

The Value of Scientific Conferences: a longitudinal survey

James W. Aiken, Ph.D.
Chief Executive Officer
Keystone Symposia on Molecular and Cellular Biology

I can't remember the last time I attended a conference where I wasn't given a form to fill in evaluating the event. Most are questions that help organizers plan future events; few ask questions that get to the core of the conference's lasting value. While writing a grant proposal for the Bill & Melinda Gates Foundation, I found myself in the position of having to propose a method for quantitative assessment of the value of our *Keystone Symposia* conferences. Had I been proposing to vaccinate children, well I could count them, but what about a conference? *Keystone Symposia* has stated objectives: To connect the scientific community for the benefit of society, for example, or to catalyze scientific progress and accelerate achieving research goals. Contemplating how to measure these objectives was the origin of the survey described below. It is a first step to document whether attending a conference produces factual value. The Survey was conducted over two seasons of *Keystone Symposia's* meetings; Winter/Spring 2004 and Winter/Spring 2005. The list of conferences included in the survey is shown in Table 1. [Find at the end of this document].

Format of Survey

The survey asked respondents whether they agreed or disagreed with a statement about the conference attended, using a five point scale: *Strongly Agree; Agree; Neutral; Disagree; Strongly Disagree*. Data were collected, initially, during the final 24 hours of eight selected conferences using a paper questionnaire, and again, nine months following each conference using an email questionnaire (10 conferences with nine-month data; the original 8 plus 2 additional ones), and again by email at 18 months after the 2004 conferences (5 conferences with 18 month data). Responses were anonymous and at each time period the data were independent, i.e. we could not link a response from any person at one survey time to their response at the next survey time.

The results presented herein focus on the nine month data, which has been repeated over two seasons and includes 1013 responders from 10 conferences (30% response rate). Independent scientists were 56% of the responders, postdoctoral fellows 25%, and Students 19%, a similar distribution to the actual attendance. Data from the 18 month survey, which was obtained from 268 responders for just the five 2004 conferences, are included sparingly, mainly for the purpose of showing that responses, when compared with nine months, were consistent with earlier survey data and/or changed in the expected direction over time. Nine month results from the two conferences whose attendees did not see the survey during the conference were not significantly different from the eight who did.

Collaboration and Sharing of Information

Results from the questionnaire given out on the last day of meeting were of interest only to compare what people anticipated *versus* what actually happened within 9 months after the meeting. For example, at the time of the meeting, they were asked to respond to this statement:

I established contact with someone at this conference that I anticipate will lead to either a collaboration or future sharing of information, data, or techniques.

At the time, 70% agreed or strongly agreed that they anticipated a contact made would lead to either collaboration or future sharing of data or techniques; 26% neutral, and 4% disagreed.

In the 9-Month survey, the statement was reworded to determine what actually had occurred since the meeting:

Since the conference, I have fostered contact with someone I met at this conference that has lead to either collaboration or sharing of information, data, or techniques.

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Number	195	412	293	91	18
Percent	19%	41%	29%	9 %	2%

At nine months, 60% of responders agreed that their contact with someone had actually led to collaboration. It was reassuring to find that at eighteen months 63% agreed, both confirming the 9-month data and suggesting a little more movement in the direction the originally anticipated 70% outcome. An often stated objective of *Keystone Symposia* is “to connect the scientific community”, so these results were particularly encouraging for us.

At the time of the meetings, 90% agreed with the statement that they anticipated that they would share information learned at the meeting with colleagues who did not attend. Nine months after the meeting, again 90% agreed that they had, in fact, shared new information with colleagues who did not attend.

Since the conference, I have shared new information that I learned at the conference with my colleagues who did not attend.

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Number	360	543	87	14	4
Percent	36%	54%	9%	>2%	>1%

It is not unexpected that almost everyone agreed with this statement, but even so, it is heartening to confirm that the information learned at the conference is being disseminated by such a high percentage of attendees to a broader audience.

During the meeting, 64% agreed with the statement: “I will leave this conference planning to accelerate publication of some of my data.” At nine months the statement was reworded:

Since the conference, I have submitted or published some of my data related to topics discussed during the conference.

