



Presidential Commission
for the Study of Bioethical Issues

TRANSCRIPT

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DR. GUTMANN: We're going to get started, and we're going to have the hard stop at noon.

This is a time where we're going to spend an hour deliberating a potential first report in response to President Obama's charge. We will ultimately have a multi-part report, but because there is a part of our report that's about the timely integration of ethics into neuroscience, we thought that we should address that in a timely fashion.

So the focus of this preliminary report is the integration of ethics into neuroscience research across the life of the research endeavor, and this morning's panel was well designed to launch us into that, and we've had other conversations at earlier meetings about it, and by releasing an early report on ethics integration and neuroscience research, we can guide institutions in developing necessary infrastructure for ethics integration, infrastructure that might be well equipped to address broader ethical and social implications that I'm certain we'll consider in our later report.

So the first report reflects our firm commitment to early integration through a timely dissemination of our own insights and conclusions.

So let me just frame this briefly and then outline three potential recommendations and open it up for Commission members to refine, reflect on what more or less, but probably more because these will be broadly framed, but first the context.

The brain has long been an object of scientific inquiry. In its groundbreaking investigation of the brain and its relation to the mind, contemporary neuroscience both raises fundamental questions about what makes us human and also holds out hope for discovering improved interventions and perhaps even cures for brain related diseases that afflict tens of millions of Americans and many as a billion people worldwide and some of the neurological illnesses that are potentially -- for which there may be potential breakthroughs through neuroscience are dementia, epilepsy, multiple sclerosis, Parkinson's disease, bipolar disorder, traumatic brain injury, and that's just to name some of many.

Many of the ethical issues raised in neuroscience research are not unique to this field. The ethics of data privacy, informed consent, minimization of risk, for example, are common to research in many scientific fields.

Some issues, however, such as those regarding privacy of our thoughts, threats to our personal volition or tinkering with our self-determination or whether we are over the lifetime the same self or multiple selves, are expressed certainly in sharper relief in neuroscience.

So let me just give one very brief, not thoroughly by any means played out, example which I think will play out more as an example in our report: dementia. It raises a host of ethical and societal issues with which neuroscience and the BRAIN Initiative must inevitably

engage. Prominent among these are questions about how dementia affects notions of the self; when informed consent is informed consent in the life of a patient who has progressive dementia.

In the case of Alzheimer's, it is progressive over a large space of time, and researchers, health care providers, and loved ones face dilemmas when a person's previously healthy self expressed preferences that conflict with his or her current wishes and circumstances. For example, in her young adulthood one patient strongly expressed she would never want to live in an assisted living facility, but her current self with dementia seems amenable to the idea.

Health care professionals and loved one must reconcile the ethical difficulties they encounter such as when pre-dementia autonomy, post-dementia autonomy, decision making capacity and beneficence appear in conflict.

That's a good example of where really careful research early on can make a difference in what scientists, clinicians understand and what they potentially -- what ordinary citizens like all of our selves who have to deal with this issue might do.

An example we've been given, a man prior to having dementia expressed the strong and clear preference against invasive treatments if his cancer were to return. The cancer recurs many years later after he has progressed to the middle stages of Alzheimer's disease at which time he insists on a major surgery that might extend his life, but is unlikely to markedly improve its quality.

The ethical question focuses on which version of his self should take priority and which decision best reflects his wishes. Neuroscience makes engagement with these issues inevitable. Its discoveries could also change how we view the self in those with dementia and in general.

So neuroscience advances also can raise questions about justice and professional ethics, such as in the case of cognitive neuroenhancement, which we discussed yesterday. Humans have long had hopes and concerns about pharmacological and technological interventions to improve mental and physical capacities beyond normal functioning. The whole idea of normal functioning raises a host of issues.

The terms "cognitive enhancement" and "neuroenhancement" cover a broad spectrum of methods from nutrition to electromagnetic brain stimulation. These are methods that improve or are thought to improve some aspect of cognitive function. Effective and safe cognitive enhancers have the potential to offer significant individual and societal benefits, but they're full of risks also about the possibility of misuse.

