgical training programs. Proponents of this practice suggest that it improves efficiency of care and resource use, and is valuable for resident training.<sup>1</sup>

Although overlapping surgery might be familiar to surgeons and their trainees, it is not clear whether patients

and their families are aware of this practice. Indeed, recent media coverage of overlapping surgery<sup>2,3</sup> and the vocal reactions by legislators<sup>4</sup> suggest that the public is not generally aware of overlapping surgery.

The current study was undertaken to examine the attitudes of the public toward overlapping surgery. In particular, we sought to understand whether the practice of overlapping surgery should be discussed during the process of informed consent. In addition, we aimed to understand whether the practice was known to survey respondents, under what conditions overlapping surgery would be considered acceptable, and whether attitudes toward overlapping surgery correlated with specific demographics.

## METHODS

### Survey design

This study was approved by the Beth Israel Deaconess Medical Center IRB (Protocol 2016P-000004).

A 51-question survey was developed to survey the attitudes of the general public toward overlapping surgery (see eDocument 1). Demographic information such as age, sex, education level, ethnicity, household income,

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and earlier surgery was obtained. Participants were randomly assigned to read 1 of 3 scenarios in which overlapping surgery was described (ie hip replacement, craniotomy for resection of a brain tumor, and cardiac valve replacement). These procedures were selected as ones that the general public is likely to be familiar with, and are associated with varying levels of perceived risk. The scenarios were identical except for the specific surgical procedure.

After the scenario, respondents were asked to comment on what aspects of the operation they should be informed about, both before and after surgery. A 4-point Likert scale was used (strongly agree, agree, disagree, and strongly disagree). A neutral response was not included as an option. Respondents were specifically asked about overlapping surgery and the role of trainees during the procedure. In addition, participants were asked about issues that are expected to be discussed in the informed consent process, such as perceived risks, benefits, and complications of the proposed operation. Respondents were also asked about issues that could be considered peripheral to the standard informed consent process, such as temperature of the operating room. Finally, participants were asked about their views of anesthesiologists who might be in multiple operating rooms during surgery.

The practice of overlapping surgery was then specifically described to respondents. Participants were subsequently asked general questions about their views on overlapping surgery and under what conditions this practice could be considered acceptable (eg an emergency operation or an operation that is considered low risk). We also asked respondents to identify what components of the operation they considered to be critical for each of the 3 scenarios. In addition, we asked respondents for their views on whether they would see a surgeon who performs overlapping operations, and whether they would be willing to wait a longer time period to have an operation that is not overlapping with another procedure.

Respondents subsequently completed the 9-question Health Care System Distrust Scale.<sup>5</sup> Higher scores indicate more distrust. To conclude the survey, respondents were provided an opportunity to give freeform answers to describe why they considered overlapping surgery to be acceptable or unacceptable.

### Participant enrollment

We recruited potential participants on Amazon Mechanical Turk (commonly known as mTurk, [www.mturk.com](http://www.mturk.com)), which is an online crowd-sourcing worksite where workers can complete tasks (eg surveys, review photographs or videos, and translations) for a nominal payment. Requesters post human intelligence tasks and

workers can respond to those that they are interested in completing. Amazon Mechanical Turk is increasingly being used in the social and behavioral sciences, as it yields results that are comparable with more traditional survey methods.<sup>6-8</sup> The survey population was constructed to be representative of the adult US population in terms of ethnicity and education level.<sup>9</sup> Participants were eligible for the survey if they were 21 years of age or older and residents of the US.

### Statistical methods

For comparing survey responses across the 3 randomized survey groups (ie hip replacement, craniotomy for resection of a brain tumor, and cardiac valve replacement), a total sample size of 650 respondents was needed to detect a statistically significant proportional difference with power of 0.80 and type I error rate at 5%.

When combining all 3 groups, to achieve a 95% confidence level using a CI of 3 (ie 3% margin of error), a sample size of 1,068 was needed. However, we targeted enrollment of 1,500 survey respondents to ensure sufficient representation of racial and ethnic minorities in the survey sample.

Initial exploratory descriptive data analysis was performed to characterize the study population demographics and the responses to each question. Univariate analysis using the chi-square test for categorical data and the *t*-test, one-way ANOVA, or Mann-Whitney U test for continuous data was performed to compare responses between groups categorized by demographics such as sex, age, ethnicity, and education level.

Multivariate logistic regression models were created to identify characteristics associated with those unresponsive to overlapping surgery. To do so, response categories were collapsed to construct a dichotomous variable (agree = strongly support or support, disagree = strongly oppose or oppose). Given the large number of univariate tests, we used Bonferroni correction to control for the per-family error rate.<sup>10</sup> All data analysis was performed using SPSS, version 18.0 (SPSS Inc).