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Number	144	248	340	218	59
Percent	14%	25%	34%	22%	6%

After the conference, 49% agreed that they had submitted or published data related to topics discussed during the conference; at eighteen months, 52% agreed with the statement

Impact on Research

At nine months and eighteen months, respectively, 64% and 66% of the attendees agreed with the statement that they became aware of a new idea or concept at the conference that, since then, has altered the direction of their research.

Since the conference, a new idea or concept (either openly stated or created in your mind), which I became aware of during the conference, has altered the direction of my research.

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Number	139	497	295	67	7
Percent	14%	50%	29%	7%	>1%

Similarly, 39% and 52% at nine months and eighteen months, respectively, agreed that since the meeting there had been a major advance in the field that was based on an idea or concept revealed or conceived of during the conference.

Since the conference, there has been a major advance in this area of research, either by me or others in the field, based upon an idea or concept that was revealed or conceived of during the conference.

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Number	76	316	513	89	12
Percent	8%	31%	51%	9%	1%

This survey did not address how an investigator's research direction was altered, or exactly what breakthrough they thought happened during the following 18 months. Answers to those questions, however, would be relevant to assessing specific outcomes resulting from information learned at the conference, a rigorous test of the value of any conference.

At the time of the conference a very high percentage, 85%, agreed with this statement:

I learned something specific at this conference that I anticipate will save me time, money or accelerate reaching a research goal.

Nine months later, 42% of attendees agreed that they had actually used something they learned to save time, money or accelerate reaching a goal. Even though only 6% disagreed with the statement (48% were neutral), the "agree" results at nine months were only half of what had been anticipated during the meeting. Eighteen months after the meeting, agreement with the statement had jumped to 52%, but still below anticipated. With all five of the previous statements above, there was no difference in the

way students, postdoctoral fellows or independent scientists responded, but with this one there was. Students or postdoctoral fellows comprised about 44% of the responders at nine months and independent scientists the remaining 56%. We found that Independent Scientists (data below) were more likely to agree with this statement:

Since the conference, I have used something specific that I learned at the conference that has saved time and/or money, or accelerated reaching a research objective.

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Number	127	164	251	20	3
Percent	23%	29%	44%	4%	>1%

Fifty-two percent of independent scientists agreed with the statement; 30% of trainees agreed (not shown above). Furthermore, as expected over time, because as trainees move on, the portion of responders who were independent scientists went up, from 49% during the meeting, to 56% at nine months, to 62% at 18 months, which may account in part for the increased “agree” response at 18 months. These results make one speculate whether students and postdoctoral fellows might sometimes learn new information that adds to their workload, an issue not addressed in this survey. If so, hopefully, the information that added work also improved the final quality of their investigation.

A follow up question was included for all of those who agreed with the statement above, asking them to quantify the time saved and/or the money saved. Some responders commented that they were not able to do that very precisely and did not attempt it. Some gave answers that were not useable for quantifying data, such as “weeks” or “months” or “thousands”. My favorite comment was: “I was awarded an R01 grant – Priceless”. In fact, several responders indicated that they saw a direct connection between information learned at the meeting and a successful grant application.

The actual amount of time saved by 250 responders, grouped in quintiles of 50, is shown in Table 1, along with the average estimate of money saved (or diverted to more effective use) from 140 responders; 28 in each quintile. The range of responses was wide, and skewed by some high values. (One extreme one was excluded.) Hence the top quintiles were substantially higher than the medians, which were 6 weeks and \$6000 saved.

Table 2: Time and money saved assessed 9-months following the conference.

Quintiles	Lowest	4th	3rd	2nd	Highest
Average Time saved (wks)	2	4	7	10	33
Average Money Saved (US\$)	\$1000	\$3300	\$6800	\$12,000	\$48,000*

* Highest value, \$2.5 Million, not included in this mean.

Potential Impact on Careers

At nine months, 33% of attendees agreed or strongly agreed with the statement:

Since the conference, someone with whom I established contact during the conference has been helpful to my career.

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Number	75	259	481	164	30
Percent	7%	26%	48%	16%	3%

At eighteen months, 39% agreed. Interestingly, the data for independent scientists, students and postdoctoral fellows were not different.

