The cost of operating institutional review boards (IRBs) in the VA

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Abstract

This study estimated the costs of operating IRBs in the VA, including VA affiliated academic medical centers. We also assessed whether there were economies of scale (i.e., cost is a function of IRB size) and estimated the optimal costs for IRBs.

Data were gathered from a survey sent to IRB administrators (n=109) and to IRB chairs (n=135) at every IRB that processes VA research (note that some IRBs have more than one chair person). After four follow-up reminders, 80 (73%) IRB administrators completed the survey. Nine of the administrators did not provide enough answers to be included in the analysis, leaving a sample of 71. A total of 76 (59%) of IRB chairs completed the survey. For the multivariate models, we linked the administrator and chair data. The merged dataset had sixty-seven cases; each case had administrator data, although only forty-one cases had chair data. When chair data were missing, averages were imputed.

On average, small, medium, and large IRBs cost approximately $78,000, $153,000, and $319,000, respectively. Large IRBs were more than four times as expensive as small IRBs, yet they handled over fifty times the workload. Workload was defined as the number of actions, which include initial full board reviews, amendments, continuing reviews, and adverse event reports. The multivariate results confirmed that there were strong and statistically significant economies of scale. In a multivariate regression, the average cost per action at small, medium, and large IRBs was $2,556, $448, and $124, respectively.

The VA may want to consider creative ways to reorganize its IRBs to take advantage of the economies of scale. Although the majority of small IRBs cost considerably higher average costs, some small IRBs had similar average costs to the large IRBs. In particular, there was significantly more variation in average costs at the small IRBs than at the medium or large IRBs. This variation is very important when considering policy recommendations, as there may be other ways to save money besides reorganizing small VA IRBs. For example, savings might also be achieved through total quality management (TQM), in which researchers and managers worth together to identify why this variance exists and make efforts to reduce it.

Although this study sheds light on the costs of operating an IRB at every medical center, more discussion is urgently needed on the benefits of local review. Without a better understanding of the costs relative to the benefits, it will be difficult to design a VA human subjects protection program that is more cost-effective than the current system.

Last, simulations with our data showed that that optimal costs could be between 13% and 47% higher than current costs. More research is needed in this area to provide guidance for policymakers. The range in optimal costs was partly due to the variability within small IRBs, which made it particularly difficult to estimate their optimal costs. Nevertheless, the results suggest that policymakers should consider additional investments in IRBs. However, these data cannot provide guidance on the best way to invest additional funds.

Highlights

Background and objectives

Many claim that institutional review boards (IRBs) are under-funded, yet little is known about the costs of operating an IRB. With the growing number of IRB-related problems and the desire to increase support, this study estimated the costs of operating IRBs in the VA. We also estimated the optimal costs for IRBs and assessed whether there are economies of scale (i.e., whether cost is a function of the IRB size).

Design and methods

In January 2001, we identified 116 VA medical centers that had an IRB or used their affiliated academic medical center's IRB. As of June 2001, seven of these medical centers merged their IRB operations with another IRB, or ceased to conduct human subjects research, thus disbanded. In July 2001, we distributed an Internet-based survey to IRB administrators (n=109) and to Institutional Review Board (IRB) chairs (n=135) at every IRB that processes VA research (note that some IRBs have more than one chair person). The Internet-based survey was sent to the administrators and chairs at VA medical centers and affiliated academic medical centers. The first computer screen of the survey included an informed consent form. The study protocol, survey, and consent form was approved by the Stanford University human subjects IRB.

After four follow-up reminders, 80 (73%) IRB administrators completed the survey. Nine of the administrators did not provide enough answers to be included in the analysis, leaving a sample of 71. A total of 76 (59%) of IRB chairs completed the survey.

This study rests on some key assumptions. First, the data were collected with a survey and so we had to assume that the participants were providing accurate and valid information. Second, other individuals and resources, such as institutional officials and legal advice, are required to operate an IRB. We had no method by which to estimate these costs and therefore excluded them from our calculations. Third, in calculating the total costs, we relied on national benchmarks for square footage and national salary estimates. This removes geographic variation and these assumptions were varied in the sensitivity analysis.

Findings

Actual and optimal costs

The average number of actions in the small, medium and large group was 52 (range 3-151), 431 (range 172-826), and 2676 (range 860-12899), respectively. Actions included initial reviews, amendments, continuing reviews, and adverse event reports. On average, small, medium, and large IRBs cost approximately $78,000, $153,000, and $319,000, respectively. The VA and its affiliated academic medical centers spent an estimated $20.62 million on IRBs in 2001. This includes the cost of office space. Excluding office space, which is often not a budget item, the VA and its affiliated academic medical centers spent approximately $18.86 million in 2001.

The results indicate that there are strong and statistically significant economies of scale. Per unit costs at large IRBs were substantially less than per unit costs at small and medium IRBs. After controlling for variables in the multivariate regression, the average cost per action at large, medium and small IRBs was $124, $448, and $2556, respectively.

There are concerns that IRBs may be underfunded. We estimated the *optimal* costs using two alternative methods, described in Chapter 6. The simulation show that the optimal total costs could be between 13% and 47% higher than current costs. Although the level of funding may be associated with quality, especially poor quality, adequate funding does not guarantee that the IRB will be high quality.

Administrator and office

Administrators can seek certification. This is not a regulatory requirement and most certification programs are relatively new. Thirty-three percent of large IRBs had a certified administrator, while only 9% of small IRB administrators were certified. This difference was statistically significant (chi-square (1 df) = 4.25; p=0.039).

VA IRBs tended to be smaller than non-VA IRBs. After controlling for IRB size, VA IRBs had similar staffing levels to non-VA IRBs. In the survey, we asked IRB administrators about the need for additional staff. IRB location was not a significant predictor of reported understaffing, but it was a predictor of the magnitude of understaffing. Twenty-one percent (5) of non-VA IRBs reported needing an additional 3-4 persons, compared to 4% of VA IRBs. In contrast, 74% of VA IRBs reported needing 1-2 additional persons compared to 39% of non-VA IRBs. This difference was statistically significant (chi-squared (2 df) =9.23; p=0.01).

The survey asked administrators how the human subjects office assessed its own performance. Only 7% of IRB administrators stated that they collected outcome data on a regular basis, and 38% reported having a stand-alone evaluation. However, 38% also said that they did not assess their performance. VA IRBs were more likely to not check their performance compared to non-VA IRBs (chi-square (3 df)=8.66; p=0.034).

Used by 58% of the administrators were research compliance plans or quality assurance plans. IRBs most frequently tracked protocols using a custom-built computer database (63%). Use of a paper tracking system (19%) and use of a commercial IRB database (18%) were less common. Small IRBs were more likely to use a paper tracking system than large IRBs, although this difference was only marginally significant (p=0.06).

IRB Chairs

Almost 50% of the chairs in our survey reported that they were neither paid by the IRB nor given release time. This means that these individuals were volunteering their time and that they still need to complete all of their other responsibilities.

When the chairs were asked about reading to keep apprised of new information, 33% reported reading books, 68% reported reading journals, 84% reported reading newsletters, and 11% reported reading none of the above. Interestingly, chairs at small IRBs were significantly more likely to report not reading books, journal articles, or newsletters (chi-square (2 df)=7.47; p=0.024). This may contribute to these boards being less prepared, compliant, efficient and knowledgeable.

Discussion and research implication

We found large economies of scale in operating IRBs. Given the large economies of scale, the VA may want to encourage small IRBs with other IRBs. It makes some sense for small IRBs to merge with other IRBs in their vicinity. This would minimize an investigator's travel time and preserve some geographic cultural influence.

As expected, we also found evidence to suggest that IRBs are underfunded. Depending on the method for calculating optimal costs, the underfunding ranged from 13-47%. There are different mechanisms available to IRBs to obtain more revenues. In particular, VA should consider reorganizing its IRB programs to take advantage of the economies of scale. In general, this study provides more insight on the costs. Unfortunately, we need a better sense of the benefits of local IRBs and regional IRBs, so that we can compare the cost-effectiveness of alternative models.

It is likely that certain types of protocols place a disproportionate burden on the IRBs. First, some studies are so technical that it is likely that very few IRBs will have the necessary expertise to conduct an efficient and thorough review. An example is gene transfer. If these situations can be identified, it may be beneficial to centralize review at one site. The site would be established on a competitive basis, and would precede independent local review. This model is similar to what is done in the UK and the new beryllium IRB established by Department of Energy.

Another type of protocol that places a disproportionate burden on the IRBs is multi-site trials with minimal risk, which are processed either as an exemption or an expedited review. The primary type of study in this case is health services research. Multi-site review of health services research can be very expensive without clear benefits. These studies could be reviewed by a centralized IRB, in lieu of local review. Moreover, as health services research becomes increasingly specialized and influenced by special regulations, such as the Health Insurance and Portability Accountability Act of 1996 (HIPAA), having a centralized review panel may offer benefits over local review. More research is needed on the topic of protocol complexity.

Although the majority of small IRBs had considerably higher average costs, it should be noted that some small IRBs had similar average costs to the large IRBs. Interestingly, there was significantly more variation in average costs at the small IRBs than at the medium or large IRBs. This variation is very important for policy recommendations as it suggests that there may be other ways to save money that do not result in the elimination of small VA IRBs. Saving might also be achieved through total quality management (TQM), in which researchers and managers identify why this variance exists and make efforts to reduce it. The hope is that over time the economies of scale and the variation among the small IRBs would disappear.

Although adequate resources are an important component in enhancing protections for human subjects, more resources do not necessarily guarantee a higher quality IRB. That will require, in addition to resources, better education and training for staff, chairs and members, ongoing quality improvement efforts, and a cultural change that emphasizes research ethics at the institutional level. These efforts are now beginning, and many organizations, including the Institute of Medicine, Association of American Medical Colleges, and National Bioethics Advisory Commission are formulating recommendations for change. However, more research is needed to guide these changes and to ensure that they will be beneficial.

Chapter 1: Methods

1.1: Sample

In January 2001, we identified 116 VA medical centers that conducted human subjects research. These medical centers either had a institutional review board (IRB), or they used their affiliated academic medical center's IRB. By June 2001, seven of these medical centers either merged their IRB operations with another IRB, or ceased to conduct human subjects research, thus disbanded the IRB.

In July 2001, we distributed an Internet-based survey to IRB administrators (n=109) and to IRB chairs (n=135) at every IRB that processes VA research (note that some IRBs have more than one chair person). The Internet-based survey was sent to the administrators and chairs at VA medical centers and affiliated academic medical centers. The first computer screen of the survey included an informed consent form. The study protocol, survey, and consent form was approved by the Stanford University human subjects IRB.

We sent out an email reminder two weeks after the initial letter. Responses from the email reminder indicated that some individuals had access problems and technical difficulties with the Internet-based survey. This led us to mail follow up questionnaires to non-respondents. Over time, non-respondents were mailed up to three questionnaires to encourage participation.