### RESULTS

A total of 1,519 mTurk workers responded to the human intelligence task request. Overall, 1,454 respondents met eligibility criteria and completed the entire survey, forming the basis for the current study.

The overall demographics of the study population are shown in [Table 1](#). Participants were well matched to the US adult population with regard to ethnicity and education level based on US Census data. The median age of the respondents was 33 years (range 21 to 74 years).

A majority of respondents ( $n = 817$  [56.2%]) had undergone at least 1 surgical procedure. There were no significant differences in demographics among respondents to the clinical vignettes.

### Response to clinical scenarios

Among the 1,454 participants, 474 were assigned the orthopaedic scenario, 502 the neurosurgical scenario, and 478 the cardiac surgical scenario. Specific responses are shown in Table 2. A large majority of respondents believed that the surgeon should discuss the nature of the surgical procedure ( $n = 1,410$  [97%]), treatment options ( $n = 1,338$  [92%]), as well as potential benefits ( $n = 1,409$  [96.9%]) and risks ( $n = 1,417$  [97.5%]) before the operation.

With regard to issues surrounding trainees and overlapping surgery, the majority of respondents believed that this information should also be disclosed before surgery.

Specifically, 85.5% ( $n = 1,244$ ) thought that they should be informed as to who would be in the operating room during the procedure, and 83.5% ( $n = 1,215$ ) thought that the specific role of trainees should be disclosed. When specifically asked about the scheduling of overlapping surgery, a smaller majority ( $n = 939$  [64.6%]) thought this should be disclosed. A similar proportion of respondents ( $n = 892$  [61.4%]) thought they should be informed of anesthesiologists who are scheduled to cover simultaneous procedures.

Responses were similar on disclosure of information after completion of surgery. For example, 96.1% of respondents agreed that complications that occurred during surgery should be disclosed. A smaller proportion thought that information on the specific role of trainees ( $n = 1,073$  [73.8%]) or whether the surgeon left the operating room during the procedure ( $n = 852$  [58.6%]) should be discussed.

**Table 1.** Sociodemographics by Clinical Scenario

Characteristic	Overall ( $n = 1,454$ )	Scenario 1* ( $n = 474$ )	Scenario 2† ( $n = 502$ )	Scenario 3‡ ( $n = 478$ )	p Value
Age, y, median (range)	33 (21–74)	33 (21–72)	33 (21–74)	32 (21–73)	0.81
Sex, n (%)					0.70
Male	794 (54.6)	260 (54.9)	267 (53.2)	267 (55.9)	
Female	660 (45.4)	214 (45.1)	235 (46.8)	211 (44.1)	
Race, n (%)					0.90
White	1,081 (74.3)	359 (75.7)	372 (74.1)	350 (73.2)	
Black or African American	219 (15.1)	71 (15.0)	75 (14.9)	73 (15.3)	
Asian	69 (4.7)	20 (4.2)	25 (5.0)	24 (5.0)	
American Indian or Alaskan Native	9 (0.6)	1 (0.2)	5 (1.0)	3 (0.6)	
Native Hawaiian or other Pacific Islander	3 (0.2)	1 (0.2)	0 (0)	2 (0.4)	
More than one	71 (4.9)	22 (4.6)	24 (4.8)	25 (5.2)	
Unknown	2 (0.1)	0 (0)	1 (0.2)	1 (0.2)	
Ethnicity, n (%)					0.49
Hispanic or Latino	196 (13.5)	57 (12.0)	69 (13.7)	70 (14.6)	
Not Hispanic or Latino	1,252 (86.1)	415 (87.6)	430 (85.7)	407 (85.1)	
Unknown	6 (0.4)	2 (0.4)	3 (0.6)	1 (0.2)	
Education, n (%)					0.98
Less than high school	8 (0.6)	3 (0.6)	3 (0.6)	2 (0.4)	
High school graduate or GED	194 (13.3)	58 (12.2)	72 (14.3)	64 (13.4)	
Attended some college	454 (31.2)	143 (30.2)	158 (31.5)	153 (32.0)	
College graduate	652 (44.8)	219 (46.2)	221 (44.0)	212 (44.4)	
Professional degree	146 (10.0)	51 (10.8)	48 (9.6)	47 (9.8)	
Household income, n (%)					0.63
High (>\$50,000)	652 (44.8)	204 (43.0)	231 (46.0)	217 (45.4)	
Low/normal ( $\leq$ \$49,999)	800 (55)	269 (56.8)	271 (54.0)	260 (54.4)	
Unknown	2 (0.1)	1 (0.2)	0 (0)	1 (0.2)	

\*Scenario 1: hip replacement.

