

(as prepared for delivery)

Indiana at the (Bio)Crossroads
Indiana Life Sciences Summit
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Thanks, David. It's a pleasure to be here to address the future of life sciences innovation in Central Indiana. I speak this morning on behalf of Eli Lilly and Company, which has a strong stake in the sustained growth of Indiana's bioscience hub ... and out of a deep personal commitment to advancing medical innovation to improve people's lives, and to making this an even more significant aspect of our state and regional economy.

Ten years ago, Lilly and a number of others helped to launch BioCrossroads ... a public/private initiative to develop the life sciences in Indiana. We began with a solid base of global life sciences corporations and our state's major research universities – including Indiana University with its School of Medicine, along with Purdue and Notre Dame – and we had significant help and support from Lilly Endowment.

As it turns out, our timing could not have been better. There has never been a more opportune moment to pursue advances in medicine, and to take advantage of an avalanche of new knowledge about disease biology and human genetics. Indeed, I believe we're on the threshold of what will someday be known as the biomedical century, as the combination of new scientific insights, along with the application of new tools and advanced technologies, creates the potential to revolutionize our work!

While this summit is an opportunity to review how far our state has come in the ten years since BioCrossroads was founded ... and to highlight the leadership position Indiana holds today in life sciences innovation ... at the core of my remarks this morning is a call to action.

As David has pointed out, Indiana's success has dramatically raised the stakes for all of us. By basing a key element of our state's economy and its identity on an industry sector powered by scientific innovation, we have tied our economic future to continued leadership in life sciences research, development, and manufacturing.

And for all our progress, regions across the U.S. and around the world have their eyes on the same goal ... even as some of our strongest competitors are taking further bold steps to distance themselves from the pack.

This morning I will address how we must build on our success to accelerate our progress in the life sciences in Central Indiana, and what this effort will require.

In short, I believe it's going to take three things:

- First, continued attention to the strategies and tactics necessary in order to attract and retain talented people. This is fundamental.
- Second, a culture change among our companies and our academic institutions in terms of how we see one another and how we work together
- And third, the active engagement of Indiana state government in this process.

It's important that we first review the progress we've made to date, before turning to the decisions and actions we must take now and in the years ahead.

[Long Pause]

Over the past decade, Indiana has created a life sciences hub that stands today as a world leader and one of the state's most important economic assets.

In 2010, more than 800 Indiana life sciences companies directly employed nearly 50,000 Hoosiers in good, high-paying jobs – and created roughly twice as many additional jobs by a ripple effect. Between 2001 and 2009 ... a time when other industries lost jobs ... life sciences employment in Indiana increased by 21 percent. Indiana life sciences employees earn, on average, nearly \$81,000 annually ... more than double the average wage of \$38,000 for all private-sector jobs in the state.

Since 2004, Indiana's major life sciences companies – including Lilly, Cook, Biomet, DePuy, Zimmer, Roche Diagnostics, Dow AgroSciences, and Covance – have invested over \$3.2 billion in expanded operations and facilities. I'm pleased to say that within the next several weeks, Lilly will announce yet another significant new investment in Central Indiana.

In a state long known as a manufacturing leader, the life sciences sector contributed one-third of Indiana's \$29 billion in exports of manufactured goods in 2011. Our state's life sciences exports last year ranked third-highest in the U.S., behind only California and Texas. Let me say that again: Indiana's life sciences exports last year ranked third among all states, after only California and Texas. All told, Indiana's life sciences hub delivers a \$44 billion boost to the state's economy.

Recently, Battelle Institute and BIO, the Biotechnology Industry Organization, released a 50-state survey of Bioscience Industry Development. In that report, Indiana is one of only five states – along with California, Massachusetts, New Jersey and North Carolina – ranked in the "First Tier" for absolute number of life sciences jobs and number of life sciences companies.

And if that's not enough, Indiana is one of only two states with a share of employment significantly above the national average in many as four of the five bioscience subsectors tracked by Battelle – agricultural feedstock and chemicals; drugs and pharmaceuticals; medical devices and equipment; and bioscience-related distribution.