So that's just to put a context of why neuroscience raises in high relief some of the questions that ethics brings to science. So although ethics is already integrated into science in various ways, as it is in many human activities, more explicit and systematic integration serves to

bring implicit ethical judgments into sharper relief and allows their merits to be assessed more mindfully.

So here are three potential recommendations for our consideration. Open it up for discussion after I review these three.

The first is a strong statement about ethics integration in neuroscience research and that it should occur and should occur now with the rationale, a background rationale for that integration. We can't just say it and assume it. I think our earlier discussion -- Nita I thought highlighted it, and I think we're all in heated agreement. We need the rationale for it, specifically the rationale for institutions and individuals engaged in neuroscience integrating ethics across the life of a research endeavor wherever relevant and taking immediate steps to make explicit a system for doing so, not a single system across the tens of thousands of neuroscience researchers and hundreds, if not thousands, of institutions, but a system that works best on the ground.

We must also recognize that successful integration cannot occur without resources. Sufficient resources, including financial resources, human resources and expertise must be dedicated to support ethics integration as well. So a recommendation along the lines that institutions and individuals engaged in neuroscience research should integrate ethics across the life of a research endeavor and take immediate steps to make explicit their means, systems for doing so. Sufficient resources must be dedicated to support such integration. So that's number one.

Two, it is critical that systems for integrating ethics in neuroscience research not operate in a vacuum. Once implemented, institutions and individuals engaged in neuroscience research should evaluate the effectiveness of their means and systems. Research funders should also support research that develops effective, innovative approaches to integration and evaluates the most effective ones, existing and new approaches.

So we learn from different approaches. The best available evidence of what works should inform ethics integration moving forward. So a draft recommendation would read something as follows: upon implementing explicit systems for ethics integration, institutions and individuals engaged in neuroscience research should evaluate the effectiveness of their systems.

Government agencies and other research funders should initiate and support research that, one, develops innovative approaches; two, ethics integration and, two, that evaluates existing and new approaches to ethics integration.

Institutions and individuals engaged in neuroscience research should take into account the best available evidence for what works when implementing, modifying or improving systems for ethics integration. So that's two.

Finally, third, we've discussed this, and it's a premise of what we do, that the ethical challenges raised by neuroscience are not unique, and the ethics needed to ensure its progress overlaps with the ethics needed to ensure progress in most, if not all, science.

We've heard repeatedly that it's essential to ensure that all scientists understand the role of ethics and good science, and I should say that all those involved in ethics understand the importance of understanding the empirical issues raised in science.

Graduate school is the most specialized stage in the education of students. Bioethics education should continue through all stages of a scientist's education as ethical issues often become more complex, but graduate school is certainly not the best place to start ethics education. Foundations for ethical thinking must be laid earlier at all levels, and we should take this opportunity to recommend that research funders initiate and support research to develop and evaluate models for integrating ethics in science through education at all levels.

This, in effect, is the companion to recognizing that we need science education early on in students' learning, and we need science and ethics education early on. Government agencies and other research funders should initiate and support research, developing effective and innovative models, and evaluating existing and new models for integrating ethics and science through education at all levels.

And this is in some sense the backdrop recommendation for what I said earlier. I would like to co-author something on, you know, ethics education and science or neuroscience. It's never too early or too late, and look at the different kinds of ethics education that exist out there and what's most promising and what kinds of research might be done to further that effective education.

So those are the three potential recommendations. Question open to the Commission: what do you think of any or each of these and the approach that we're taking? And so I just open it up now.

Christine.

DR. GRADY: So just based on actually our discussion this morning, I think that especially in response to the first recommendation that you suggested, Amy, in addition to making a case and defending a good rationale for why ethics integration, I think we have to be very clear about what we mean it is.

DR. GUTMANN: Yes.