†Scenario 2: craniotomy for tumor resection.

‡Scenario 3: cardiac valve replacement.

GED, General Educational Development.

**Table 2.** Specific Responses to Clinical Scenario Questions (n = 1,454)

Question	Response, strongly agree/agree	
	n	%
Before the day of your operation, Dr Green should tell you about:		
The specific nature of the surgical procedure (ie the details of what will be done)	1,410	97
The treatment options, other than surgery, for your specific medical condition	1,338	92
The expected results and possible benefits of surgery	1,409	96.9
The possible risks and complications of surgery	1,417	97.5
The possible risks and complications of anesthesia (that is, sleep medicine)	1,385	95.3
How long the surgery is expected to last	1,407	96.8
Who will be in the operating room during the surgery	1,244	85.6
The temperature of the operating room	389	26.8
Whether any pictures or videos of the surgery will be taken and how they will be used	1,223	84.1
What role the surgery resident (someone in training) will have during the operation	1,215	83.6
Whether your surgeon is scheduled to perform any other operations that may overlap with your surgery	939	64.6
Whether your anesthesiologist is scheduled to handle other surgical cases that may overlap with your surgery	892	64.6
How much you will have to pay out-of-pocket for the surgery	1,084	74.6
How much your insurance company will have to pay for the surgery	980	67.4
How much experience your surgeon has doing this type of operation	1,314	90.4
After your operation, Dr Green should tell you about:		
The surgery did not take as long as expected	1,106	76.1
The surgery took longer than expected	1,181	81.2
Temperature changes in the operating room during surgery	241	16.6
Whether any pictures or videos of the surgery were taken and how they will be used	1,248	85.8
Whether the surgery resident (someone in training) performed any part of the operation	1,073	73.8
Whether your surgeon left the operating room for any reason during your surgery	852	58.6
Whether your anesthesiologist left the operating room for any reason during your surgery	792	54.5
Complications during the surgery	1,397	96.1

### Specific views on overlapping surgery

When overlapping surgery was described specifically, only 31% (n = 450) supported the practice. However, 70.3% (n = 1,022) agreed that overlapping surgery is acceptable under specific circumstances. Circumstances in which >50% of respondents thought that overlapping surgery would be acceptable are when the expected risks of the operation are low (64.7% [n = 940]), there is an emergency in another operating room (60.9% [n = 885]), either the primary surgeon (53.3% [n = 778]) or resident (58% [n = 844]) is highly experienced with the procedure, or at least 2 of the surgeons are no longer in training (60.9% [n = 886]).

With regard to the critical components of the procedure, respondents clearly discriminated between preparatory phases of surgery and the key portion. For example, only 12.3% (n = 179) of respondents thought that positioning of the patient was a critical component,

and 82.5% (n = 1,199) thought that performance of the central component of the procedure (eg replacement of the hip or cardiac valve or removal of the tumor) was critical. Respondents also replied that the surgeon should disclose what the critical components of the operation are (95.6% [n = 1,391]).

Similarly, a large majority of participants agreed that overlapping surgery should be discussed both before (94.7% [n = 1,378]) and after (91.5% [n = 1,331]) the procedure. However, 57.5% of respondents (n = 835) would be willing to see a surgeon who performs overlapping surgery. In addition, 77.9% of survey participants (n = 1,132) were willing to wait up to a month longer to schedule surgery that was not overlapping.

### Multivariate analysis

Results of the univariate and multivariate analysis are shown in Tables 3 and 4. In general, older respondents,

female respondents, and those with higher distrust of the healthcare system were more likely to have an unfavorable attitude toward overlapping surgery. Those who have undergone earlier surgery were more likely to have a favorable attitude toward overlapping surgery and less likely to think that the surgeon should disclose overlapping surgery either before or after the procedure.

In multivariate analysis, significant predictors of an “oppose” response to the specific question: “In general, do you support or oppose the scheduling of overlapping operations by the same surgeon?” are as follows: female sex (odds ratio [OR] = 1.71; 95% CI 1.35 to 2.16;  $p < 0.001$ ), higher annual household income (OR = 1.38; 95% CI 1.09 to 1.74;  $p = 0.0082$ ), and higher healthcare system distrust (OR = 1.07; 95% CI 1.06 to 1.09;  $p < 0.001$ ).

### Selected freeform comments about overlapping surgery

Survey participants were provided the opportunity to provide freeform comments about overlapping surgery.