A total of 80 (73%) of IRB administrators completed the survey. Nine of the administrators did not provide enough answers to be included in the analysis, leaving a sample of 71.

Seventy-six (59%) IRB chairs completed the survey. The chair survey differed from the administrator survey in that it did not collect staffing and employee information for the human subjects office. Also, the chair survey collected information on the perceived complexity of the protocols that underwent full board review. When designing the questionnaire, we decided that the administrators were better suited to answer staffing questions, and that chairs were better suited to answer protocol-related questions.

VA medical centers can either operate their own IRB or they can use the IRB services of their affiliated academic medical center. According to the VA Office of Research and Compliance (ORCA), 60% of the 109 VA medical centers that conduct research with human subjects have internal IRBs that review research protocols. ORCA has labeled these as independent IRBs; we labeled them *VA IRBs*. The remaining 44 (40%) VA medical centers either rely solely on the services of an affiliated university's IRB or have some sort of joint arrangement with them. We labeled these IRBs *non-VA IRBs*.

1.2: Variables

IRB cost

The cost of operating the IRB was estimated as the sum of 1) personnel costs, 2) space costs, 3) supplies, and 4) education & training. To calculate the personnel costs, we multiplied personnel time, using the full-time equivalence (FTE), by salary, where each salary is a function of education, tenure, and job category.

For the IRB administrator and staff, personnel time was valued using estimated national wage rates. We assumed that the wage rates were the best indicator of opportunity costs, or the value of a resource in its next best use.[1] Therefore, the cost of an administrator volunteering 2 hours is the same as the cost of an administrator paid by the IRB for 2 hours of work. Although the valuation is the same irrespective of who bears the cost (IRB, other department, or individual), the incentives may be very different. We did not take into account the underlying incentives, but recognize that this may affect other factors such as quality.

To determine whether a person received the low, mid, or high salary, we combined information on each person's education and tenure. We assumed that the relative value of education was more important than tenure, as is reflected in the federal Office of Personnel and Management (OPM) pay scales. We used the matrix presented in Table 1.1 to differentiate between low, mid, and high salary levels.

Table 1.1: Estimating salary based on education and tenure

	Education				
Tenure in job	High school	Assoc.	BA	MS	Doctoral degree
<1 year	**Low**	**Low**	**Low**	**Mid**	**High**
1-2 years	**Low**	**Low**	**Mid**	**Mid**	**High**
3-5 years	**Low**	**Low**	**Mid**	**High**	**High**
6+ years	**Low**	**Mid**	**Mid**	**High**	**High**

For low, mid, and high salary estimates, we used the 2001 national federal pay scales. We divided the different IRB personnel into five categories. We then assigned the grade and step level for the low, mid, and high salary ranges for each position (see Table 1.2).

Table 1.2: Salary Chart

Job Category	Grade and Step Level	Salary
Clerical/Administrative		
Low	GS7 - step 1	$29,273
Mid	GS9 - step 1	$35,808
High	GS11 - step 3	$46,214
Database/Computer Analyst		
Low	GS9 - step 1	$35,808
Mid	GS9 - step 5	$40,580
High	GS11 - step 3	$46,214
Compliance officer		
Low	GS11 - step 1	$43,326
Mid	GS12 - step 1	$51,927
High	GS13 - step 1	$61,749
Coordinator		
Low	GS9 - step 1	$35,808
Mid	GS9 – step 5	$40,850
High	GS11- step 3	$46,214
Director		
Low	GS11 - step 3	$46,214
Mid	GS12 - step 3	$55,387
High	GS13 - step 3	$65,867
Chair		
High	GS13 - step 3	$65,867

Once the person's base salary was estimated, we included a benefit rate of 28%. The total was then multiplied by the person's FTE. For the administrator, we collected the exact FTE. For other personnel, we only collected data on whether they were full time or part time. Those working part time or having missing FTE data were coded as 0.5 FTE.

For chairs, we estimated the exact FTE based on time paid by the IRB. This reflects the IRBs budget, but since few chairs receive reimbursement this is likely to underestimate the real cost of operating the IRB. The chairs also reported the amount of time they spend with IRB activities in a usual month. With this information, we calculated the actual FTE. This latter information was used in determining the difference between actual and optimal costs. We assumed that committee members were not reimbursed for their time and effort.

To calculate space costs, our survey collected information on the type of office space and whether that space was shared with another department. To estimate the average square footage per type of office (own, shared, cubicle, copy room, conference room, and filing room), we used information from a commercial real estate website (www.vandema.com). For administrators, we used their self-reported space estimates and adjusted the space estimate based on the type of office.

In our survey, 87% of the administrators had their own office, while 13% shared an office with another person. The average office size was 13 feet by 15 feet (195 square feet). Table 1.3 shows the types of office space that the IRBs used, and whether they were shared with another department or not. The majority of IRBs had a meeting room (93%), 76% had a copy room, and 77% had a filing / storage room. The meeting room space was often shared with another department (82%), compared to the copy room (61%) and storage/filing rooms (42%).

Table 1.3: IRB space

	% of IRBs with this room	Share space with another department
Copy Room	76%	61%
Meeting Room	93%	82%
Storage/filing room	77%	42%

Given potential problems in using self-report to estimate office sizes, we decided to use national estimates for the copy room, meeting room, and storage/filing room. The copy room and meeting room were assigned 150 and 180 square feet, respectively. The filing rooms for small, medium and large IRBs were 100, 150, and 200 square feet, respectively.[2] Offices that said that they share this space were assigned 50% of the space.

We multiplied the total square footage times the annual rental rate per square footage. Rental rate estimates were obtained from an Internet real estate website that tracks rental rates across the country (www.oncorintl.com). The weighted national average for 2001 was $34.71 per square foot per annum, and we used this amount as the estimated rental rate.[3]

None of the administrators surveyed had a separate budget for space or rental costs. While this fact is interesting on its own, there were no data with which to assess the validity of our estimated space costs.

Fourteen IRB administrators provided expenditure information on supplies. To calculate supply costs, we divided the cost of office supplies and equipment as reported by the IRB administrators by the total number of actions processed by the IRB in the last year. From these data (n=14), we calculated that supplies costs were $17.90 for each action.

With an estimated supply cost per action, we were able to calculate supplies costs for all IRBs. This was done by multiplying $17.90 by the number of actions at each IRB. This assumes that supplies were a function of the number of actions processed. We then added the costs for personal computers and a local area network. For each computer, we assumed it had a $1800 purchase price, with a straight-line depreciation over three years and no salvage value. We estimated the costs of the local area network and its maintenance at $1000 per user per year.

Thirteen IRB administrators provided expenditure data for employee education and training. To calculate training and education costs, we divided the cost of education and training as reported by IRB administrators by the total number of staff at the IRB in the last year. From these

thirteen sites, we calculated that training and education costs averaged $1,155 for each staff member.

Using an estimated education and training cost per staff member, we calculated training and education costs for all IRBs. This was done by multiplying $1,155 by the number of staff members at each IRB. This method assumes that providing education and training to staff were a function of the number of staff members.

Other individuals and resources are required to operate an IRB. Institutional officials and legal advice are required. These indirect costs should be included. One could either use time estimates and market rates to calculate these indirect costs, or one could identify indirect costs in administrative data and distribute a certain percentage of these data to the IRB. Unfortunately, both options were not feasible with the currently available data, and we had to exclude indirect costs from our estimates.

The average unit cost was calculated by dividing the total costs by the total number of units (equation 1). The total number of units (the denominator) was based on respondents reporting of the number of actions (i.e., protocols and adverse event reports) their office processed in the last year.

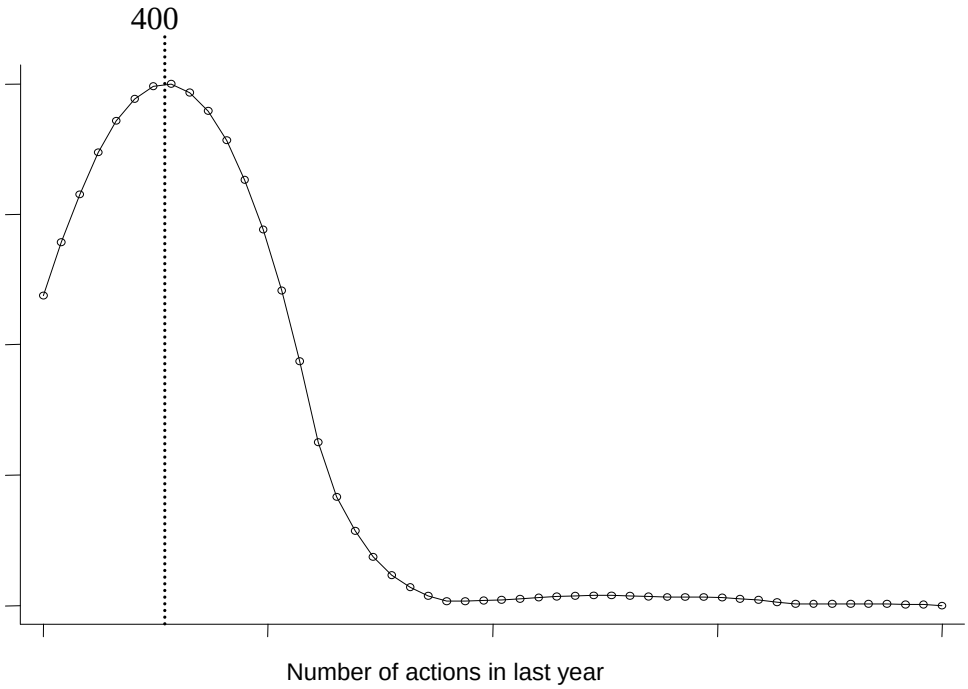
$$\text{Average Cost (AC)}_i = \frac{\sum_{i=1}^{n} \text{Salary} + \text{space} + \text{education/training} + \text{supplies}}{\sum_{i=1}^{n} \textit{actions}} \quad (1)$$

where i represents the institutions

IRB Size

IRBs review study protocols and handle adverse event reports. In the survey, we asked the number of full initial reviews, expedited initial reviews, exempt initial reviews, full continuing/annual reviews, expedited continuing/annual reviews, amendments under full board review, amendments under expedited review, and harms/adverse event reports reviewed in the last year. We summed these together to calculate the total number of actions. The distribution

Figure 1.1: Distribution of the actions per year using a kernel density diagram



of actions is presented in Figure 1.1. As is shown, approximately half of the distribution has less than 400 actions, and there is a large right tail.

We then created three dummy variables for size: small, medium, and large. This allowed for a non-linear relationship between size and average costs. The size designation was based on the 33% and 66% (tertiles) of the sample. The average number of actions in the small, medium and large group was 52 (range 3-151), 431 (range 172-826), and 2676 (range 860-12899), respectively.