DR. GRADY: What ethics integration is, and maybe head on -- I don't know -- to address the issue of this is not risk mitigation and following rules, but it is an inquiry into how to be socially responsible for when you do your science.

You know, I don't know how we would describe it, but we need to make a case. We need to be clear about what it is.

DR. GUTMANN: It's not only or primarily that.

DR. GRADY: Yes.

DR. GUTMANN: I mean there is --

DR. GRADY: Some is, but we need to be really clear about what we mean by ethics integration, I guess is what I'm saying.

DR. GUTMANN: Yes.

DR. GRADY: And define it.

DR. GUTMANN: Yeah, and say what we mean.

Dan.

DR. SULMASY: To sort of continue my theme of both/and, I guess, for the last few days, and I think with respect to the integration, I mean, I'm 100 percent for it, but I think we should be careful not to craft it in such a way that we're putting all of our eggs into that basket; that we, I think, also would both in terms of approach and in funding want to see a place for sort of the kinds of centers that we heard about in the panel today which would not be integrated; that we see the possibility of people being able to apply for funding for ethics regarding science in general or the neurosciences in particular that would not be part of something that was integrated, as well as promoting the new part, which would be integrated.

And similarly to that, much of what we heard this morning is based on a sort of virtue-based approach to ethics education, which I think is extremely valuable. We also heard some people saying yesterday that, well, to reach the vast majority of scientists you've got to have some clear rules and have the principles there.

And so, again, I want to say, you know, yes to both of those and then to emphasize again from the discussion yesterday with Raju that we want to have both local ethicists and funding for local ethicists to be able to teach formally in programs, particularly if they're integrated, but also to encourage better integration, to have the scientists themselves become sort of small group instructors and part of that enterprise.

So there are three ways in which I'm very much in a both/and mode over these two days.

DR. GUTMANN: And I think that lends itself to our developing a list of ways in which funders can move forward and support this.

Yeah, Nelson.

DR. MICHAEL: So I like the obvious call for research being integrated with bioethics during the entire lifecycle. I like the rationale not only for institutions, but, and PIs, but I assume we're also going to put a rationale in for the funders to be interested in doing this for reasons I'll say in a second.

DR. GUTMANN: Yeah.

DR. MICHAEL: I think like other reports having a call for an evaluation, the impact of these recommendations is critical to provide the, I think, very vital durability of our interest in this.

And lastly, and obviously it's a very positive thing to emphasize, education during the entire lifecycle of an investigator's career is really important since it captures some of the issues in terms of the generational emphasis on ethics that is more recent than it is historical.

Specifically I want to go back to this comment that we made at the very end of the session. I really think it's critical for us to emphasize that there is opportunity here, that we're not necessarily talking about risk mitigation. We're talking about opportunity, opportunity for institutions, for PIs, for society as a whole to see that an interdisciplinary approach which is part of what comes from an ethical consultation can open up new synergies, and that is something that is going to require that an investigator and institutions think about second and third order effects of any science that we do.

It's almost inconceivable to me that a principal investigator can believe that there can't possibly be second or third order effects regardless of how fundamental that science is, and as a consequence of thinking those issues through not only do you touch on what those second and third order effects might be in terms of risk mitigation, but you think about novel syntheses scientifically, open up new opportunities for PIs and institutions to go down research avenues that maybe have not been previously thought forward.

DR. GUTMANN: So let me underline Nelson's conclusion. I think it's really important in this report that we indicate how intellectually exciting and productive this pursuit is; that understanding more from a neuroscientific and ethical perspective of what's going on in the human brain is an enormously exciting intellectual venture.

DR. MICHAEL: Yeah.

DR. GUTMANN: From both the ethics perspective and the neuroscience perspective, and it can only be done together because for obvious reasons, but we'll give some examples of that.

I have Steve and Jim and the rest of my Commission members, and I have you all down.

DR. HAUSER: So I would also agree that this is a great beginning, and might want to just remind us of two points that we highlighted in our synthetic biology report that I think are very relevant here, and the first is that as we're speaking about education at all levels we include public discourse and public education --

DR. GUTMANN: Excellent.