#### Favorable views toward overlapping surgery

For those who had favorable views toward overlapping surgery, there was a strong sense that such a practice increases efficiency and allows the surgeon to focus exclusively on the most critical components of the surgery.

*A good surgeon's time is limited and wasting time on non-critical parts of the surgery is pointless. I would rather the surgeon spread his skills around so that more people can benefit. Additionally, non-critical areas of surgery are good practice for up-and-coming surgeons. (48-year-old Hispanic female)*

*I feel the surgeon in residency has enough experience for the non-critical role and this allows the surgeon to use his time wisely for the greater benefit of all patients. (27-year-old black male)*

*The surgeon/doctor will be able to do more operations if he/she is able to conduct overlapping operations.*

*This is especially true with renowned medical professionals. Each patient will have the doctor for the most important parts of the surgery, and to me, that's what is most important. (21-year-old Asian male)*

#### Unfavorable views toward overlapping surgery

The overwhelming theme among those with unfavorable views toward overlapping surgery is the concern or worry that complications or problems can arise in the absence of the most-experienced surgeon.

*Complications in both surgeries could cause imperfections in surgery since the doctor is dealing with two surgeries. (30-year-old black male)*

*There's no way to know if an unexpected complication will arise while the chief surgeon is away, with the other surgery. All surgeries are a risk, and the idea that the primary surgeon might not even be in the room if an emergency arises is what is unacceptable. (56-year-old black female)*

*With overlapping operations, the doctor's attention will not be concentrated on one patient and mistakes can be made. (39-year-old Hispanic male)*

## DISCUSSION

Although there is a clear consensus that informed consent must be obtained before a surgical procedure, there is less consensus about what constitutes adequate informed consent in specific cases. The goal of the informed consent process is to ensure that patients who agree to surgery do so with a clear understanding of the potential benefits and risks of the proposed surgery, as well as alternatives.<sup>11</sup> From the legal perspective, informed consent requires the physician to “disclose material information that would be necessary for a reasonable patient to make an informed decision.”<sup>12</sup>

In practice, the fulfillment of these goals and mandates might be difficult. Several studies have documented poor recall of information provided to patients, regardless of

**Table 3.** Univariate Analysis

Variable	Support (n = 450)	Oppose (n = 1,004)	p Value
Age, y, mean (SD)	35.3 (10.4)	36.0 (11.3)	0.23
Sex, female, n (%)	158 (35.1)	502 (50)	<0.001
Race (white, non-Hispanic), n (%)	305 (67.8)	658 (65.5)	0.41
Income (high), n (%)	182 (40.4)	470 (46.8)	0.02
Healthcare distrust, mean (SD)	24.4 (6.6)	27.7 (6.8)	<0.001
Earlier operation (yes), n (%)	238 (52.9)	579 (57.7)	0.09

**Table 4.** Multivariate Analysis

Variable	Odds ratio	95% CI	p Value
Sex, female	1.71	1.35–2.16	<0.001
Income (high)	1.38	1.09–1.74	0.007
Healthcare distrust	1.07	1.06–1.09	<0.001

the manner in which the information is presented.<sup>13,14</sup> Additionally, it might be difficult to determine what a “reasonable” patient would wish to know. Certainly, expectations for information vary across individuals, and a specific patient might desire more or less information, or different information, than a reasonable person might desire. In addition, surgeons might debate the amount and kinds of information to disclose. For example, is it preferable to disclose all potentially relevant information, with the likelihood that recall might be lower? Or is it preferable to focus on providing less information that is more critical?<sup>15</sup>

In this context, a discussion of informed consent and overlapping surgery is particularly challenging. Importantly, no publications have provided evidence on the safety of this practice. The single report on overlapping surgery was presented in abstract form in 2015 and has not been published.<sup>16</sup> Consequently, a discussion about the perceived advantages and disadvantages of this practice might be informed by personal opinion or the judgments of institutional or professional entities, but cannot be supported by rigorous data. Additionally, surgeons might be reluctant to discuss a custom that is considered integral to surgical training and embedded in their day-to-day practice. It has been well documented, for example, that surgeons are reticent to disclose involvement of trainees in a surgical procedure.<sup>17</sup> Strikingly, a detailed survey of 30 surgeons in a major academic center revealed that 83% did not volunteer information about trainees’ participation in surgery.<sup>18</sup> However, 77% of attending surgeons acknowledged that they allowed residents to operate when they were not present in the operating room.

The current study was undertaken to survey attitudes of the general public about overlapping surgery. Although editorial articles have been published recently,<sup>1,19,20</sup> no study has investigated whether the public is aware of this practice and the degree to which it is considered acceptable.