Discussion

What did we learn? I think we learned what we hoped to be the case, or perhaps what we previously had assumed was true: Attending a scientific conference is not only fun but also has immediate value for your research program. This survey quantifies, at least for one organization's conferences, the extent of the certain benefits for the attendees.

The two aspects that stand out most are, first, the high number of scientists who met someone with whom they started collaboration, and second, the high number of scientists that learned something that changed the direction of their research. I would like to think that some of the collaborations were catalyzed by the retreat-like environment conducive to informal interactions that we strive for at our conferences. The average attendance of the events in this survey was about 330, and our conferences are held at venues where attendees have lots of time to mingle and do unstructured activities together. It would be interesting to compare these data to results from a much larger (or smaller) meeting held at an urban venue.

The finding that 66% of attendees learned or conceived of something new that changed the direction of their research is the tip of an important iceberg. What lies below to be discovered is the impact of the changes. A challenge for meeting organizers is to design practical studies that obtain information to confirm whether or not the change in direction led to positive outcomes. Comments added to the survey would suggest that this is the case, but the evidence is still anecdotal.

It would make sense that changes in research direction are linked in some way to the responders who claim to have saved time, money or reached goals faster. In fact, 80% of those who said they saved time also agreed that they learned something that changed the direction of their research. Saving time might be as simple as meeting someone at the conference who can give you a needed reagent that may have taken you two weeks to prepare yourself. Some claim to have saved two years; it would be interesting to know the details here. The value of time saved is hard to assess, which may account for some responders not attempting to answer that question with a dollar amount. At the easy end of the spectrum, one can simply translate the cost of running a project for a week and multiply it by the weeks saved, and assume that the funds were diverted to more effective use or to advancing the project towards its goal ahead of plans. At the more complex end, how does one assess the value of reaching a goal faster than anticipated?

The amount of money that participants "saved" has to be considered a rough estimate. The value of a meeting may not be easily translated into dollars, and I question following that path in future surveys. Rather, I would like to pursue avenues that reveal specific, and perhaps unexpected, outcomes that resulted from ideas generated

because the event took place. One aspect of the money diverted to more effective use, however, is worth mentioning. Conservative extrapolation to the entire *Keystone Symposia* season of meetings would suggest that at least \$20 to \$30 Million in research funds are diverted to more effective use each year use because of information learned at our conferences. Since most of the responders are Academic and Government scientists (over 80%), the more effective use of research funds is likely to be money that has come from major funding agencies (NIH, MRC, etc). It would follow that one consequence of the conferences is that government (i.e. taxpayer) funded research support is used more efficiently.

The results are of potential value to *Keystone Symposia*. They provide a benchmark from which we can attempt to raise standards. Continuous improvement in conference quality should be an expected outcome. We have shared most of this information with other non-profit meeting organizations, and at least one that I am aware of, the Wellcome Trust at Hinxton, UK, plans to use it internally as a benchmark. I began this article with the implication that post-conference surveys were routine, perhaps too routine. We use a different email survey following every meeting, which provides useful feedback on the operational success of a meeting, as well as important comments for helping future organizers. A challenge for us is to measure our progress in enhancing conference quality without being too bothersome for attendees. All meeting organizations have objectives. *Keystone Symposia* wants to “connect the scientific community for the benefit of society”. This survey provides evidence that we are doing fairly well connecting the scientific community; more data are needed to determine to what extent that results in benefits for society.

Table 1: *Keystone Symposia* conferences included in the survey

2004

NF- κ B: Biology and Pathology

Biology of Hypoxia: Role of Oxygen Sensing Normal Function and Disease
siRNAs and miRNAs

Molecular Mechanisms of HIV Pathogenesis

HIV Vaccine Development: Progress and Prospects

2005

Diabetes Mellitus: Molecular Mechanisms, Genetics and New Therapies

Obesity: Molecular Physiology and Genetics of the Control of Body Weight

Tuberculosis: Integrating Host and Pathogen Biology

Molecular Helminthology: An Integrated Approach

Drugs against Protozoan Parasites: Target Selection, Structural Biology, and Medicinal Chemistry