IRB Quality

To get a sense of attitudes about the human subjects office, we asked the administrators and chairs to rate five statements. The five statements were:

- This human subjects office protects the rights and welfare of human subjects
- This human subjects office runs with reasonable efficiency
- This human subjects office gets into areas that are not appropriate to its function
- This human subjects office has difficulties handling some types of research properly because of lack of expertise
- This human subjects office improves the scientific quality of research done on human subjects

The response options to the five items were "Strongly Agree (1)," "Somewhat Agree (2)," "Neither Agree nor Disagree (3)," "Somewhat Disagree (4)," or "Strongly Disagree (5)." After

reverse coding the response scores for items 3 and 4, the response scores were summed together in a single scale that varied from 0-1, with a higher number representing a more favorable attitude. Cronbach's alpha was 0.70 for the chair scale and 0.68 for the administrator scale.

To test the external validity of the scale, we compared performance ratings with estimated total costs. As expected, there was a negative relationship between performance ratings and total costs. As performance ratings went up, total costs decreased. This association, however, was not statistically significant. This could reflect the fidelity of the scale or the limited sample size.

1.3: Reliability and validity of staffing data

Estimating the cost of IRBs is highly dependent on the reliability and validity of the data. In particular, because IRBs perform a service, the primary input is personnel. We addressed the issue in two ways.

Approximately six months after the survey, we sent all respondents the same question on IRB staff and FTE. The question asked about staffing in August 2001, to approximate the time they completed the first survey. Twenty-four participants responded. With this information, we calculated an intraclass correlation coefficient (ICC) as a measure of reliability. For both staff and FTE, the ICC was above 0.95, suggesting a high degree of reliability.

To assess the accuracy and validity of the staffing data, we asked administrators to provide data on their budget if available. Ten administrators in our survey provided budget information on personnel costs. Although our estimates are based on national salary estimates, and do not include geographic wage adjustments, we would expect our estimated personnel costs to be correlated with the reported personnel costs. The data show a correlation of 0.94 (n=10) between the actual personnel budgets and the estimated personnel budgets. As expected, when administrators provided all of the information on the staff, our cost estimates were very close to the actual budgets. The most common missing data element was the staff member's FTE equivalent. In these cases, we assumed the person had a half time position. This was done so that we would not overestimate the personnel costs for smaller IRBs.

1.4: Analysis

The descriptive analysis involved cross-tabulations using Pearson's chi-square test. For continuous variables, we used Wilcoxon rank sum tests. All cost data were for the year 2001.

To assess economies of scale we used multivariate techniques. Economies of scale refer to the efficiency of the organization in relation to the organization's output. In some instances, higher volume (i.e., greater scale) is associated with economic savings. However, for many organizations, there exists a point where the additional cost to review an additional protocol is no longer declining. Production should continue until the additional cost of producing the next unit is equal to the average cost of a unit (i.e., marginal cost=average cost). According to economic theory, this point will maximize revenues and minimize average costs.

Testing for economies of scale with the cost function required linking the administrative data with the chair data. The merger was done using the institution as a common identifier. We were able to link chair data to the administrative data at 42 (58%) of the medical centers. The remaining 30 medical centers had administrator data, but no chair data. For six medical centers with administrator data, more than one chair completed the survey. To have a one-to-one merge between chair and administrative data, we used the mean of the chair's data for these six sites.

To test for economies of scale, we built regression models with the average unit cost as the dependent variable. In the cost function, it is important to adjust for the quality of the organization and to control for any case mix differences.[4] The cost function is denoted as:

$$\text{Average cost(AC)}_i = \beta_1 size_{small} + \beta_2 size_{medium} + \beta_3 quality_i + \varepsilon_i \quad (2)$$

The size variables were described above. For quality, we included self-rated office performance, administrator certification, the percentage that the IRB office is understaffed, and the percentage of time for which the Chair is actually paid or given release.

It should be stressed that these survey data provide information on the organization, which is our unit of analysis. This is the appropriate unit of analysis because the IRB program is the unit of production. However, if data were available, either through administrative databases or chart review, it would be ideal to have reliable data on individual protocols, including relative time and protocol complexity. Unfortunately, some organizations use paper-tracking systems, while other organizations use sophisticated databases. This makes collecting administrative data from a large sample of organizations difficult or even impossible. For this reason, we relied on self-report information from the administrators and chairs. It is hoped that future research will address this limitation.

1.5: IRB costs as a percentage of research funding

For each VA medical center, the VA Research and Development Information System (RDIS) tracks the number of studies and the amount of funding for each. For studies with human subjects, the system tracks overall number of studies, studies with devices, and studies with drugs.

We obtained RDIS information for 1999 for each VA medical center. With the exception of one site, we were able to merge these data with our survey data. With this information, we calculated the percent of human subject funding that included devices and the percentage of human subjects funding that included drugs.

The RDIS data also had information on all (VA and non-VA) human subjects grant funding. When combined with IRB costs, we were able to calculate the percentage of human subjects grant indirect funds that would be necessary to operate an IRB. Because these data were not available from the non-VA IRBs, we restricted our analysis to the VA medical centers.

Chapter 2: IRB Administrator

2.1 Administrators' experience and background

Almost half of the IRB administrators reported having six or more years of experience with IRBs. Few individuals had less than 1 year of experience (see Table 2.1). Table 2.1 also shows that more than half (52%) of the administrators had at least a Master's degree and that the majority (60%) were women. Administrator background and experience was similar in VA and non-VA IRBs, and it was similar in small, medium and large IRBs.

Table 2.1: Administrators' IRB experience and background

	N	%
IRB Experience		
<1 year	8	11%
1-2 years	14	20%
3-5 years	16	23%
6+ years	33	46%
Educational degree		
High School or Associates degree	12	17%
Bachelor's	10	15%
Master's	22	31%
Doctoral	17	25%
Other	8	11%
Gender		
Male	23	34%
Female	45	66%
Age		
<40	14	21%
41-50	27	40%
51+	27	40%

Note: percentages may not add due to rounding

2.2 Continuing education and certification

Administrators play a pivotal role in ensuring human subjects protections. In doing so, they must consistently stay up-to-date with current IRB regulations. In our survey, 72% of administrators said that they attended a national or regional meeting/workshop about human subjects protection in the past three years (Table 2.2). The percentage of administrators who led sessions at conferences, served on state committees, or authored a journal article was 20% or lower. Twenty-five percent (18) of the respondents did none of the above. Not being involved in any of the three listed activities was significantly more common among small IRBs. Forty-seven percent of small IRBs were not involved in these three activities in the past three years,

whereas 17% and 13% of medium and large IRBs, respectively, were not involved in these activities (Chi-square (2 df)=8.92, p=0.012).

Many administrators reported reading literature about human subjects protection to keep informed. Most administrators read newsletters (94%), compared to journal articles (64%) and books (35%).

Table 2.2: IRB Administrator events/activities in the past 3 years

	N	%
Activities in the past 3 years		
Attended a national or regional meeting/workshop about human subjects protection	52	72%
Led a session at a national or regional meeting/workshop on protection of human subjects protection	11	15%
Served on a national, state, or regional committee related to human subjects protection	12	17%
Authored a journal paper on human subjects protection	2	3%
None of the above	18	25%
Literature regularly read on IRBs		
Books	25	35%
Journal articles	46	64%
Newsletters	68	94%
None of the above	0	0%

Although administrators can seek certification, this is not a regulatory requirement. Most certification programs are relatively new and this is reflected in the low percentage of certified IRB administrators in our sample. Approximately 82% of the administrators reported not being certified by Association of Clinical Research Professionals (ACRP), National Association of IRB Managers (NAIM), Applied Research Ethics National Association (ARENA), or Society of Research Administrators (see Table 2.3).

Thirty-three percent of large IRBs had a certified administrator, while only 9% of small IRB administrators were certified. This difference was statistically significant (chi-square (1 df) = 4.25; p=0.039).

Table 2.3: Human subjects certification for administrators

	N	%
Association of Clinical Research Professionals (ACRP)	1	1%
National Association of IRB Managers (NAIM)	3	4%
Applied Research Ethics National Association (ARENA)/Council for Certification of IRB Professionals (CCIP)	6	8%
Society of Research Administrators	5	7%
None of the above	59	82%

Note: certification does not include NIH or other web-based certification

2.3 Administrator job activities

IRB administrators reported spending an average of 25 hours per week doing activities related to human subjects protection. Administrators in medium and large IRBs spent twice the amount of hours per week in human subjects protection activities compared to small IRBs, respectively (see Table 2.4).

Table 2.4: Average number of hours per week devoted to human subjects protection activities by IRB size

	Total	IRB size		
		Small	Medium	Large
Hours per week	24.9	12.8	28.1	33.5

Table 2.5 lists administrators' time distribution by size and location. In most cases, these percentages did not vary by IRB size or location. Interestingly, self-and peer-education was one of the most frequently performed activities by the administrator. In general, 20% of the administrator's time went into educational activities.

Table 2.5: Distribution of administrator's time

		IRB size		
	Total	Small	Medium	Large
Initial reviews	21%	26%	23%	22%
Continuing/Annual reviews	12%	11%	14%	10%
Amendments	8%	5%	6%	7%
Adverse Event Reports	6%	5%	6%	7%
Educating yourself or others	20%	20%	21%	16%
Compliance activities	11%	14%	10%	10%
Managing human subjects office	21%	19%	16%	27%
Other	13%	21%	10%	10%

Note: averages are calculated for each category; the columns do not sum to 100%

Chapter 3: IRB office and staff

3.1 Office staffing

Table 3.1 shows the overall number of IRB staff and their FTE. In general, each IRB has an average of 4.2 staff employees, with an average load of 2.94 full-time equivalent (FTE) employees; these numbers include the director and support staff, but do not include any chair(s) or committee members. As expected, small IRBs had fewer FTE employees (1.05) than medium or large IRBs, which had an average of 2.23 and 5.44 FTE employees, respectively.

Table 3.1: Average number of FTE IRB staff and personnel time per institution

		IRB size		
	Total	Small	Medium	Large
IRB Staff	4.16	2.13	3.09	7.13
FTE	2.94	1.05	2.23	5.44
Average number of actions per FTE*	219	46	222	381

*Note the total number of actions excludes adverse event reports
There were no differences between VA and non-VA sites

VA IRBs had fewer staff compared to non-VA IRBs, but this reflected the fact that VA IRBs are smaller on average than non-VA IRBs. After controlling for size, staffing in VA IRBs was similar to non-VA IRBs. Staffing has a profound effect on the costs of an IRB. Table 3.1 shows evidence consistent with economies of scale: larger IRBs review significantly more protocols per FTE than smaller IRBs.

