

Making health care lean and efficient:

Address to the Robert Wood Johnson Foundation's Aligning Forces for Quality conference

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Thank you, Margaret. I am delighted to be here with all of you.

As both a private citizen and a representative of a corporate citizen, The Boeing Company, I want to thank the people of the Robert Wood Johnson Foundation, the Puget Sound Health Alliance and the Aligning Forces for Quality participant organizations here tonight. And I want to thank you especially for stepping up and taking on one of the most important issues America is facing today.

A strong, effective, high-quality and well-managed health care system is vital to our country's well-being, our prosperity and our strength.

There is a personal dimension to your work as well. When people like you come together to identify and to implement solutions that will improve the quality and delivery of care, you are touching lives — millions of lives — and making them better in a very profound and personal way. That has to be among the highest callings one has the privilege to undertake. So I applaud you for this great work.

The reason that this work is so important is that the beneficiaries of an improved health care system are our own families, our friends and our neighbors.

At Boeing, we have an enormous interest in a successful health care system. Before I tell you about some of our efforts and the partnerships we have forged to make that vision a reality, I want to tell you a little bit about the company itself.

I think the scale of our operations and the kind of work we do have some interesting parallels to the health care field.

Boeing began right here in the Puget Sound area. Our founder, Bill Boeing, had been a lumberman. In 1910, he ventured south to Dominguez Hills, California, to an air show, fell in love with the technology, came back up here and on the shores of Lake Union, just north of downtown Seattle, and founded the Boeing Company in 1916. So we're 91 years old.

Over the years, we have become the world's leading producer of commercial and military aircraft. Our heritage encompasses the entire history of flight, from our first wooden World War I training aircraft to the 7-series of commercial jet aircraft to the International Space Station.

Our history is a history of innovation and of exciting new ideas, going all the way back to Bill Boeing and that day in 1910 when he marveled at manned flight.

As we speak, that history of innovation is being taken to new heights. A little after midnight today, the first 787 Dreamliner was rolled out of our large facility in Everett, Washington, and across the freeway to a paint hangar, in anticipation of the Premier. We have one of these product rollouts about every 12 or 13 years, so they are a very big deal. The 787 Premier will happen on Sunday, July 8, 2007. Get it? See, the marketing people are really smart. 7-8-07.

I know you are finding that a little bit funny and a little bit interesting. But when you think about the millions of parts that have to come together to get this ready for a certain date set years in advance, the logistics and the planning are not exactly easy tasks. We've got a lot of bright people who are working diligently night and day, literally, to pull this off.

In the 1990s, we undertook a series of strategic mergers and acquisitions to broaden our portfolio and flatten some of the ups and downs of this highly cyclic aerospace industry. These included McDonnell Douglas, the space and defense business of Rockwell International, and Hughes Space and Communications, one of the world's leading satellite producers. And so today, Boeing finds itself an extremely broad, global business and the aerospace leader.

We have more than 155,000 employees in 48 states and 70 countries. More than 70 percent of our employees are located in three states — of course, here in Washington; in Missouri, where McDonnell Douglas was founded; and in California, where the Douglas Aircraft, the Rockwell firm and Hughes were established.

84,000 members of our team have college degrees, including nearly 29,000 advanced degrees. Boeing is an engineering company. We're a technology leader, and our bread and butter is innovation and we do that through the brains and brawn of our engineering and technical team. These degrees are in virtually every business and technical field from almost 3,000 colleges and universities worldwide.

Now, 36 percent of our employees are represented by labor unions. Here in the Seattle area, two-thirds of the roughly 55,000 employees are represented by labor. So as Margaret said, bringing the labor unions into this dialogue and into this discussion is critically important to our success. And they, like we, are very interested in the quality and cost of health care.

We are one of the largest exporters in the United States. We have customers in more than 90 countries, and 37 percent of our revenue comes from international sales.

Total company revenues last year were \$61.5 billion. And in 2006, we spent \$1.9 billion of that on health care. Three out of every \$100 of revenue is spent on health care for our employees, families and retirees. So this is a very, very significant line item.