The results of this survey suggest that the general public takes a nuanced view toward overlapping surgery. Importantly, only a very small minority (3.9%) were aware of this practice before the survey. In the context of specific clinical vignettes, the majority of participants (64.6%)

thought that overlapping surgery should be disclosed. However, a significantly greater proportion of respondents (>95%) thought that the complications, risks, and benefits of a procedure should be disclosed, and a far smaller minority thought that peripheral information (eg the temperature of the operating room) should be disclosed. This suggests that participants were selective in the information they wish to be provided.

The survey did not provide any specific information on potential advantages or disadvantages of overlapping surgery to participants. Although the majority of participants opposed or strongly opposed the practice, 31% were supportive. In addition, a majority of respondents expressed support for the practice in specific situations, such as an emergency, or when the attending surgeon or resident has considerable experience in the procedure. Although a majority of respondents would be willing to receive care by a surgeon who performs overlapping surgery, most expressed a willingness to accept a longer waiting period for elective surgery if that would mean that overlapping surgery would be avoided.

We observed significant correlations between age, female sex, and healthcare system distrust and opposition to overlapping surgery. The association between female sex and unwillingness to consent to procedures in which trainees participate is noteworthy and has been observed previously in an earlier publication.<sup>21</sup> In that study, a carefully worded consent in which the participation of a trainee was explicitly described was provided to cataract patients. Although 95% of patients were willing to consent to the procedure, all of the nonconsenters were female.

The current study strongly suggests that the general public is not aware of overlapping surgery, and that the practice should be disclosed during the informed consent process. However, this and other studies also suggest that patients are willing to consent to procedures in which trainee participation is significant. For example, in the cataract study discussed, patients were informed that the resident might perform the entire procedure, based on their individual ability. With this information, 95% of patients consented to surgery. A study of patients undergoing neurosurgical procedures led to similar conclusions.<sup>22</sup> However, it must be noted that a survey of more than 300 surgical patients treated in a US Army hospital suggested that full disclosure of resident participation would have a negative impact on consent rates.<sup>23</sup> In that study, 94% of patients would allow a resident to participate in the

surgery. However, only 57% would allow the resident to perform the majority of the operation with the attending assisting, and only 25% would consent for an operation in which the attending is present and observes the resident.

The contradictory findings among these studies might be related to the opportunity for patient education. In the cataract trial, patients met with the surgeon before providing informed consent, suggesting that patients might have been given the opportunity to understand the qualifications of the trainee surgeon and the system of graded responsibility of surgical training. A similar process was undertaken for neurosurgery patients, in which the interviews were conducted in person. In contrast, the US Army survey was conducted by mail and patients were not given the opportunity to address their concerns.

It is probable that patients' views on overlapping surgery might be similar. In the current study, participants would consider overlapping surgery in commonplace situations, such as low-risk operations and procedures in which the attending surgeon and trainee are highly experienced. It is certainly possible that a greater proportion of patients would consider overlapping surgery if the potential advantages were discussed explicitly by the attending surgeon.

The American College of Surgeons has recently revised their Statement on Principles in response to the increased attention on overlapping surgery.<sup>24</sup> In that revision, the distinction between *concurrent* and *overlapping* surgery was emphasized. Concurrent surgery was defined as occurring when the critical components of an operation are performed simultaneously. Overlapping surgery was defined as a situation in which the key component of an operation is being performed by the attending surgeon while, in another room, the noncritical component of an operation is being performed by a qualified practitioner. Using these definitions, concurrent surgery was not considered appropriate under any circumstances, although overlapping surgery was considered acceptable if the patient was informed and the practice did not negatively affect the time of either procedure. In future studies of these practices, it is critical that these terms be defined clearly and used consistently.

The current study reinforces the importance of discussing these issues with patients during the informed consent process. Specifically, the attending surgeon should define the critical components of the surgery to the

patient beforehand if he or she plans to delegate noncritical components of the operation to another practitioner (ie overlapping surgery). In addition, surgical societies in other specialties (eg orthopaedic and neurologic surgery) should be encouraged to adopt policies that address overlapping surgery.