IRBs typically have a mixture of administrative help, coordinators, database analysts, and compliance officers. Table 3.2 shows the different IRB personnel positions and the mean number of employees per institution. Administrative help was the most common, while few IRBs had a data analyst. Small IRBs frequently had only administrative help and no other staff (see Table 3.2).

Table 3.2: Average number of employees per institution

		IRB size		
	Total	Small	Medium	Large
Administrative assistant	1.77	0.87	1.65	2.75
Database analyst	0.34	0.04	0.40	0.92
Research compliance officer	0.39	0.09	0.04	1.00
Coordinator (non-management)	0.41	0.04	0.26	0.92

Note: These numbers reflect persons not FTE status

3.2 Perceptions of staffing adequacy

In the survey, we asked administrators if the office was understaffed and, if so, by how much. A total of 50 (72%) administrators reported that their office was understaffed. Among those who thought their office was understaffed, 89% thought 1-2 staff members should be added, while 11% thought 3-4 persons were needed. No one reported that the IRB was understaffed by more than 4 persons. Perceptions of understaffing was relatively similar among different sized IRBs: 62%, 77%, and 76% of large, medium, and small IRBs reported being understaffed, respectively.

IRB location was not associated with being understaffed, but it was a predictor of the magnitude of understaffing. Twenty-one percent (5) of non-VA IRBs reported needing 3-4 persons, compared to 4% of VA IRBs. In contrast, 74% of VA IRBs reported needing 1-2 persons compared to 39% of non-VA IRBs. This difference was statistically significant (chi-squared (2df) =9.23; p=0.01).

3.3 Protocols and actions

In our survey, administrators were asked to report how many protocols and adverse event reports (AERs) their IRB reviewed in the last year. Table 3.3 shows the average number of protocols according to the type of review. By definition, large IRBs reviewed more protocols than medium and small IRBs.

Table 3.3: Average number of protocols and adverse event reports in last year

		IRB size			IRB location	
	Total	Small	Medium	Large	VA	Non-VA
Full initial reviews	118	19	78	254	50	282
Expedited initial reviews	45	1	6	123	7	141
Exempt initial reviews	36	1	10	92	4	109
Full continuing/annual reviews	173	14	133	362	74	407
Expedited continuing/annual reviews	61	1	11	163	8	182
Amendments that underwent full review	108	3	53	244	33	282
Amendments that underwent expedited review	211	2	37	576	30	680
Total number of protocols	752	41	328	1814	206	2083
Harms/adverse event reports (AER)	394	8	117	971	155	971
Total number of actions	1146	49	445	2785	361	3054

3.4 IRB committees

As the number of actions (i.e., protocols and AERs) increased, so did the number of IRB committees. On average, each IRB committee reviewed 611 actions. However, the actions per committee varied significantly by IRB size. IRBs at small IRBs handled an average of 79 actions per year. Committees at medium and large IRBs reviewed 529 and 1080 actions per year, respectively. This suggests that the volume of work placed on chair(s) and members depends on the size (and volume) of the IRB.

On average, there are 1.7 IRB committees per institution. Small IRBs have fewer IRB committees than large IRBs, but this is to be expected.

Table 3.4: Average number of IRB committees per IRB

		IRB size		
	Total	Small	Medium	Large
Number of IRB committees (*mean*)	1.7	1	1.21	2.19
Actions per IRB committee (*mean*)	723	79	529	1080

In our survey, we found that the average IRB committee held 16 meetings per year on average, with each meeting lasting 2 hours. In addition, the IRB administrators reported that on average, the committee members received protocols for their review eight days before each meeting. There were no significant differences between VA IRBs and non-VA IRBs, or between small, medium, and large IRBs.

3.5 Educational sessions

Administrators reported spending approximately 20% of their weekly time educating their staff and members regarding human subjects protection. This did not include time devoted to developing local policies and procedures. Interestingly, the amount of time spent on education did not vary by IRB size or IRB location.

The administrators were also asked about types of educational sessions offered in the last year. In the last year, 38% of the IRBs offered between 1-3 educational sessions on human subjects protection, and 43% offered at least 4 or more educational sessions (Table 3.5). Large IRBs offered significantly more sessions than small IRBs, but this might reflect other factors, such as the number of researchers working at the medical center.

Table 3.5: Number of educational sessions on human subjects protection the IRBs offered in the last year

Number of sessions per year	N	Percent
0	13	18%
1-3	27	39%
4-7	11	16%
8-10	6	9%
11+	12	17%

Note: percentages may not add due to rounding

In the last year, 64% of IRB administrators reported that they held educational sessions for investigators and students on the requirements for human subjects protection. Table 3.6 shows the frequency with which IRBs held educational sessions on the informed consent process, procedures associated with IRB review, and responsible conduct of research. Table 3.6 also shows the rates with which the IRBs held educational sessions for the IRB staff and committee members. These sessions were more commonly provided to chairs and members than to IRB staff.

Table 3.6: Educational sessions offered by the IRB in the last year

Session topic	Office staff	Chair(s) & members	Investigators and students
Requirements for human subjects protection	57%	71%	64%
Informed consent process	46%	57%	61%
Procedure associated with IRB review	51%	63%	51%
Responsible conduct of research	43%	54%	47%

3.6 Quality assurance and oversight

The survey asked administrators how the human subjects office assessed its own performance. As shown in Table 3.7, 7% of IRB administrators stated that they collect outcome data on a regular basis, and 38% reported having a stand-alone evaluation. However, 38% also stated that they did not assess their performance. VA IRBs were more likely to not assess their performance than non-VA IRBs (chi-square (3 df)=8.66; p=0.034).

Table 3.7: Methods used by human subjects offices to assess their own performance

		IRB size			IRB location	
	Total	Small	Medium	Large	VA	Non-VA
Collected data on a regular basis	7%	5%	4%	13%	2%	17%
Had 1+ stand-alone evaluations, but did not collect data regularly	38%	45%	35%	33%	42%	30%
Had 1+ stand-alone evaluations, and also collected data regularly	17%	14%	17%	17%	13%	26%
Did not check on office's performance	38%	36%	43%	38%	44%	26%

Note: percentages may not sum to 100 due to rounding

The primary reason for IRBs self-assessment was for quality improvement (58%), followed by legislative requirements (21%). At least half of the IRBs monitored their performance to improve their quality, regardless of their size and location (Table 3.8).

Table 3.8: Reasons to assess IRB performance

	Total
Legislative requirements	21%
Quality improvement	58%
As a management tool other than for quality improvement	9%
Other	12%

Note: percentages may not sum to 100 due to rounding

Not all of the IRBs currently evaluate their office's performance. However, at least 50% of those who do not check on the office's performance said that they plan to do so in the future.

Regardless of the IRB size and location, standard operating procedures were almost universally used (97%). The use of a research compliance plan or a quality assurance plan was less common among all IRBs (58%), but was still widely used.

3.7 Tracking Protocols

As shown in Table 3.9, IRBs most frequently tracked protocols using a custom-built computer database (63%). Use of a paper tracking system (19%) and use of a commercial IRB database (18%) were less common. Small IRBs were more likely to use a paper tracking system than large IRBs, although this difference was only marginally significant (p=0.06).

Table 3.9: Methods used by human subjects offices to catalog and track protocols

		IRB size		
	Total	Small	Medium	Large
Paper tracking system	19%	35%	23%	4%
Commercial IRB computer database	18%	20%	23%	13%
Custom-built computer database	63%	45%	55%	83%

3.8 Federal audits

In the survey, we asked the last time the IRB was audited by the VA, FDA, or OHRP/OPPR. More than half (55%) of the IRBs were audited within the last four years (Table 3.10). Large IRBs and non-VA IRBs were audited more often in the last four years than small IRBs and VA IRBs, 65% and 72% of the time vs. 34% and 46% of the time, respectively. Interestingly, 39% and 13% of small and large IRBs, respectively, were never audited. This difference was marginally significant (p=0.06).

Of those that were audited in the last year, most IRBs (70%) reported that minor problems were identified. These differences did not vary by IRB size or location, in part due to the rarity of major problems.

Table 3.10: Last VA, FDA or OHRP/OPRR audit

	Total	IRB size			IRB location	
		Small	Medium	Large	VA	Non-VA
Last year	37%	17%	37%	48%	33%	45%
1-4 yrs ago	18%	17%	21%	17%	13%	27%
5-10 yrs ago	18%	22%	21%	13%	20%	14%
10+ yrs ago	6%	6%	5%	9%	8%	5%
Never	21%	39%	16%	13%	28%	9%

Note: percentages may not add due to rounding

3.9 Perceived problems

Administrators are often plagued by uncooperative investigators and investigators who provide insufficient information. When administrators were asked about five potential problems with investigators, the most commonly reported problem was that investigators did not provide enough information. Another commonly cited problem was inadequate consent forms. Table 3.11 shows the problems reported by the administrators. All problems were more frequent among non-VA IRBs than VA IRBs. Of these problems, providing unacceptable consent forms was the most bothersome; 23% said it was a major problem and 63% said it was a minor problem.

Table 3.11: Common problems reported by administrators that happen at least some of the time

Problem	At least some of the time		
	Total (%)	VA IRBs (%)	Non-VA IRBs (%)
Investigators initially do not provide enough information	77%	74%	83%
Investigators not cooperative in answering questions	19%	13%	30%
Investigators provide unacceptable consent forms	74%	70%	87%
Investigators try to circumvent amendments	20%	17%	26%
Investigators try to bundle many projects under one	14%	9%	22%

When administrators were queried about their perceptions of the IRB, most felt that it improved the scientific research and protected patients. Table 3.12 lists the administrators' attitudes. These attitudes were relatively stable across IRBs of different size and at different locations (VA and non-VA).

Table 3.12 Attitudes about the value of the IRB

	Strongly agree (%)	Somewhat agree (%)	Neither (%)	Somewhat disagree (%)	Strongly disagree (%)
This human subjects office protects the rights and welfare of human subjects	68.1	27.5	4.4	0.0	0.0
This human subjects office runs with reasonable efficiency	33.3	44.9	15.9	4.4	1.5
This human subjects office gets into areas that are not appropriate to its function	0.0	10.1	21.7	21.7	46.4
This human subjects office has difficulties handling some types of research properly because of lack of expertise	5.8	18.8	24.6	7.3	43.5
This human subjects office improves the scientific quality of research done on human subjects	30.4	36.2	23.2	7.3	2.9

Chapter 4: IRB chairs

4.1 Background on chairs

A total of 75 chairs responded to our survey. Of these, 66 (88%) were men and 83% were between 41 and 60 years of age. Almost all chairs (91%) had a PhD or MD; the remaining chairs had a law degree, Master's degree, or were a registered nurse. Given that the sample consisted of IRBs at medical centers, it is not surprising that most chairs had training in clinical and biomedical sciences. Most chairs had considerable experience with IRBs: 59% had 6 or more years of experience. Only 13% had two or fewer years of experience.