Folks, these are impressive accomplishments, and we should be proud of how far we've come in these 10 years. Indiana's life sciences leadership did not happen by accident. It's the result of a clear strategy and a relentless effort by so many of you in this audience today, beginning with the launch of BioCrossroads ten years ago.

In the decade since,

- BioCrossroads has directly raised or helped catalyze the formation of over \$270 million of market capital and philanthropic funding to identify and pursue promising new Indiana life sciences opportunities.
- It has organized four venture capital funds that have invested in 25 start-up Indiana life sciences companies and has attracted over \$395 million of additional outside venture capital.
- BioCrossroads has also formed eight sustainable enterprises to capitalize on our strengths in life sciences, including the Indiana Health Information Exchange.
- BioCrossroads has directly helped draw more than 3,000 new life sciences jobs to our state and has elevated Indiana's visibility on the national map of biotech, medical device, and health care IT centers.

[Long Pause]

While BioCrossroads will continue to pursue the kinds of initiatives that have brought Indiana to where we are today, it is also charting the course for the next phase of our journey. Last year, BioCrossroads commissioned the Battelle

Technology Partnership Practice to do a thorough study of Indiana's strengths and weaknesses and to lay out a strategy for the ten years ahead.

The good news from this report is that we do indeed have a vibrant and thriving life sciences sector, built upon the successful commercialization of frontier science ... leading-edge engineering, chemistry and biology ... all driving our economy as well as improving the health and well-being of our citizens and people around the world.

But this good news comes with a sobering assessment of growing challenges in a rapidly changing scientific and economic environment. Building on the success we've achieved will require a far larger, and much more ambitious shared effort going forward.

Today, I believe we're at a crossroads ... or maybe I should say, a biocrossroads. Do we simply continue on the road that has brought us this far, or is it time to chart a new direction? Whichever path we choose, we must look at the decision as if we're starting from square one, as if the competition starts today.

Fortunately, we're not starting all over; in fact, all the basic building blocks for success are already here. Innovation takes a long time to nurture and develop, and that's an advantage we have in competing with other places that are just now beginning to pursue bioscience. But it also means we have to keep our eyes on the long-term requirements of leadership in this challenging field.

That's also why this decision is so urgent. Most of our potential competitors have nothing to lose, but we've already achieved something worth fighting for. We must not squander the advantage we've created.

What's more, other established leaders are moving farther ahead, with bold initiatives like a Massachusetts program that provides \$1 billion in state support

for biotechnology, including tax incentives to encourage companies to expand ... and grants for research, fellowships and workforce training.

The key question facing us today is: What is it going to take for Indiana to maintain leadership in the life sciences and to compete effectively on the world stage?

Even as we bask in the glow of recent success, we face serious challenges: escalating costs and declining public funding for research ... intensifying global competition for investment and talent ... and the growing complexity and interconnectedness of life science research itself.

In this environment, Indiana's growth will not continue without a talented workforce fostering productive and focused collaborations between industry and academia, supported by an engaged state government, all working together to advance science and compete more effectively.

So let me now take a closer look at each of these three imperatives ... all of them absolutely essential to maintain Indiana's leadership position in life sciences and accelerate growth.

[Long Pause]

The first imperative is a strategy to attract and retain talented people. An educated, motivated workforce is the foundation of Indiana's life sciences network.

We need to start by focusing on better educating our own citizens. Basic comprehension of math and science is essential, first of all, so that young people across Indiana have an opportunity to participate at any level in the high-tech economy of the future. Further, as the technology sector grows and the baby boom

generation retires, we'll need a large cohort of people with basic scientific skills to essentially fill in behind their parents and grandparents.

Today, unfortunately, we are a long, long way from where we need to be. The latest test scores from the U.S. Dept. of Education showed only 33 percent of Indiana 8th graders to be proficient in science. That means two-thirds are not. And it's little consolation to know that Indiana 8th graders perform at the national average in science and math, because American students perform poorly compared with those in other countries.

One of the big focus areas for our Lilly Foundation has been to foster new hands-on, inquiry-based approaches to teaching science in Indiana, to give students opportunities to learn in a way that creates the energy and excitement that most scientists feel about the work they do. Ask any of us who got interested in science at an early age; this is how it happens!