DR. HAUSER: -- and also the possibility that we create some sort of fact check mechanism for new claims and ideas and accomplishments in neuroscience.

DR. GUTMANN: That is terrific. That is terrific, and I think that also underlines something that Nita said earlier about how there can be also resources to help scientists communicate publicly on this.

These are good because we need -- the more specific we can be in fleshing out not only the rationale but the implications for these recommendations, the more useful it will be.

Jim, you're next.

DR. WAGNER: Just a couple of quick points. I hope that we -- I was trying to be a PI. I was trying to sit here thinking about being PI after all of these recommendations are implemented, and I'm hoping that as a PI

DR. GUTMANN: I hope we get to that place. That would be wonderful.

DR. WAGNER: Yeah, that would be exciting. That would be exciting.

But I hope we don't confuse the attachment of this very important dimension of neuroscience, the ethical dimension of neuroscience, and I hope we don't confuse attachment and integration, "attachment" meaning something that's hung onto this that I've got to pay attention to even if I can find something exciting and inspiring about it.

I fear that -- you know the fears. I don't have to go there, but I do imagine though that there would be ways to challenge our PIs to imagine and even maybe by specific questions what it is that is expanded by or what they anticipate the new ethical challenges to come from their research might be so that there's a sense of ownership.

I think until our PIs own some of this, I don't think we could claim that we've integrated it. We've just added it on, and we will end up -- I'm sensitive to some of the language that we may get back from our PIs if we don't.

And a very brief comment. Apropos of making sure we don't offend PIs, I agree with you Nelson. I cannot imagine in neuroscience any endeavor that doesn't have second and third order effects, and I think that's a fair statement. We can't imagine it.

Having said that, I can imagine in other forms of science where, in fact, the science is pursued very simply for the joy of pursuing that science. Some of the biggest stuff we still fight about in physics, relativity and the Quantum Theory have their roots in simply the joy of understanding something, and people do not go down the second and third order effects of Quantum Theory to imagine nuclear power or nuclear disaster.

So I would caution us against saying that there is never a scientific endeavor where scientists couldn't imagine second and third order effects. We can say we can't imagine it, and I really can't imagine it in neuroscience, but I want to caution us.

Remember we're talking about wanting to draw in addition to the stick, Dan; we were talking about wanting to draw our PIs in this discipline into an understanding and we want to be careful not to offend.

DR. GUTMANN: Yes, and we should remember that -- and we saw it in surveys that Mildred had done, but you see it on the ground -- we have about, almost 200 neuroscientists, self-identified neuroscientists at Penn, and the vast majority of them, not all, but the vast majority of them are involved, care about the ethical issues of their research.

This is a field unlike some other fields, but like genomics, in which there is an intense interest in these issues. So this is not an overlay. This is a recognition and an endorsement of how we have --

DR. WAGNER: Facilitation. I like that word.

DR. GUTMANN: -- we have to facilitate it more, and if there's no money behind it, it's the opposite of facilitation.

DR. WAGNER: It's a requirement.

DR. GUTMANN: I have Nita --

DR. WAGNER: It's a mandate.

DR. GUTMANN: -- Raju, and then Anita and then Dan.

DR. FARAHANY: So I like very much this starting point that you've laid out and think that it captures well a lot of the sentiment that we've heard from different speakers, as well as the conversations we've had. I just want to underscore a few things that we've said but just to emphasize how important I think they are.

The first is just much greater specificity, and by that I mean a couple of things. First, what do we mean by ethics integration? And we have talked about this, that we need to be very specific about models, but also what ethics integration. So not just models of how, but what it actually means.

So what we're calling for people to do, so what kinds of questions they should be asking, what kinds of -- you know, far more than just ensuring the protection of the research subjects, being much more specific because I think a lot of times when we're within a field we can lose sight of the fact that in other areas people don't even necessarily know what questions they should be asking or what it means, what ethics means, period, which brings me to the second point.