Two-thirds of the chairs oversaw one IRB committee. Nine chairs (12%) were responsible for two committees. The remaining 16 chairs oversaw between 3 and 5 committees (see Table 4.1).

Table 4.1 Number of committees for which the chair is responsible

Committees	N	%
1	50	67%
2	9	12%
3	6	8%
4	8	11%
5	2	3%

Note: percentages may not add to 100% due to rounding

4.2 Chair's time

We asked chairs about the distribution of time spent in board meetings. We also asked them how their time was spent on different topics, including time inside and outside the board meetings. In the typical board meetings, chairs spent almost half of their time dealing with initial reviews (Table 4.2). Education and ethical issues received less attention in the board meetings.

The overall distribution of chair's time is listed in Table 4.3. Over a third of their time was spent on initial reviews. Time spent on education averaged 11% of the time, which when compared to time spent in committee (see Table 4.2), suggests that many educational issues are handled outside of the committee.

Table 4.2: Distribution of chair's effort in a typical board meeting

	Total	IRB size Small	Medium	Large
Initial reviews	47%	46%	44%	48%
Continuing/Annual reviews	16%	15%	16%	16%
Amendments	9%	7%	9%	10%
Adverse Event Reports	7%	6%	10%	6%
IRB education and training	6%	8%	6%	5%
Ethical principals	3%	4%	4%	3%
Oversight and compliance	5%	3%	6%	4%
Management policy issues	4%	4%	4%	3%
Other	1%	2%	1%	1%

Note: averages are calculated for each category; the columns do not sum to 100%

Table 4.3: Distribution of chair's overall time

	Total	IRB size Small	Medium	Large
Initial reviews	37%	38%	39%	37%
Continuing/Annual reviews	15%	15%	16%	15%
Amendments	13%	11%	12%	15%
Adverse Event Reports	11%	7%	13%	12%
Educating yourself or others	11%	16%	10%	11%
Compliance activities	6%	6%	7%	6%
Managing human subjects office	4%	7%	3%	3%
Other	1%	<1%	1%	2%

Note: averages are calculated for each category; the columns do not sum to 100%

Although the distribution of chairs' time was similar in different sized IRBs and VA and non-VA IRBs, the total hours a chair worked varied with size. The average time per year spent on IRB matters was 350 hours. Chairs at small, medium, and large IRBs, spent on average 116, 296 and 456 hours per year, respectively. This trend was statistically significant ($F_{2,72}$=7.65; p=0.001).

4.3 Review time

The chairs were asked about different types of protocols that underwent full-board review in the last year. In pilot testing, the collection of data on different types of protocols (e.g., those with blood, gene transfer, etc.) provided very unreliable data. Therefore, we asked about simple protocols and complex protocols. We further segmented these two groups into those with special populations and those without.

Table 4.4 shows the mean time it takes to review protocols. Simple protocols took an average of 43 minutes to review. Simple protocols with special populations took an average of 75 minutes. Complex protocols and those with special populations took an average of 117 and 173 minutes to review, respectively.

Table 4.4 also shows that average review time varies by IRB size. Small IRBs took longer in every category, but these differences were not statistically significant

Table 4.4: Average time review protocols in the last year

	Average review time in and outside committee (minutes)			
	Simple	Simple with special populations	Complex	Complex with special populations
IRB size				
Small	55	98	240	240
Medium	37	51	148	210
Large	42	81	96	152
Total	43	75	117	173

Note: IRB size was not statistically associated with review time.

4.4 Budgeting for the chair

A chair's effort on the IRB can be paid in one of three ways: 1) they may be paid by the IRB, 2) they may be paid by their home department but given "release time" to work on the IRB, or 3) they may be paid by their home department and not given release time to work on the IRB.

As shown in Table 4.5, almost 50% of the chairs in our survey reported that they were neither paid by the IRB nor given release time. In essence this means that these individuals are volunteering their time. They still may be required to complete their other responsibilities.

"Release time" was reported only among chairs that were VA employees. Seventeen chairs reported that they were released from other duties to cover IRB duties. One person reported being paid 5% but was released for 20% of their time (see Table 4.5).

Table 4.5: Chair's time released or paid for out of budget

Time paid out of IRB budget	Release time				
	0%	5%	20%	30%	Total
0%	35 47%	8 11%	9 12%	3 4%	55 73%
5%	5 7%	--	1 1%	--	6 8%
20%	9 12%	--	--	--	9 12%
30%	5 7%	--	--	--	5 7%
Total	52 69%	9 12%	11 15%	3 4%	75 100%

Note: Percentages are for the cell and may not add due to rounding.

4.5 Chair and committee education

The survey asked chairs about the information used for continuing education of committee members. On average, 87% circulated newsletters and journal articles, 63% used email communication, 57% used formal lectures or workshops, 85% used brief updates during board meetings, and 60% used national or regional conferences. Interestingly, rates of using these educational methods were more common in medium and large IRBs than in small IRBs (Table 4.6).

Table 4.6: Methods used for training and continuing education of IRB members

		IRB size		
	Total	Small	Medium	Large
Circulation of newsletters or journal articles	87%	67%*	89%	87%
Use of e-mail	63%	47%	68%	63%
Formal lectures or workshops within the institution	57%	33%*	53%	57%
Brief updates during board meetings	85%	67%*	84%	85%
National or regional meetings or conferences	60%	40%	74%	61%

Note: * Significantly less than medium and large IRBs ($p<0.05$; two tailed test).
Percentages are calculated for each category; the columns do not sum to 100%

When the chairs were asked about reading to keep apprised of new information, 33% reported reading books, 68% reported reading journals, 84% reported reading newsletters, and 11% reported reading none of the above. Interestingly, chairs at small IRBs were significantly more likely to report not reading books, journal articles or newsletters (chi-square (2 df)=7.47; p=0.024).

4.6 Committee turnover and use of consultants

In the survey, chairs were asked about the rate of turnover on the committee as well as the committee's use of external consultants. Eighty-eight percent of chairs reported that recruiting committee members was difficult or extremely difficult. Only one chair reported that recruiting members is somewhat easy; no one stated that it was very easy. As might be expected, chairs at small and medium sized IRBs had a significantly easier time recruiting committee members. This probably reflects the time commitment required from committee members on large IRBs. Interestingly, although recruiting members was difficult, the vast majority (81%) of chairs reported that turnover of members was not a problem.

Chapter 5: The cost of IRBs and economies of scale

5.1 Cost of IRBs

For our sample, the average total cost of operating an IRB was approximately $189,000, or $173,000 excluding office space costs (Table 5.1). Costs varied by IRB size. On average, small, medium, and large IRBs cost approximately $78,000, $153,000, and $319,000, respectively. Table 5.1 also shows the median and maximum estimated costs.

Table 5.1 Total estimated cost of operating a small, medium and large IRB

IRB size	Total IRB costs	Total costs, excluding space
Small		
Mean	$78,152	$67,155
Median	$57,365	$49,067
Maximum	$218,478	$200,152
Medium		
Mean	$153,059	$137,923
Median	$146,625	$135,059
Maximum	$345,201	$323,576
Large		
Mean	$319,215	$297,913
Median	$297,051	$182,716
Maximum	$981,054	$917,048
Total		
Mean	$189,131	$173,091
Median	$117,227	$109,831
Sum of IRBs in sample	$13.62 million	$12.46 million

Note: costs represent 2001 dollars
Includes chair's reimbursement
Excludes reimbursement to other committee members and to consultants

The majority of these IRB costs are borne by IRBs that are an affiliated academic medical program or have a joint operating relationship with the VA. Table 5.2 shows the total costs by the IRB's affiliation.

Assuming our sample of 71 is a random sample of VA medical centers, we scaled the sample costs to estimate the amount that the VA and its affiliated academic medical centers spent on its 109 IRBs in 2001. The total cost was approximately $20.62 million on human subjects offices and IRBs. This includes the cost of office space. Excluding office space, the VA and its affiliated academic medical centers spent approximately $18.86 million in 2001. Table 5.2 shows the total costs separated by VA affiliation.

Approximately 61% of the estimated total costs are borne by VA-affiliated IRBs. These are IRBs housed by the affiliated academic medical college. Some operate on their own and others operate with some VA support, usually in the form of staff.

Table 5.2 Estimated total cost of operating VA and VA-affiliated IRBs in 2001

	IRB costs (in millions)		
	VA	Non-VA	Total
Estimated total costs			
IRBs in our sample (n=71)	$5.24	$8.37	$13.62
For all VA medical centers (n=109)	$7.94	$12.68	$20.62
Estimated total costs excluding space			
IRBs in our sample (n=71)	$4.66	$7.81	$12.47
For all VA medical centers (n=109)	$7.05	$11.81	$18.86

Note: costs represent 2001 dollars
May not add due to rounding

5.2 Economies of scale

It is important for policy makers to know if economies of scale exist in IRBs. Such information may encourage reorganization in which the same money can be used to provide more services.

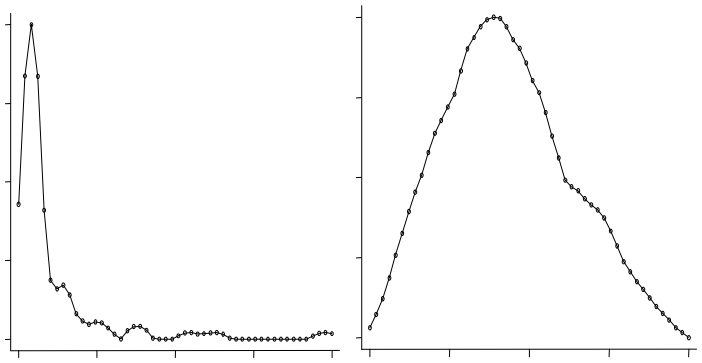
As mentioned in the methods, economies of scale involve developing a regression model in which average costs are regressed on size or volume of output. In this case, output is the number of actions that are reviewed each year.

There are a couple econometric issues that need to be addressed to accurately assess economies of scale. These include: 1) the specification of the dependent variable, 2) the heterogeneity of the dependent variable, and 3) the adjustment for IRB quality. Each of these problems is addressed below.

We tried two alternative specifications for the dependent variable. The first was the average cost per action and the second was the natural log of the average cost per action. In assessing the distribution of the dependent variable, we sketched the distribution using kernel density diagrams, which avoid problems found in histograms with binning the data.[5] We found that the natural logarithm was more normally distributed and provided better fitting models (see Figure 5.1). As such, we used the natural logarithm, and used the smearing estimator to avoid retransformation problems.[6]

The second econometric problem is that study protocols and actions are a very heterogeneous product. One way of solving this problem would be to weight each action with a resource-based relative-value weight. Unfortunately, such weights do not exist. Another potential solution is to include attributes of the dependent variable as explanatory variables. For attributes we included the percent of time spent on each type of protocol. This information was collected in the survey. These attributes must be included as percentages so that they do not reflect scale characteristics.