BioCrossroads has also launched initiatives to expand and enhance science and math education in grades K-12 ... for example, improving professional development for math and science teachers through the I-STEM Network under the direction of Purdue University.

In addition to improving K-12 education, we must ensure that young people across the state have access to high-quality vocational training, notably through Ivy Tech, as another avenue for participation in the bio-economy we're working so hard to build.

[Pause]

A second element in attracting and retaining talented people is ensuring that Indiana's business environment remains favorable to new and existing businesses,

and supports the creation of good jobs. We appear to be in pretty good shape today; just last month, Indiana ranked 5th best on *Chief Executive* magazine's annual list of the Best and Worst States for Business – that's up one position from 2011.

And thirdly, we need to consider the quality of life for our citizens and for those who might consider moving here. This means, of course, keeping the cost of living reasonable, and our streets safe, but it also means improving our public schools ... and making the necessary public investments to meet future needs, such as mass transit.

While Indiana has some real advantages compared with day-to-day living on the coasts, we must not paper over the challenges we face in competing with other life sciences hubs. One of the real benefits of developing the life sciences in Indiana is the boost to the state's income and economic growth, and we need to be ready to reinvest some of those gains in continually improving the quality of life here.

We must also be inclusive of all the talented individuals who might be interested in our state. The last thing we want to do is put out a “need not apply” sign to anyone.

[Long Pause]

Let me turn now to a second and very important imperative: a culture change among companies and academic institutions in terms of how we work together ... from silos, distrust, and maybe even disdain ... to collaboration and active engagement ... as we both pursue our respective missions.

In my view, Indiana's great research universities must embrace the notion that one of their prime functions is to actively assist in the process of translating new knowledge into useful products that serve the larger society to which they owe their existence.

This must start at the top: Earlier this month, I participated in a conference with Dr. Susan Desmond-Hellmann, chancellor at the University of California at San Francisco and, until recently, a senior executive at Genentech. In her remarks, Sue identified the keys to success in engaging academics with partners in order to – as she put it – “create value so that patients are served.”

Those keys are:

- First, attitude: The extensive mistrust between industry and academic institutions must change – as it has at UCSF since Dr. Desmond-Hellmann arrived.
- Second, geography and environment: We need to create a “space” for interaction. That’s one of the potential strengths of a life sciences hub – because nothing beats meeting face-to-face – and we should capitalize on it.
- Third, training: Sue noted that nothing in scientists’ training really prepares them for the business of developing a new medicine or medical device or prepares them to create companies. That needs to change, as well.
- And fourth, funding: Sue called it the “mother’s milk” of innovation. Money must be available at the right time to do what she referred to as the “killer” experiment.

Ultimately, we need an infusion of entrepreneurial spirit into our research universities ... more people open to pursuing the applications of their research, working collaboratively with others outside their own walls, and, yes, even starting companies. This is what we see today in San Francisco, in Boston, in San Diego, but not here, or at least not nearly as much as we should.

Those of us in industry also need to rethink the way we relate to our counterparts in academia ... to be open to broader possibilities for collaboration. I should note that while Lilly works with academic institutions around the world, we engage far too

little in meaningful ways with the universities in our own state ... and here I'm speaking about engagement that goes beyond "fee for service" relationships, where, for example, we might pay IU to conduct a clinical trial.

We need to build a culture of capitalizing on our basic research findings at all levels at our major universities. Such a culture would necessarily reflect a greater focus on invention disclosures ... and an emphasis on training and recruiting faculty in science and engineering who are interested in turning discoveries into products that benefit people ... that help cure disease ... that meet so many of the most compelling needs of 21st Century society.

And such a culture would benefit not only the life sciences network in our state, but also the universities themselves. At a time when federal and state funding is declining, this approach creates a new avenue for supporting research and for expanding research horizons.

And as research universities face ever-greater demands to justify the funding they receive, I believe that this approach would garner greater appreciation among Hoosiers for the essential role these institutions play in the economy, and how their development of talent and pursuit of basic research contribute to growth, jobs, and income ... not to mention new medicines, medical devices, diagnostic tests, and agricultural products that improve life and health for people around the world.

[Long Pause]

Let me turn now to the third imperative: the active engagement of state government – which to date has been largely cheering from the sidelines – as a partner with academia and industry in advancing life sciences in Indiana.