So we --

DR. GUTMANN: So in the first, let me just -- because I know you have the --

DR. FARAHANY: Yeah.

DR. GUTMANN: So where -- because we're going to move ahead on this. The kinds of questions, we don't want to put these are the only --

DR. FARAHANY: That's right.

DR. GUTMANN: But to give the sense of the kinds so we give a sense of how broad the kinds of questions are.

DR. FARAHANY: And I don't just mean examples of questions. I mean oftentimes you'll find people are really interested. You know, they recognize the importance of responsible science, and they recognize that good science means responsible science, and they want to have an ethical inquiry, but they don't even know necessarily what that means. What does it mean to do an ethical inquiry? What does it mean to have ethics as part of the conversation?

And so while that's self-evident and obvious to a group that's a Bioethics Commission, it isn't necessarily and since this is meant to be instructive as well to the field, I mean models of and examples of questions and examples of how you might approach the kinds of issues that are at issue in these really diverse and interesting scientific inquiries.

The second is highlighting science communications separately rather than just as part of the affects integration. So we've mentioned it and we've had panels on it, but we have simply made it part of ethics integration, and I think recognizing it as both an ethical inquiry and an ethical responsibility of scientists, but being able to provide the separate justification because we hear repeatedly and see examples of scientists saying things like, "Why would I want to talk to the public?" and I don't mean just public and kind of lay audience science communication.

But integration into congressional and legislative decision making and legal decision making and the importance of neuroscientists and scientists being involved in those different areas and being willing to bring empirical evidence to bear on those types of questions. And I think providing the separate justification for why scientific communication is an essential part of ethical science, particularly in this context which is so sensitive.

And then last, I would just want us to highlight successful efforts already underway in the field, and just some examples of those. For example, the Society for Neuroscience already includes the David Kopf lecture every year, which is the neuroethics lecture at their annual convention; the International Neuroethics Society, which has ensured that its conference always occurs in tandem with the Society for Neuroscience, and they have significant public education and significant resources which are available to scientists. You know, they've done some tremendous things.

And I think showing that we're not just saying that this is a field that's in its early days, but this is a field that already is taking ethics and integration of ethics quite seriously and, you know, here are some examples of how it has happened successfully to show we recognize it and we celebrate it and want to use those as models to build and move ahead.

DR. GUTMANN: Good. Raju.

DR. KUCHERLAPATI: I just want to bring a little cautionary note about funding. You know, President Obama in his State of the Union address sort of indicated, you know, the need for more money for biomedical research. That doesn't necessarily mean that there will be more money for biomedical research, and I read recently, you know, an interview with Francis Collins, and Francis says that, you know, "I go to Congress many, many times and I tell them about how exciting biomedical research is and why we need support, and the Senators and Representatives says, 'Yes, everything you say is correct, but you know, we have a deficit and we may not be able to afford, you know, more money for science.'"

And even, you know, in the case of the BRAIN Initiative the amount of money that President Obama announced is \$100 million. I mean, it's a tiny amount of money.

And so the cautionary note is that, you know, if we were to make a recommendation, say that there should be a significant amount of support for integration of ethics into science, and if there is no additional money that would be available to do that, then, you know, it either has to come out of sort of, you know, what is currently spent for science, and so it is possible that if we make such a recommendation it might fall on deaf ears.

So we have to be cautious, and I think that the ideas that actually Nita is suggesting, actually they're exciting ideas because those are ideas that don't require a significant amount of new spending, but you know, within the framework of what we have like the societies and so on and so forth, we'll be able to accomplish, you know, the goals of educating the

scientists and researchers or clinicians about the importance of them and how they may be able to bring together.

DR. WAGNER: Amy, I guess I should ask you. Do you imagine the charge from the President is such that we could at least talk about the monies that are the new monies that are being proposed?