Figure 5.1: Distribution of the dependent variable using kernel densities



Average cost

Natural logarithm of average cost

The third problem involves adjusting the cost function for IRB quality. It is important to control for quality as it may greatly affect the costs of the IRB. The variables used for quality are described in detail in the methods section.

Table 5.3 Means and description of variables in the cost function (n=67)

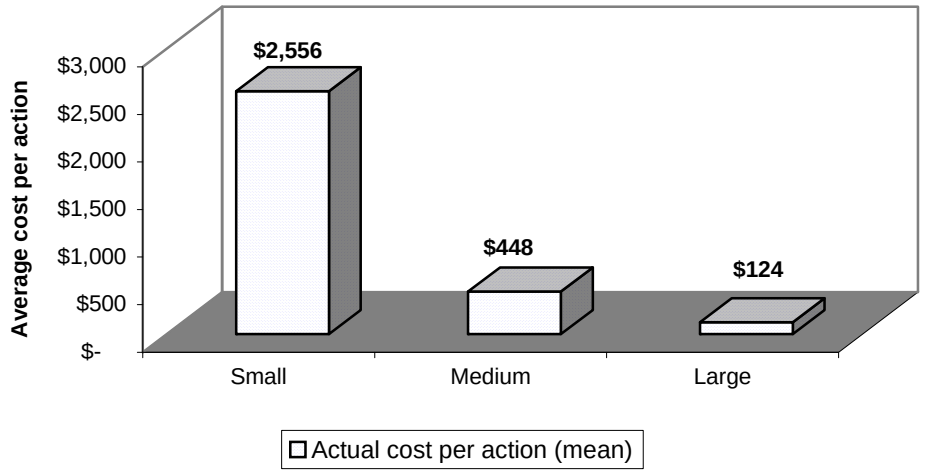
Description		IRB size		
	Total	Small	Medium	Large
		means		
Average cost per action	1,172	3,193	387	123
Natural log of average cost	5.997	7.639	5.908	4.642
Small IRB	0.313	1	0	0
Medium IRB	0.328	0	1	0
Large IRB	0.358	0	0	1
Office performance	0.807	0.825	0.827	0.772
Percent of time with initial reviews	0.215	0.271	0.174	0.203
Percent of time with continuing reviews	0.117	0.112	0.149	0.093
Percent of time with amendments	0.083	0.065	0.098	0.085
Percent of time with AERs	0.059	0.043	0.065	0.067
Administrator is certified	0.194	0.095	0.136	0.333
Percent understaffed (self-reported)	0.399	0.534	0.315	0.358
Percent of chair's IRB effort paid or released	0.528	0.456	0.653	0.476

The regression results indicated that there were strong and statistically significant economies of scale. Even when the model only included scale variables, the R^2 and adjusted R^2 were 0.74 and 0.73, respectively. When we include all explanatory variables the R^2 and adjusted R^2 increased

to 0.84 and 0.81, respectively. The full regression results are presented in Table 5.4. The difference in economies of scale is striking when visually displayed. The estimated cost per action is for small, medium, and large IRBs is presented in Figure 5.2.

We exponentiated the coefficients to interpret the beta coefficients as the marginal increase in the average cost per action. This was done using the smearing estimator, which adjusts the residuals to have the appropriate conditional mean.[6] After this retransformation, the average cost per action for large, medium and small IRBs was $124, $448, and $2,556, respectively. Recall that small, medium, and large IRBs handle approximately 52 (range 3-151), 431 (range 172-826), and 2676 (range 860-12899), actions respectively.

Figure 5.2 Estimated cost per action



Note: Estimates were from regression model
Costs are in 2001 dollars

Given the small sample, the regression model could be influenced by outliers. We ran three specification tests. First for each case we calculated Cooks distance, which is an F statistic comparing the full model and the model if that case were omitted. Large F statistics identify influential cases. The maximum Cooks distance was 0.38 suggesting that there were few influential outliers. In fact, after removing the top four cases (5%), the re-estimated model was similar to the full model (see Table 5.4). Economies of scale remained, although there were slight fluctuations in the other variables.

For the second specification test, we used the Pregibon linktest,[7] which fits a regression model with the fitted values and fitted values squared. The linktest was not significant.

Third, we used quantile regression, where we minimized the absolute values from the median. Quantile regression minimizes the absolute values, whereas OLS regression minimizes the mean values. This model provided similar results to the regression model that excluded the outliers. The strong economies of scale persisted.

Table 5.4: Regression models estimating the economies of scale

	Beta coefficients (t-statistics)		
	Full sample	Excludes outliers[1]	Quantile regression
Small IRB	3.008	3.042	2.818
	(15.34)**	(16.66)**	(15.22)**
Medium IRB	1.294	1.196	1.061
	(6.50)**	(6.46)**	(5.75)**
Large IRB	Reference group		
Human subject office performance (0-1 higher is better)	-0.868	-0.560	-0.402
	(1.42)	(1.01)	(0.69)
% of time dealing with initial reviews	1.256	0.372	0.184
	(2.50)*	(0.70)	(0.40)
% of time dealing with continuing/annual reviews	1.279	2.190	0.384
	(1.18)	(2.04)*	(0.40)
% of time dealing with amendments	-1.669	-0.062	0.39
	(1.24)	(0.05)	(0.33)
% of time dealing with adverse event reports	-1.323	-2.618	-3.375
	(0.70)	(1.54)	(2.02)*
Administrator is certified	0.311	0.196	0.317
	(1.48)	(1.03)	(1.72)
Percent understaffed	-0.327	-0.509	-0.301
	(2.25)*	(3.02)**	(2.60)*
Percent of chair's IRB effort paid by IRB	0.307	0.488	0.648
	(1.42)	(2.37)*	(3.12)**
Constant	5.034	4.816	4.886
	(10.37)**	(10.76)**	(10.44)**
Observations	67	63	67
R-squared	0.84	0.87	--

Dependent variable is the natural logarithm of the average unit costs
Absolute value of t-statistics are in parentheses
* significant at 5%; ** significant at 1% (two-tailed test)
[1] Excludes 5% of outliers identified with Cooks distance

5.3 Sensitivity analysis

In a sensitivity analysis, we included size (number of actions) as a linear variable. The negative association between size and average costs remained strong and significant. Given the functional form restrictions imposed by a linear variable, we used the dummy variables in the main model.

We also tried calculating the size dummies using other cut points (small<125, medium 125-400, and large 401+). This had very little effect on the model or the interpretation.

In further sensitivity analyses, we varied the space costs as a function of the IRB size. Under the assumption that small IRBs would be in a rural or semi-rural area with cheaper space costs, we estimated the annual cost per square foot of space at $34.71, $52, and $69 for small, medium and large IRBs. The economies of scale remained—small IRBs remained significantly more expensive than medium and large IRBs. Also, medium IRBs remained more expensive than large IRBs.

Another concern was that the economies of scale was really detecting wage differences given that small IRBs might be located in areas with lower wage rates. To test for this, we merged the data with the Medicare wage index created by the Centers for Medicare and Medicaid Services (CMS). We used the wage index to calculate the personnel estimates, allowing for geographic wage differences. Consistent with past models, the regression models showed strong economies of scale (data not shown). In fact, the t-statistic for the size variables became even larger. This confirms that geographic wage differences do not account for the economies of scale.

Last, the sensitivity analysis shows that the regression results for the economies of scale were robust to whether the adverse events were included as an action. Removing adverse events from the calculation of the average unit costs, yielded average costs of $247, $654, and $3369 for the large, medium and small IRBs, respectively. These differences were all statistically significant ($p<0.0001$; data not shown).

5.4: Policy scenarios

Given the large economies of scale, savings could be potentially realized through reorganization. However, in the current system, it is difficult to estimate all costs borne by the VA to operate IRBs. Some IRBs are at VA medical centers, and these costs are borne completely by the VA. Other IRBs are at the affiliated medical centers. At these sites, the VA may incur little or no direct costs for using the affiliated medical centers.

Although there may be economic savings by consolidating the number of IRBs, there are potential risks to research if there are too few IRBs. If there are too few IRBs, then the risks of IRB sanctions might be too high. For instance, if VA had only four regional IRBs, then many research projects would be adversely affected if one IRB were sanctioned.

Nevertheless, the current system is in flux and may be suboptimal. In the first months of 2001, 7 VA medical centers either merged their IRB operations with another IRB or disbanding their IRB. It is also not clear that the current system will not become more expensive for the VA. For instance, Vanderbilt University recently asked the VA Tennessee Valley Healthcare System to pay $491,000 for the continued use of their IRB.[8] Although the current system does not entail start-up costs, it is an expensive option, with little predictability, and little control.

Also, the cost model shows that any regulatory mandates, such as increased staffing or increased education and training, will affect the small IRBs much more than the large IRBs. Given the

move towards administrator certification and training requirements, operating costs will become prohibitively expensive for small IRBs.

Given the economies of scale, the VA may want to encourage small IRBs to merge with another small IRB, or to merge with a medium or large IRB. It makes some sense for the mergers to take place in the same geographic vicinity. This would minimize travel time if an investigator were asked to present his or her protocol to the committee.

It is likely that certain types of protocols place a disproportionate burden on the IRBs. More research is needed on this topic, but two scenarios are likely. First, some studies are so technical that it is likely that very few IRBs will have the necessary expertise to conduct an efficient and thorough review. An example is gene transfer. If these situations can be identified, it may be beneficial to centralize review at one site. Local IRBs would be asked to compete for this contract based on their technical experience. Centralized review would precede an independent local review. This model is similar to what is done in the UK[9] and it is also similar to the National Cancer Institution's centralized IRB and the new beryllium IRB established in 2001 by the Department of Energy.

Another type of protocol that places a disproportionate burden on the IRBs is multi-site trials that are processed by expedited review (i.e., the study entails minimal risk). Multi-site review is often blamed for placing a disproportionate burden on local IRBs.[10] The primary type of study in this case is health services research. Multi-site review of health services research can be very expensive and lead to long delays in starting a study without clear benefits.[11] A recent analysis found that the total costs for IRB procedures in an 8-site study of outpatient opiate substitution treatment for heroin dependence was $56,191 (2001 costs).[12] The majority of these costs ($29,824) reflected the IRB's cost for reviewing the additional 70 IRB actions. Coordinating center personnel, space and supply costs were the second largest expense, at $16,951. The additional effort for the investigators at the eight participating sites totaled $9,416. These costs represent the marginal costs associated with the "supplemental" IRB activities that occurred after the study's initial IRB approval.