However, it is important to acknowledge the potential biases of surveys in general, and Internet surveys in particular. Although mTurk has been widely used as a survey platform in social and behavioral sciences, we were unable to determine how many workers viewed the survey and chose not to participate, and whether there were significant demographic differences between those who did and did not participate. In addition, it is necessarily the case that only those with Internet access are represented in such surveys. However, this is an increasingly small demographic of the US population, according to Pew research data.<sup>25</sup>

The observation that a small minority of respondents were aware of overlapping surgery despite widespread media coverage should also be discussed. We do not find this surprising, for several reasons. It is possible that the medical community, and surgeons in particular, are selectively attentive to the topic compared with the general population because it directly affects our daily practice. Additionally, the majority of media coverage was centered in the New England region, and respondents to the survey were drawn from the entire nation. Finally, an increasing proportion of the US public receives their news from social media (eg Facebook) rather than traditional news outlets, where this issue was covered.<sup>26</sup>

## CONCLUSIONS

The practice of overlapping surgery is known to only a small minority of the general public, and should be discussed explicitly as part of the informed consent process. Although the majority of the general public is opposed to overlapping surgery in general, they would consider it acceptable under specific circumstances.

## Author Contributions

Study conception and design: Kent, Rodrigue

Acquisition of data: Fleishman, Tomich

Analysis and interpretation of data: Kent, Whyte, Rodrigue

Drafting of manuscript: Kent

Critical revision: Whyte, Farrow

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## eDocument 1

We are conducting a research study of people's opinions about surgery practices. Your opinions are important to us so we can better understand the public's views. Therefore, we are asking you to fill out a brief survey.

You are under no obligation to complete the survey. Your participation in this study is completely voluntary. If you decide to complete the survey, your answers will be anonymous. We are not asking for any information that could identify you in any way. Any identifying information that you provided to Amazon Mechanical Turk for subject payment is not linked to survey responses or given to the investigators.

To take part in this study you must be at least 21 years old and a resident of the US.

Your participation in this study is completely voluntary. You can refuse to answer any question you do not want to answer. Also, you can stop the survey at any time. You can log off and your responses will be deleted.

There is no direct benefit to you for completing the survey. By completing the survey you are giving us your consent to use your responses in summary reports. If you start the survey, then decide not to complete it, you can log off and your responses will be deleted.

The survey will take about 15 to 20 minutes of your time. Once you complete and submit the survey, you will be paid \$2.

If you have any questions about the study, please contact Dr Jim Rodrigue at Beth Israel Deaconess Medical Center in Boston, MA at [jrrodrig@bidmc.harvard.edu](mailto:jrrodrig@bidmc.harvard.edu), or you can contact the Beth Israel Deaconess Medical Center IRB at 617-667-0469.

Thank you for considering this request to take part in the study.

Sincerely,

James R Rodrigue, PhD ([jrrodrig@bidmc.harvard.edu](mailto:jrrodrig@bidmc.harvard.edu), 617-632-9821)

Michael Kent, MD

Richard Whyte, MD

Beth Israel Deaconess Medical Center

Boston, MA

Please read the following story and imagine that you are in this situation.

### Scenario #1: Participants 1 through 500

You have arthritis in your hip and it is now more painful than ever. You are considering surgery to treat your hip problem. You are referred by your primary care doctor to Dr Green, a highly experienced orthopaedic surgeon. Dr Green does an examination, performs some additional tests, and confirms that you might benefit from total hip

replacement surgery. The benefits of this type of surgery include less pain, being able to move around more freely, and a better quality of life. The risks of this type of surgery include blood clots, infection, breaking of healthy parts of your hip joint during surgery, and the chance that you do not experience any benefit.

After meeting with Dr Green and talking to your loved ones, you decide that surgery is the best option for you. You are then scheduled for the operation.

*Right before the operation, Dr Green again meets with you to describe the operation and to be certain that you want to go through with it. Then, Dr Green meets with the surgical team, including the anesthesiologist, operating room nurse, and surgery resident (someone in training to become a surgeon). The surgical team reviews your medical condition, the type of operation you will have, each team member's role during the operation, and how long it is likely to take. The operation will take about 2 hours. You are then brought into the operating room.*

### Scenario #2: Participants 501 through 1,000

You have a brain tumor, which is causing you to have seizures. You have been taking medication to control the seizures. However, the medicine is no longer working and you are considering brain surgery to remove the tumor. You are referred by your primary care doctor to Dr Green, a highly experienced brain surgeon. Dr Green does an examination, performs some additional tests, and confirms that you might benefit from an operation to cut away the tumor that is causing the seizures. The benefits of this type of surgery include having no more seizures or fewer seizures than before, not having to take as many medications, and a better quality of life. The risks of this type of surgery include bleeding, infection, swelling in the brain, new problems with the way your brain works (eg with memory, vision, or hearing), and the chance that you do not experience any benefit.

After meeting with Dr Green and talking to your loved ones, you decide that surgery is the best option for you. You are then scheduled for the operation.