Frankly, once again, our competitors are schooling us on how such collaboration can work.

One clear example remains the San Francisco Bay area, where academic engines powered by UCSF, UC Berkeley, and Stanford created the nucleus of intellectual capital that led ... with critical support from the community and the State of California ... to the creation of life science giants like Genentech, along with a wide array of start-up companies that continue to form to this day.

Another example in a top-tier competitor state is the North Carolina Biotechnology Center. The state of North Carolina funds the Center as a private, non-profit organization dedicated to biotech research and support for industry commercialization. The Center estimates that its support has resulted in the creation of 4,700 jobs and roughly \$34 million a year in tax revenues – well in excess of the Center’s annual budget.

And still another example, which I mentioned earlier, is the Massachusetts initiative to provide \$1 billion to help fuel the growth of the state’s biotech industry.

State government in Indiana needs to re-engage with the life sciences sector. Early on, the state contributed to the BioCrossroads effort by making permanent the Research and Development tax credit. But more recently, the R&D credit was added to a list of credits that are now under annual review. Similarly, the state’s 21st Century Fund has sharply decreased investments in emerging life sciences companies since 2008, to the point that start-ups in Indiana no longer view the fund as a promising source of support.

Now is the time for the State of Indiana to demonstrate a commitment to the life sciences to meet the challenge of competitors in California, Massachusetts, North

Carolina ... not to mention numerous other cities, regions, and countries around the world!

The Battelle report makes this clear. It cites, quote, “missed opportunities for generating new economic activity and job creation in Indiana, with Indiana now lagging the nation’s leading centers.” And it calls for the state’s governmental leadership to focus on high-quality job generation in Indiana’s life sciences sector.

The fact is, employment in the life sciences in our state surpassed the automobile industry in 2008, and is today the state’s chief engine of economic growth. And it’s important to recognize that the ripple effect of growth in our sector generates jobs across the entire Hoosier economy. Lilly alone spends more than \$1 billion with 1,300 Indiana vendors.

Our state must remain as committed to expanding the life sciences sector as we are to protecting existing jobs in other industries, or we simply will not see growth in jobs and income in our state.

Battelle offers a host of ideas for state action – virtually all of them being implemented today by our competitors around the country – that reinforce many of the points I’ve made this morning. Let me touch on just a few:

- First, pursue pro-active university policies to support and encourage collaboration. These include policies to manage potential conflicts of interest ... predictable and streamlined processes for licensing technologies ... and promotion and tenure policies that provide incentives for researchers to pursue industry partnerships and intellectual property creation.

- Second, provide sustained and predictable funding to bridge the so-called “valley of death” – the gap between a basic research breakthrough and the point where industry is able to invest in advancing it through R&D. This funding is what Sue Desmond-Hellmann called the “mother’s milk” of innovation. And this is an area where Indiana is at a major disadvantage. Two means of addressing this funding gap are a statewide life sciences proof-of-concept fund to advance research discoveries, and a matching grant program for applied research projects.
- Third, create strategic industry/university partnerships ... to advance world-class basic-to-translational research ... to develop, attract, and retain top talent ... to focus on commercialization ... to foster the growth of existing firms, creation of new firms, and attraction of out-of-state firms to Indiana ... and to generate what Battelle calls a “health care dividend” for Indiana – thus expanding the base of support for life sciences investments by “connecting the dots” between results-oriented research and a broad community of people who benefit from the scientific and economic gains that such research can produce.

We also need to explore home-grown ideas to promote innovation, such as those advanced recently by gubernatorial candidate Mike Pence ... including, for example, an Executive Innovation Network of business leaders, entrepreneurs, investors, and university executives charged with bringing more entrepreneurship, capital, and business expertise to university-based innovation.

State government leaders must also take a hard look at seemingly unrelated actions that work against building our life sciences hub ... whether those actions be pursuing a social agenda that makes it harder to recruit innovators to our state ... or misguided efforts by state agencies to use government controls to set drug prices.

[Pause]

Beyond all of the efforts I've outlined thus far, it is time to make a bold stroke for the life sciences in Indiana ... the establishment of a truly world-class research institute in our state.