Multi-site health services research studies that are eligible for an expedited review could be reviewed by a centralized IRB, in lieu of local review. Moreover, as health services research becomes increasingly specialized and influenced by special regulations, such as the Health Insurance and Portability Accountability Act of 1996 (HIPAA), having a centralized review panel may offer benefits over local review.

Chapter 6: Optimal costs

Chapter five focused on current actual costs of operating an IRB, where we included labor, space, training and education, and supplies. One concern is that the actual costs of operating IRBs are inadequate (i.e., too low) and that we need to invest more money into IRBs. In this chapter, we estimate the optimal costs of operating IRBs. To do this, we used the econometric model developed in Chapter 5 to predict the costs under optimal conditions (e.g., no understaffing).

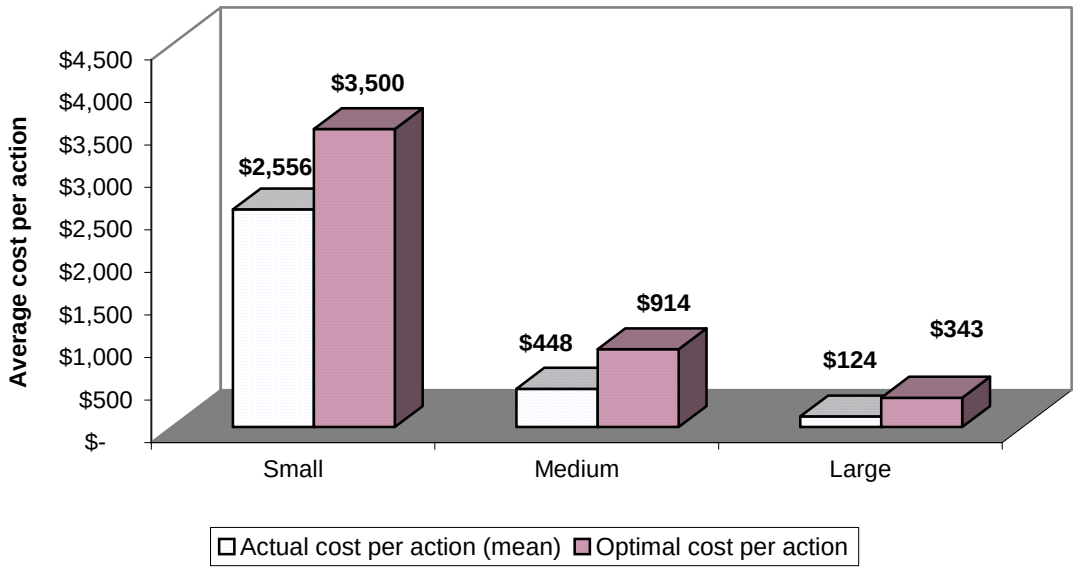
Although this chapter discusses the optimal level of funding, it should be stressed that adequate funding does not guarantee that the IRB will be high quality. Having a high quality IRB requires other criteria, including supportive organizational leadership, responsible investigators, and a culture that respects human subject participants.

6.1 Econometric estimation of optimal average costs

We ran simulations with our data for small, medium, and large IRBs. For the first optimal cost simulation, we made the following restrictions: understaffing was set to zero percent and the administrator was certified. We also assumed that the IRB paid the chair for his/her effort on the IRB.

Figure 6.1 shows the actual and optimal average costs per action by size. The left bar is the estimated actual average cost per action, and the right bar is the estimated optimal average cost per action.

Figure 6.1: Actual and optimal cost per action



6.2 Optimal total costs based on staffing benchmarks

Many experts feel that IRBs are understaffed. The current conventional wisdom is that a full-time (FTE) professional staff can handle approximately 300-350 protocols per year.[13] We used this staffing benchmark to calculate estimates of optimal costs. After calculating the optimal number of staff, we then adjusted the space and education costs accordingly. Additional FTE were assumed to be mid-level coordinators ($40,580 plus benefits). Space was assumed to be a shared office and education was assumed to be $1000. Also, given that protocol reviews excludes AERs, we included an additional FTE if the site handled more than 350 AERs in a year.

According to our survey data, the average number of actions per FTE was 218 (interquartile range 44-254). Small and medium sized IRBs, averaged 45 and 222 actions per FTE, respectively, while large IRBs averaged 381 per FTE. This suggests that large IRBs may be more likely to need additional coordinators. Table 6.1 lists the optimal costs based on the staffing benchmarks. It should be noted that analysis confirmed that strong economies of scale remained.

Table 6.1: Optimal IRB costs and average costs per action based on staffing benchmarks

IRB size		Actual total cost	Optimal total costs	Optimal average cost per action
Small				
	Mean	$78,152	$81,727	$2,952
	Median	$57,365	$68,075	$1,760
	Maximum	$218,478	$218,478	$8,482
Medium				
	Mean	$153,059	$154,716	$345
	Median	$146,625	$146,625	$367
	Maximum	$345,201	$345,201	$587
Large				
	Mean	$319,215	$394,889	$146
	Median	$197,051	$222,581	$144
	Maximum	$981,054	$1,769,296	$387
Total				
	Mean	$189,131	$218,129	$1,134
	Median	$117,227	$140,546	$354
	Maximum	$981,054	$1,769,296	$8,482
	Sum	$13,617,431	$15,705,308	--

Note: Staffing benchmarks were based on 350 actions per FTE

The staffing benchmarks also suggest that the large IRBs are currently understaffed compared to the small and medium sized IRBs. On average, small and medium IRBs would not need to add any additional staff, whereas the large IRBs would need to add 1.8 FTEs. Even after adding these additional people, the economies of scale remained.

6.3 Optimal total costs

We estimated the total optimal cost of operating IRBs. Table 6.2 shows the estimated actual and optimal costs. Optimal costs were forecasted using an econometric model as well as calculated based on staffing benchmarks. These alternative methods suggest that the optimal total costs could be between 13% and 47% higher than current costs.

Table 6.2 Estimated total cost of operating VA and VA-affiliated IRBs

	IRB costs (in millions)		
	VA	Non-VA	Total
Estimated total actual costs			
IRBs in our sample (n=71)	$5.24	$8.37	$13.61
For all VA medical centers (n=109)	$7.94	$12.68	$20.62
Estimated total optimal costs (based on econometric model)			
IRBs in our sample (n=71)	$8.99	$11.00	$19.99
For all VA medical centers (n=109)	$13.61	$16.66	$30.27
Estimated total optimal costs (based on staffing benchmarks)			
IRBs in our sample (n=71)	$5.68	$10.02	$15.70
For all VA medical centers (n=109)	$8.60	$15.17	$23.77

Note: costs represent 2001 dollars

Chapter 7: IRBs & market competition

Although some IRBs charge initial review fees ranging from $1,000 to $2,500, most academic and research institutions rely on indirect funds from grants to support the IRB. By combining our cost estimates with the VA RDIS administrative data, which tracks all grant funds, we estimated the level of grant indirect costs necessary to sustain the IRB. We only made this calculation for VA IRBs because we did not have complete grant information for non-VA institutions.

At large VA medical centers, which review approximately 1,359 actions per year, we found that the average cost of operating an IRB was approximately 2% of grant revenues (Table 7.1). At medium sized VA medical centers, the average IRB would require approximately 4% of grant revenues (371 actions per year). On average, small VA IRBs, which handle 68 actions, would need over 12% of grant revenues. The average is somewhat misleading because grant revenues and IRB costs are skewed. Therefore, we also present median estimates in Table 7.1. Yet even at the median the story is still the same, if not more favorable towards large IRBs. The median sized small, medium and large IRB would need 87%, 5%, and 2% of the grant revenues to operate.

Table 7.1: VA IRB costs in relation to the grant revenues

Size	Costs	Grant Revenues	IRB Actions	IRB costs as a percent of grant revenues
Small VA IRBs				
N=23				
Mean	$78,453	$615,502	52	12%
Median	$52,631	$60,173	30	87%
Medium VA IRBs				
N=19				
Mean	$139,698	3,687,653	371	4%
Median	$127,479	2,788,433	357	5%
Large VA IRBs				
N=7				
Mean	$92,008	3,268,286	1359	3%
Median	$73,898	3,914,010	1265	2%
Total				
N=49				
Mean	$97,332	2,185,713	374	4%
Median	$78,750	705,433	198	11%

Note: These costs are restricted to only VA IRBs in our sample
Grant revenues reflect VA and non-VA grants involving human subjects.

In addition to indirect funds, IRBs could also generate revenues by charging a review fee. As mentioned above, some IRBs already charge initial review fees that range from $1,000 to $2,500. The use of review fees indicates that an IRB market is developing. Another indicator of this fact is that approximately 25 private centralized IRBs already exist.

At present, there is little market competition among IRBs. Most researchers are required to use their organization's IRB. However, federal regulations do not require each organization to have its own IRB. The organization could contract with an IRB at another organization or use a private centralized IRB. According to the Office of Human Research Protections (OHRP), the institution needs to ensure proper human subjects protections and will be held liable if problems are found. This is true whether the institution uses its own IRB or another institution's IRB.

Market competition is often viewed as having a positive influence on efficiency as organizations compete. However, there can be some significant problems with market competition that could lead to market failure. These potential problems include natural monopoly and product heterogeneity. Each of these is discussed below.

7.1 A natural monopoly

In a market with large economies of scale, it is natural to question whether this is a situation in which a natural monopoly would be most efficient. First, it is unclear from these data whether a single IRB would be more efficient than alternative models. While these data do suggest that small IRBs are less efficient, perhaps a more politically viable model would include *regional* IRBs. A potential advantage of regional IRBs over a national IRB is that the regional IRBs may have better ability to oversee compliance activities.

Although many policy makers and ethicists like the current system of IRBs, the growth of a market may doom small IRBs through price competition alone. With our data we calculated the average cost per initial review. The data show that if small, medium, and large IRBs charged a review fee of $2,500 and that this was their only source of revenue, 91% of the large IRBs would break even or make a profit. Sixty-seven percent of the medium IRBs would break even or make a profit, and only 15% of the small IRBs would break even or make a profit. If competition increased and the review fees dropped to $1,500, then only 5% of the small IRBs and 29% of the medium IRBs could break even. Survival for small and medium sized IRBs would likely depend on subsidies or on their ability to grow into large IRBs.

Survival rates of small and medium IRBs would further decrease if additional quality regulations were passed and the prices did not change accordingly. If we calculate the average review fees based on optimal costs, then no small IRB would break even at $2,500. Moreover, only 10% and 36% of the medium and large IRBs would break even at this price.