*Right before the operation, Dr Green again meets with you to describe the operation and to be certain that you want to go through with it. Then, Dr Green meets with the surgical team, including the anesthesiologist, operating room nurse, and surgery resident (someone in training to become a surgeon). The surgical team reviews your medical condition, the type of operation you will have, each team member's role during the operation, and how long it is likely to take. The*

*operation will take several hours. You are then brought into the operating room.*

### Scenario #3: Participants 1,001 through 1,500

The valves in your heart are damaged and do not work the way they should. This means that your heart must work harder to pump the blood through the valves. This is causing you to have chest pain, difficulty breathing, and swelling in your feet and ankles. You are considering open heart surgery to treat this condition. You are referred by your primary care doctor to Dr Green, a highly experienced heart surgeon. Dr Green does an examination, performs some additional tests, and confirms that you might benefit from an operation to replace your heart valves. The benefits of this type of surgery include an improvement in your symptoms because your heart is better able to pump blood through the valves. This might improve your quality of life and lower your risk for a heart attack or stroke. The risks of this type of surgery include bleeding, infection, blood clots that can cause a heart attack or stroke, and the chance that you do not experience any benefit.

After meeting with Dr Green and talking to your loved ones, you decide that surgery is the best option for you. You are then scheduled for the operation.

*Right before the operation, Dr Green again meets with you to describe the operation and to be certain that you want to go through with it. Then, Dr Green meets with the surgical team, including the anesthesiologist, operating room nurse, and surgery resident (someone in training to become a surgeon). The surgical team reviews your medical condition, the type of operation you will have, each team member's role during the operation, and how long it is likely to take. The operation will take about 2 to 4 hours. You are then brought into the operating room.*

Based on the information provided, please indicate whether you strongly agree, agree, disagree, or strongly disagree with each of the following statements. [menu of response choices will be provided]

Before the day of your operation, Dr Green should tell you about:

1. The specific nature of the surgical procedure (ie the details of what will be done)
2. The treatment options, other than surgery, for your specific medical condition
3. The expected results and possible benefits of surgery
4. The possible risks and complications of surgery
5. The possible risks and complications of anesthesia (ie sleep medicine)

6. How long the surgery is expected to last
7. Who will be in the operating room during the surgery
8. The temperature of the operating room
9. Whether any pictures or videos of the surgery will be taken and how they will be used
10. What role the surgery resident (someone in training) will have during the operation
11. Whether the surgeon is scheduled to perform any other operations that might overlap with your surgery
12. Whether the anesthesiologist is scheduled to handle other surgical cases that might overlap with your surgery
13. How much you will have to pay out-of-pocket for the surgery
14. How much your insurance company will have to pay for the surgery
15. How much experience the surgeon has doing this type of operation

After your operation, Dr Green should tell you about: [same response choices as above]

16. The surgery did not take as long as expected
17. The surgery took longer than expected
18. Temperature changes in the operating room during surgery
19. Whether any pictures or videos of the surgery were taken and how they will be used
20. Whether the surgery resident (someone in training) performed any part of the operation
21. Whether the surgeon left the operating room for any reason during your surgery
22. Whether the anesthesiologist left the operating room for any reason during your surgery
23. Complications during the surgery
  - a. If yes: [choose one]
    - i. Dr Green should tell you about all complications, whether they were expected or not
    - ii. Dr Green should tell you about only those complications that were not expected

At some hospitals in the US, a surgeon can schedule 2 overlapping operations with different patients. Overlapping operations are sometimes called a “simultaneous” or “overlapping” operation, which means that 2 operations are taking place at the same time. In this situation, the primary surgeon is present for the critical (or key) portions of the first operation, but then leaves the first patient to be present for the critical (or key) portions of the second operation. A surgery resident (someone in training) is left to perform the noncritical portions of the operations when the primary surgeon is in the other operating room.

The primary surgeon is available to return to either operating room as needed.

*Let's return to your surgery. Your [hip replacement/brain/open heart] operation with Dr Green is scheduled to begin at 8:00 AM and last about [2 hours/several hours/2 to 4 hours]. Dr Green has another patient, let's call him Donald, who is also undergoing a similar operation. Donald's surgery is scheduled to start at 8:45 AM and also will last about the same amount of time. Both you and Donald will have a surgery resident (someone in training) in your operating room for the whole surgery, while Dr Green moves between the 2 operating rooms. Dr Green will be present for the critical (or key) portions of both operations.*