The Broad Institute in Cambridge, Massachusetts, the Scripps Research Institute in San Diego, and the Danforth Institute in St. Louis are all good examples of research powerhouses that energize a network of life sciences activity in their respective regions.

We've discussed the idea of a research institute here that will engage entrepreneurial faculty from leading research universities in Indiana ... and across the United States ... and enable them to work collaboratively with industry leaders to pursue outcome-driven research along the frontiers of biotechnology, human health and nutrition. Such an institute should offer a compelling environment for innovative activity, including liberalized intellectual property policies ... readily accessible sponsored research arrangements ... and other relevant professional opportunities.

A world-class research institute can serve as a center for recruiting "star" academic talent ... individuals with proven entrepreneurial and commercialization success elsewhere ... to come to Indiana to join other distinguished colleagues. In addition, it can help recruit and retain other talented people at our state's research universities through attractive joint appointments. Indiana has some of these entrepreneurial academic superstars working in our universities today, but frankly we do not have nearly enough.

One last benefit of establishing a top-tier research institute is that such a bold effort would embody ... and demonstrate to the world ... the enduring commitment of Indiana's public, private, academic and philanthropic leadership to the State's life sciences economy.

[Long Pause]

As I said earlier, for all our progress, Indiana's life sciences strategy stands at a crossroads. We face an existential decision:

- On one hand, we can be content with the progress we've made, and continue to follow the same path that got us this far. My prediction is that this will produce diminishing returns over time.
- Or we can make a course correction ... based on a sober assessment of our strengths and shortcomings and those of the competition we face. We can seize the initiative, take bold action, and accelerate our progress.

If we chart this new course to the future of life sciences in Indiana ... and would I strongly argue that we should ... then we must build broader participation and a greater commitment from key life sciences partners in the private sector, our research universities, and the State of Indiana.

I urge my colleagues in industry ... many of whom, as I noted earlier, have been a part of Indiana's life sciences hub from the start ... to step up their level of engagement. I can say that the company I represent – Eli Lilly and Company – is firmly committed to this effort, and I want to lay out several specific commitments on our part:

- First, Lilly will continue to play a leading role in bringing investment funding for life sciences innovation to Indiana ... as we did most recently as lead organizer and largest single investor in the second Indiana Seed Fund launched earlier this year. From the start, our effort has involved much more than writing checks. We are working with BioCrossroads to attract venture capital interest and funding to Indiana ... and we continue to demonstrate this commitment.
- Second, we will continue to look for opportunities that help seed or enhance new company presence in our state, as we did with Covance in Greenfield and Evonik in West Lafayette. Similarly, when we make decisions, as we continually do, about internal versus external paths for development of molecules in our pipeline, we will seek opportunities to spin off particular candidates as a life sciences entity in Indiana ... as a start-up or to an existing firm ... and in fact, we've already done so in several instances.
- Third, we will actively support the new research institute I described earlier, by providing sponsored research funding and access to our top scientists. And in light of the challenge I put forward, to transform the way in which companies and universities engage with one another, Lilly intends to make helpful changes within our organization that will facilitate the exchange of ideas and opportunities among Lilly and the state's three research universities.

[Pause]

All of the participants in Indiana's life sciences hub all need to think about our collaboration in new ways. We need to be as innovative in the ways we work together – across disciplines and across institutions – as in the science we pursue... in order to overcome the barriers to common efforts to recruit and retain talent ...

fund research ... create, share, and protect intellectual property ... and develop economic opportunities.

Most importantly, we need a new perspective and a revamped self-image. For too long, I think, Indiana has been surprised at our success in life sciences ... our ability to compete with the likes of Boston and San Francisco. It's time to recognize that we're a leader, that we can attract and build life sciences enterprises competing with the best ... right here. We've been doing it, we can continue to do it, and we should not be content with anything less than world-class leadership in this 21st Century industry.

We need to publicize more what we've been doing, to call attention to our success, to let our light shine, to blow our horn ...

As we act with urgency ... let's also act with confidence and boldness ... and deliver an effort that's worthy of the mid-American crossroads of life sciences ... Indiana ... and chart a course for even greater success and growth.

Thank you!

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