7.2 Product heterogeneity

A key assumption for perfect competition is that there are a large number of firms, each producing a homogeneous product. According to OHRP, there were over 1,500 institutions with Federalwide Assurances (FWA).[14] The problem is that IRB products are not homogenous. The

approval process is usually rigorous and up to 90% of the time the IRB asks for changes in the study protocol.[15] However, requests for changes are not always consistent, making the time to get an approval highly variable. For example, a recent multi-site HIV cost and utilization study reported that the time to obtain human subjects approval varied across sites from 1 to 17 months.[11]

The primary problems with product heterogeneity are pricing and quality. If every initial review is charged the same price, such as the average cost, then very simple protocols pay more than is necessary, while complex protocols pay less than is necessary. This does not necessarily cause problems for an organization in any given year. However, this sets up incentives that can be exploited by organizations over time. Some organizations might refuse complex protocols so that they can make additional profits from basic protocols. This will also encourage organizations to be less rigorous with complex protocols so that they do not lose money. This is dangerous as the complex protocols pose the greatest risk to human subjects.

Will the problem of product heterogeneity solve itself? This is highly unlikely and this situation may cause market failure. Therefore, this may be an appropriate place for additional regulations, either through an association or through the government. Additional regulations could address the problems with both pricing and quality.

For pricing, one would need to establish mutually exclusive categories. Protocols would get placed in a category based on their attributes. The attributes would reflect the wage-adjusted time necessary to review the protocol. Ideally, the protocols within a category would be relatively homogenous. Pricing would then reflect this time; more complex protocols, such as gene transfer, would cost more than less complex protocols.

To address the potential quality problems, professional standards would need to be set and monitored. To some degree this is already being addressed in the VA, which recently contracted with NCQA to audit every VA and VA-affiliated IRB. But all IRBs, not just VA IRBs, would have to agree to standards, monitoring and oversight. To some degree the quality problem is more difficult to address than the pricing problem. The definition of quality changes over time, especially as quality indicators become less predictive over time.[16]

Chapter 8: Discussion

8.1 Comments in response to the 2000 GAO report

In 2000, the GAO[17] identified three specific weaknesses in VA's system for protecting human subjects. They were:

1. The VA has not done a good job ensuring that research staff had appropriate guidance regarding human subjects protection,
2. The VA has had insufficient monitoring and oversight activity, and
3. The VA has not ensured that the necessary funds for human subject protection activities are provided.

In response to the first criticism, 64% of IRB administrators reported that they held educational sessions for investigators and students on the requirements for human subjects protection in the last year. The majority of IRBs held educational sessions on requirements for human subjects protection (64%), the informed consent process (61%), and procedures associated with IRB review (51%). Forty-seven percent of IRBs held educational sessions on the responsible conduct of research for investigators and staff (see Table 3.6). Education and training sessions were also held for the IRB staff and committee members. These sessions were held with approximately the same frequency as those for investigators and students. Sessions were more commonly provided to chairs and members than to IRB staff.

Self-and peer-education was one of the most frequent activities performed by the IRB administrator. According to administrators' estimates of time spent, approximately 20% of their time each week was spent educating themselves and others

The GAO[17] also criticized VA for poor monitoring and oversight of its IRBs. In part, VA responded to this criticism by creating ORCA. The VA has also set up plans to conduct routine onsite monitoring of medical centers' research programs, and it has contracted with NCQA to accredit all of its IRBs over the next five years.

In our survey, we find that VA IRBs are aware that they should have written documentation and should strive to improve quality. The use of a research compliance plan or a quality assurance plan was used in the majority of sites (58%).

The survey asked administrators how the human subjects office assessed its own performance. As shown in Table 3.7, 7% of IRB administrators stated that they collected outcome data on a regular basis, and 38% reported having a stand-alone evaluation. However, 38% also said that they did not assess their performance. VA IRBs were more likely to not check their performance compared to non-VA IRBs (chi-square (3 df)=8.66; p=0.034).

Last, the GAO[17] report criticized the VA for failing to support its IRBs. In our survey, we collected information on staffing and asked administrators if they felt that the human subjects office, excluding committee members, was understaffed. In general, each institution has an average of 4.2 staff employees, with an average load of 2.94 full-time equivalent (FTE) employees; these numbers include the director and support staff, but do not include any chair(s) or committee members. As expected, small IRBs had fewer FTE employees (1.05) than medium

or large IRBs, which had an average of 2.23 and 5.44 FTE employees, respectively. VA IRBs and non-VA IRBs had similar staff levels.

In the survey, we asked administrators if the office was understaffed and, if so, by how much. A total of 50 (72%) administrators reported that the office was understaffed. Among those who thought the office was understaffed, 89% thought it needed 1-2 staff members, while 11% thought it needed 3-4 persons. No administrator stated that the IRB needed more than 4 additional persons. Perceptions of understaffing did not vary by IRB size: 62%, 77%, and 76% of large, medium and small IRBs reported being understaffed. These differences were not statistically significant.

IRB location was not a significant predictor of reported understaffing, but it was a predictor of the magnitude of understaffing. Twenty one percent (5) of non-VA IRBs reported needing 3-4 persons, compared to 4% of VA IRBs. In contrast, 74% of VA IRBs reported needing 1-2 persons compared to 39% of non-VA IRBs. This difference was statistically significant (chi-squared (2df) =9.23; p=0.01).

8.2 Study implications

The cost model suggests that there are large economies of scale in operating IRBs. The actual per action cost at large IRBs was $124 compared to $2,556 at small IRBs. The average cost per action for medium sized IRBs was $448. This is closer to the average cost of large IRBs, although it was still significantly greater. A factor underlying this cost difference is that large IRBs are better able to spread the fixed costs across the workload.

As expected, when we compared the actual cost estimates to the optimal cost estimates, we found evidence to suggest that IRBs are underfunded. Depending on how the optimal costs were calculated, the underfunding ranged from 13-47%. The discrepancy between the optimal costs and the actual costs raises concerns about how to increase funding to IRBs. As DHHS Secretary Shalala[18] recently wrote "...the ultimate responsibility for protecting human subjects must be borne by the institutions that perform the research," reiterating a mandate imbedded in the federal regulations.

There are different mechanisms available to IRBs to obtain more revenues. The first and perhaps easiest way is request more indirect funds (i.e., funds from grants) from the parent organization. According to our data, this solution may be very difficult for small IRBs. The data from our VA medical centers suggests that, on average, running a small IRB requires a greater percentage of the grant revenues at the medical center. In contrast, the operating cost of medium and large IRBs is less than 5% of grant revenues.

The second mechanism by which IRBs could generate revenues is by charging review fees. This issue was raised in 1978[19] and again recently by the National Bioethics Advisory Commission.[20] While some IRBs already do this, the prevalence of this practice is not known. Prepayment introduces strong incentives for efficiency. By collecting review fees, IRBs are able to set budgets and to plan ahead. For instance, an IRB administrator could estimate next year's budget based on the present year's workload and the price schedule. While this would encourage

efficiency and price competition, such a system would only be advisable if quality standards could be set and monitored. In addition, the fee schedules should account for differences in the use of resources as a gene therapy trial costs much more to review and to monitor than a survey of healthy patients. Otherwise organizations may try to game the system by cutting quality. The problems were raised in Chapter 7.

Reorganizing the IRB programs to take advantage of the economies of scale is another option that could save considerable money. The savings depend on how the programs are reorganized (see Chapter 6).

This study is limited in that it relies on survey data collected in 2001. Some of the issues, such as IRB quality and protocol complexity would be better to collect from administrative datasets. However, such administrative datasets do not exist.

Although adequate resources are an important component in enhancing protections for human subjects, more resources do not necessarily guarantee a higher quality IRB. That will require, in addition to resources, better education and training for staff, chairs and members, ongoing quality improvement efforts, and a cultural change that emphasizes research ethics at the institutional level. These efforts are now beginning, and many organizations, including the Institute of Medicine, Association of American Medical Colleges, and National Bioethics Advisory Commission are formulating recommendations for change. But more research is needed to guide these changes and to ensure that they will be beneficial.

It is hoped that these data allow for a more complete discussion on the costs and benefits of IRBs in the VA. Although additional research is needed to provide more accurate cost estimates, a logical next step would involve bringing together key leadership from the VA and non-VA to discuss creative ways for increasing IRB quality while maintaining or reducing the cost of IRBs.

References

1. Gold MR, Siegel JE, Russell LB, Weinstein MC, eds. *Cost-effectiveness in health and medicine*. Oxford: Oxford University Press; 1996.
2. Officefinder. Tenants rules of thumb. Available at: http://www.officefinder.com/how.html. Accessed October 11, 2001.
3. Oncor International. Available at: http://www.oncorintl.com/downloads/marketrepts/overview-midyear-01.html.
4. Gertler PJ, Waldman DM. Quality-adjusted cost functions and policy evaluation in the nursing home industry. *Journal of Political Economy.* 1992;100(6).
5. Tarter ME, Lock MD. *Model-free curve estimation.* Vol 56. New York: Chapman & Hall; 1993.
6. Duan N. Smearing estimate: a nonparametric retransformation method. *JASA.* 1983;78(383):605-610.
7. Pregibon D. *Data analytic methods for generalized linear models* [Doctoral dissertation]. Toronto, University of Toronto; 1979.
8. Walsh M. Personal communication, November 7, 2001; 2001.
9. Middle C, Johnson A, Petty T, Sims L, Macfarlane A. Ethics approval for a national postal survey: recent experience. *Bmj.* 1995;311(7006):659-660.
10. Burman WJ, Reves RR, Cohn DL, Schooley RT. Breaking the camel's back: multicenter clinical trials and local institutional review boards. *Ann Intern Med.* 2001;134(2):152-157.
11. Berry SH, Perlman JF, Nederend S. Variations in Institutional Review Board (IRB) response to requests for approval to implement the HIV Cost and Services Utilization Project (HCSUS). Paper presented at: Association for Health Services Research, 1998; Washington, D.C.
12. Humphreys KN, Trafton J, Wagner TH. Estimating the cost of Institutional Review Board procedures in multi-center treatment research. *VA Palo Alto, Menlo Park CA.* 2002.
13. Sugarman J. The role of institutional support in protecting human research subjects. *Academic Medicine.* 2000;75(7):687-692.
14. OHRP. Federalwide Assurances. Available at: http://ohrp.osophs.dhhs.gov/humansubjects/assurance/nfed.htm.
15. Levine R. *Ethics and regulation of clinical research.* 2nd ed. New Haven, CT.: Yale University Press; 1986.
16. Meyer MW, Gupta V. The performance paradox. *Research in Organization Behavior.* 1994;16:309-369.
17. General Accounting Office. *VA research: system for protecting human subjects needs improvements.* Wasington D.C. 2000. GAO/T-HEHS-00-203.
18. Shalala D. Protecting research subjects -- what must be done. *New England Journal of Medicine.* 2000;343(11):808-810.
19. National Commission for the Protection of Human Subjects of Biomedical Research. *Report and recommendations: institutional review boards.* Washington DC: DHEW; 1978.
20. National Bioethics Advisory Commission. *Ethical and policy issues in research involving human participants.* Bethesda MD December 19, 2000 2000.