DR. GUTMANN: Well, a number of people -- Christine, for example -- said earlier if there aren't any resources, any put behind this, then it's not going to happen, and if we're serious about the integration of ethics and science, it is about the science, not about something that's separate, and the magnitude of resources is really small in comparison to what's needed to do lab science.

So given that any scientific enterprise will be derailed if it isn't ethical in its nature and given that good science means good ethics, there has to be some level; it's going to be a modest level, but it doesn't need to be more than a modest level of resources put in.

Whether any level of resources incremental will come from the government is, as Raju said it, an issue, but that hasn't prevented me and scientists, including Raju, for arguing for the need for devoting resources to this because it is the economic engine of our society and is also something that has been key to the goodness of our society.

So I think it's not a reason not to make the case. It's are we realistic about how much. Yeah, but you asked about the BRAIN Initiative. If the BRAIN Initiative doesn't put some amount of resources into the integration of ethics and neuroscience, then it's not serious about ethics. It's just as simple as that.

You can't do it without any resources. You don't need huge resources to do it. So that's -- and we're not going to lead with we need more resources. What we're going to lead with are the things that really need, the substantive things that need to be done, and the resources adequate to doing them.

DR. KUCHERLAPATI: Can I just make a brief comment there?

DR. GUTMANN: Sure.

DR. KUCHERLAPATI: So the point that you made is really excellent because, you know, because this President's request to the Commission came in the context of the BRAIN Initiative, and that there are monies that are set aside for that.

DR. GUTMANN: Yes.

DR. KUCHERLAPATI: That would be a first place that the incorporation of this would take place, and as you know, all of us know, that there is, you know, a couple different

task forces that are currently thinking about it and they're fighting in terms of what would constitute, you know, the BRAIN Initiative and where the efforts need to go.

I read, and I haven't participated in them, but I read the reviews of them, but the word "ethics" never came up in those reviews.

DR. GUTMANN: Yes, correct. And there was not a single member of that advisory board that was self-identified or would be identified by the larger community as somebody who had expertise in ethics.

So I think we should add in this preliminary report a recommendation that, you know, that should be --

DR. KUCHERLAPATI: Or we should maybe bring the chair of those task forces to come and talk about that.

DR. GUTMANN: Yeah.

DR. KUCHERLAPATI: We can mutually educate about this important issue.

DR. GUTMANN: Right, right. And we have actually communicated, and those advisory groups are being reconstituted. So it's going to be really important. I think the sooner we can get this report out and have -- that's some of the specifics that we need to put in the report, and it's important for public accountability.

I just want to highlight -- well, let me let Anita and Dan go through because we do have a hard stop at 12. So Anita and then Dan.

DR. ALLEN: This is a very short suggestion, and, Amy, I endorse all three of your suggested recommendations, and I love the conversation about how we can make them strong in terms of the report.

But just one thing. We haven't talked much about how we educate divinity students and philosophy students to prepare them for their role as bioethicists, and if we don't include good science education --

DR. GUTMANN: Absolutely.

DR. ALLEN: -- in the training of our future bioethicists, this idea of integration is not going to work. You can't drop a naïve humanist into the room of scientists and expect him to have any credibility.

So I don't want to plug, you know, Penn too much, but I do think that we have been at Penn trying to make sure that our bioethics Fellows and Masters students and

undergraduate students study science, learn rigorous methodologies so that they can better perform as bioethics experts.

I just wanted to add that to the conversation.

DR. GUTMANN: It's a two-way street.

DR. ALLEN: It's a two-way street, absolutely.

DR. GUTMANN: It's a really important two-way street.

Dan.

DR. SULMASY: First I'll just endorse that and say it's not just Penn that does this. Even at the University of Chicago Divinity School, for instance, we have seriously identified --

DR. GUTMANN: Thanks to Dan.

DR. SULMASY: -- to the extent we are going to be applied at all, that it's ethics and the life sciences broadly written, including environmental ethics, and we've got actually a search going on for an environmental ethicist. So we very much want to integrate science education for divinity students and people getting Ph.D.s in religious ethics as well. So I think that's good.