As I said earlier, health care benefits go beyond dollars and cents. Yes, we are concerned about the effect of health care on our bottom line, as is every other employer offering this type of benefit to date. But we are mindful of the fact that without a high-quality, effective, efficient health care system, our employees and their families are at risk.

And at Boeing, we know something about risk. That's the nature of our business.

Our airplanes have to perform flawlessly. If we make mistakes, if our processes are ill-defined and sloppy, if we don't design and build our products properly so that they perform as they should, we put all of you and the entire flying public at risk.

It's very simple. In our business, our tolerance for defects is zero. We think the health care industry should adopt the same standard.

We are pleased that our industry delivers an extremely safe and reliable product. The chance of a flight fatality on a U.S. commercial airplane is three in 10 million. But that's not good enough. And so, every single day, we strive to make it better.

Now compare that to the chance of becoming injured while you are a hospital patient. You are twenty thousand times more likely to be injured in a hospital than to be injured on a commercial airplane.

The commercial airplane industry safety record isn't the result of luck. It is the result of some very serious quality initiatives and careful analysis of processes to eliminate risk. It is the result of

working closely on quality issues with our customer airlines, with regulators and with thousands of suppliers around the world.

We'd like to see some of the strategies that we use and that work in our industry take hold in the health care sector.

One concept that we are particularly attached to, and particularly excited about and that we've embraced in a big way at Boeing — and that we think has terrific potential in the health care area — is the creation of a Lean production system.

Lean manufacturing is the foundation of the world's best production system — the Toyota production system — used in the factories in Japan and the United States to build what are probably the highest-quality cars in the world.

Interestingly, before the world's attention turned to Toyota, a lot of those same techniques were used by Boeing here in Seattle during World War II. We built the B-17 bomber, known as the Flying Fortress, just south of downtown at what we call Plant 2 and adjacent to Boeing Field. And of course, the B-17 was critical in helping the Allies win World War II.

In those days, a team of highly motivated employees in the factory — almost half women, working in industry for the first time — analyzed the work they were doing, redesigned their processes for maximum efficiency, and ended up with a manufacturing miracle, producing about 15 airplanes a day. These airplanes rolled out the factory doors and across the street to what is now called Boeing Field, where they flew off to war at a rate of 1.6 per hour.

Lean focuses on eliminating waste, whether from errors, or inefficiency from a production process. Wasted money, wasted space, wasted time.

In a Lean system, the people who do the work analyze how they are building, assess how they should be building and then squeeze all the waste out of the processes.

Sometimes that means eliminating steps in a process, reconfiguring a work space or making sure supplies are delivered to a production line just when they are needed. The idea is to create a smooth workflow, reduce the time it takes to build the product and eliminate rework.

Besides increasing efficiency and lowering cost, Lean reduces defects. Defects cause rework, and if you don't catch them, they become a threat to quality. Lean thinking requires that every abnormality be addressed immediately. Work is stopped and the defect is addressed in real time.

The exciting thing about Lean is that it's grounded in creating a culture of continuous improvement. The journey never ends. There is always opportunity to eliminate more waste and lean out processes. In this culture, every employee shows up every day obsessed with one thing: improving the processes, even, as at Toyota today, targeting taking seconds out of a process.

So you can go to a Toyota plant and to a General Motors plant, and you will think you are seeing the same thing. There really is very little difference when observed by an untrained eye. The companies use the same robotics, the same moving lines and very similar production processes.

The difference is that Toyota has trained its work force and embedded them in this culture of continuous improvement. So every day the hearts and the minds of the employees are focused on improving the process.

People will come to Toyota and look at the production system and say, "Seems like we can do that." They go back home and try, and fail, and they ask themselves why. And the reason is that the employees aren't grounded; a culture hasn't been created where the hearts and minds of everybody involved in the process are focused on one thing — and that's continuous improvement.