24. In general, do you strongly support, support, oppose, or strongly oppose the scheduling of overlapping operations by the same surgeon? [menu of response choices will be provided]
25. Which of the following statements best reflects your views about overlapping operations?
- Overlapping operations are always acceptable
    - If "a" is chosen: Why do you feel that overlapping operations are always acceptable? [open ended]
  - Overlapping operations are never acceptable
    - If "b" is chosen: Why do you feel that overlapping operations are never acceptable? [open ended]
  - Overlapping operations are acceptable under certain circumstances
    - If "c" is chosen: Overlapping operations would be acceptable if: [menu of response choices will be provided: strongly agree, agree, disagree, strongly disagree]
- The expected risks of the operation are low
  - The expected benefits of the operation are high
  - The 2 operations are expected to last less than 2 hours
  - There is an emergency in another operating room
  - The primary surgeon is very experienced with this type of operation
  - The surgery resident (someone in training) has experience with this type of operation
  - The patients both agree to the overlapping operations
  - The operations are being performed in the same hospital
  - There are at least 2 surgeons who are not in training
26. Dr Green plans to be present for the "critical (or key) portions" of both operations. What do you think are the "critical (or key) portions" of your operation? Please choose all that apply.
- Positioning of the patient
  - Marking the body area of the surgery
  - Making the incision (or opening) to perform the operation
  - Doing the actual [hip replacement/removing of the brain tumor/replacing of the heart valves]
  - Closing the incision (or sewing the opening)
  - All of the above
- Please indicate whether you strongly agree, agree, disagree, or strongly disagree with each of the following statements. [menu of response choices will be provided]
- Dr Green should tell you some time before your surgery about the overlapping operations
  - Dr Green should tell you the name of the "back-up" surgeon who will be in the operating room if he/she has to leave your surgery for any reason
  - Dr Green should stay in your operating room the entire time, if that is your preference
  - Dr Green should tell you about what the "critical (of key) portions" of your operation are
  - After the operation, Dr Green should be required to document (eg in the operating report) what parts of your surgery she/he was present for.
  - You would have gone to Dr Green even if you knew that she/he was scheduling overlapping operations
  - If overlapping operations are not allowed, it is possible that some patients would have to wait longer for an operation. Surgeons might not be able to do as many operations. In the scenario above, how much longer would you be willing to wait for your [hip replacement/brain/open heart] operation to be sure that your surgeon doesn't have another surgery that overlaps with yours?
    - A few days
    - 1 to 3 weeks
    - 1 month
    - 2 to 3 months
    - 3 to 6 months
    - Longer than 6 months
    - I would not be willing to wait for my surgery
- Please use the following scale to indicate how much you agree or disagree with each of the following statements. (Questions are from the well-validated Health Care System Distrust Scale; 5-point Likert scale will be added to each question, 1 = strongly disagree to 5 = strongly agree.)
- The healthcare system does its best to make patients' health better.
  - The healthcare system covers up its mistakes.

36. Patients receive high-quality medical care from the healthcare system.
37. The healthcare system makes too many mistakes.
38. The healthcare system puts making money above patients' needs.
39. The healthcare system gives excellent medical care.
40. Patients get the same medical treatment from the healthcare system, no matter what the patient's race or ethnicity.
41. The healthcare system lies to make money.
42. The healthcare system experiments on patients without them knowing.

Please tell us a little about you. This information will help us to examine patterns in the survey responses. We will not be able to identify you in any way.

43. Your age:  
[in years, drop down menu]
44. Your sex:  
Female  
Male
45. Your ethnicity:  
Hispanic or Latino  
Not Hispanic or Latino
46. Your race:  
White  
Black or African American  
Asian  
American Indian or Alaskan Native  
Native Hawaiian or Other Pacific Islander  
More than one race
47. Highest education level:  
Less than high school

- High school graduate or GED  
Attended some college  
College graduate  
Professional degree (master's, doctorate)
48. Your household income:  
Less than \$15,000  
\$15,000 to \$24,999  
\$25,000 to \$49,999  
\$50,000 to \$99,999  
\$100,000 to \$249,000  
More than \$250,000
49. In what state do you live:  
[drop down menu]
50. Have you ever had an operation:  
Yes  
No
  - a. If yes, about how many operations have you had in your lifetime:  
[actual numbers, drop down menu]
  - b. If yes, which of the following statements is most true for you:
    - i. For at least one of my operations, I was told that my operation would overlap with that of another patient, and that my surgeon would not be in my operating room the whole time.
    - ii. I was never told whether my operation would overlap with that of another patient, nor was I told whether my surgeon would be out of my operating room during my surgery.
51. Before taking this survey, had you read or seen any news story about overlapping surgery?
  - a. Yes
  - b. No