But to go back to the point I was going to make, I wanted to underscore Jim's point about the sort of sense in which I would like to see the report really hold up as an ideal the dispassionate, disinterested desire to know, which is actually a quote from a Canadian philosopher -- I don't know if our Canadians are here -- Bernard Lonergan, as an ideal that is not simply to just get buy-in from the scientists, but something that we promote.

One of our own principles is respect for academic freedom, and I think we ought to emphasize that in this report and to recognize that maybe I read the quote that Mildred put up on the board differently than she did, and perhaps Peggy read it the way I did, that I don't think a scientist's -- there's a difference between a scientist saying that I am interested in understanding how this neuron works for the sake of understanding how this kind of neuron works and saying that I'm constrained in being able to do that until I know that there is some sort of clinical application, which I think was the fear.

And that sort of sense that we should promote academic freedom and this kind of dispassionate, disinterested desire to know is important and is different from that same scientist being disinterested in what happens to my science. That's a critical distinction.

DR. GUTMANN: And important that scientists and the public understand that that's an ethical principle of the pursuit of science in an open democracy.

So Nelson.

DR. MICHAEL: I was just going to comment for a second on I think Raju's important point that, you know, we don't fall into this standard trap of, you know, not recognizing that there are research funding constraints and prioritization, but when I mentioned initially my first thoughts about the recommendations that you read, Amy, I specifically mentioned that a rationale for funders is really important. If we're working smarter, if we're avoiding having downstream investigations by groups like ORI, you're going to be inherently strengthening the research enterprise and inherently finding efficiencies in it.

So it's probably going to be the case, and you mentioned also that we need to evaluate that system so that we'll actually have real data that could support this. This is probably going to allow the research enterprise to become more efficient.

Now, again, this is sad, but you can probably do more with less money because you're not going to be having to spend dollars downstream with some of these unintended consequences.

So I don't think that's something we should push really hard, but I think inherent to understanding that we need to find a rationale for funders is capturing some of those comments that you made.

DR. GUTMANN: So I think we should encourage anybody here, anybody listening, as well as ourselves, to offer examples. Let me just focus in on the education.

As Nita and Dan and Raju and others have said, there are good examples already out there of models of integrating education both in the early stages and later stages, and we should mention them and really flesh out the landscape without doing a comprehensive study of this because time wouldn't and it wouldn't pay off in time, but give examples that we know of where people who are expert in bioethics coming together with scientists who are doing really important research and working together in educational ways.

I also think we added to what we had earlier discussed, and under the education let's make sure we have a discussion also of helping the science community to educate the public by communicating. You know, I gave the example that we have in West Philadelphia of the Science Café. That is an institution that the community itself could never support and it takes some resources but not huge ones, and scientists enjoy communicating out, and it's a kind of test bed, if you will, for public communication, and after that we publish research reports that are better communicated to a more general public. So I think that would be helpful.

Any other suggestions because we're going to wrap up? I think we've really covered a lot.

(No response.)

DR. GUTMANN: I will then thank, first, on behalf of the Commission, we all want to thank Lisa Lee, Executive Director, and the staff for really organizing a great meeting, helping us move this report forward, and most importantly in advance, for help us get to the point where we actually can issue a public report on our preliminary findings. So thank you.

(Applause.)

DR. GUTMANN: I want to thank our fellow Commission members, and I also want to thank Jim Wagner, who has just been a great partner as Vice Chair. Thank you, Jim.

DR. WAGNER: You are most welcome.

(Applause.)

DR. WAGNER: Keep applauding so we can thank our Chair as well. Thank you very much.

(Applause.)

DR. WAGNER: No, it was a wonderfully productive meeting, and I think lots of meat for our staff to be working on. So I add my thanks to our staff as well.

Thank you.

DR. GUTMANN: And safe travels, everybody.

(Whereupon, at 11:45 a.m., the meeting was concluded.)

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