After World War II, Boeing led the world into the jet age. But with minimum competition. Then, during the prosperous fifties, we began to forget our Lean ways.

Decades later, when our business became extremely competitive with the advent of a European competitor called Airbus, we really had to focus on lowering cost and improving quality. We focus on that today, and we'll focus on that tomorrow, and we'll focus on that for the rest of our existence. We began to implement the Toyota production system in our commercial airplane factories.

Amazingly enough, the Lean philosophy still works, decades after we first started using it, in the 1940s.

Many of you probably arrived at this event on a 737 built by Boeing — the most popular commercial airplane in history. It is built down at the south end of Lake Washington in Renton.

In 1999, we were struggling to produce 17 737s a month. We were operating three separate assembly lines, which required nearly 7 million square feet of covered space for the production facilities and related offices and equipment. Then we readopted Lean principles.

Since then, we've reduced our floor space in Renton by 35 percent. We've sold 118 acres of land. We went from operating three 737 assembly lines to one and a half.

And most importantly, and this is the key — we've nearly doubled the number of airplanes we're delivering to customers each month.

So this is what Lean delivers: doubling production, using half the assembly space. That's the type of productivity gain that creates the revenue that allows us to continue to invest in innovation and keeps us in the game for decades to come.

But the story can't stop there. The market wants even more 737s. So we've got to find a way to do that, to create capacity in the production system so that our customers buy from us and not from the competition.

That's the beauty of Lean. The improvements never end. We have an obsession with always being better tomorrow than we are today.

Now we are working to implement Lean beyond the manufacturing areas, in the office areas in particular.

We think these principles can be used in any environment, on any process, including those used in the hospital environment and in the health care clinic environment.

Lean does two things really well that are vitally important to improving our health care system: It improves quality and it lowers cost.

The Boeing executive who led the Lean effort on the 737 is a very talented leader by the name of Carolyn Corvi. Carolyn is also on the board of Virginia Mason hospital here in Seattle, which has been recognized as a national leader in quality improvement. Virginia Mason has officially embraced Lean thinking and is applying Lean principles in its day-to-day operations, with some very impressive results.

At Boeing, we've used Lean to address and prevent defects such as a bolt that hasn't been torqued properly, or a wrench that gets left behind and sealed into the compartment of the airplane, which could pose a safety hazard or just drive the customer nuts by rattling around.

When you are paying tens of millions of dollars for products, you expect them to be perfect, right? Our customers will crawl all over these airplanes before we deliver them and will find the smallest

item — they call it FOD or foreign object debris — that's left in the airplane. And they get all over us if we fail to deliver a perfect aircraft.

Here in the Seattle area, a number of great medical institutions — Group Health, Virginia Mason and others — are using Lean principles and using them very effectively. At Virginia Mason, Lean is being used to eliminate defects such as an accidental puncture, an infection, or a foreign object left inside the human body as opposed to the body of an airplane.

When we implemented Lean thinking, we used a medical metaphor: Our highly skilled mechanics were to be treated like surgeons. We wanted to make sure they had everything they needed when they needed it so they could focus on producing a high-quality product for our airline customers. And we had to make sure that the processes that they used were designed to avoid defects and rework.

In short, we wanted to make sure that those mechanics, those very skilled mechanics, were operating in the type of environment that most patients would expect doctors to be operating in. We think it makes sense to do the same thing for real doctors and real operating rooms, which, as many of us know, could benefit from becoming leaner and more efficient.

A big part of Boeing becoming Lean was working with thousands of independent suppliers, in almost every state and on every continent, who deliver millions of parts that come together to make commercial airplanes.

In partnership with us, they focused on standardizing processes across the industry, reducing defects and improving productivity, thus lowering cost. And they got as excited about Lean as we did. They took on the principle of continuous improvement themselves. So we have assurance that tomorrow they'll be doing their work even better than they are doing it today.

If thousands of independent companies in the aerospace industry can standardize practices, become more efficient, lower cost and increase quality, it would seem to us that doctors, clinics, insurance companies and other segments of the health care industry can do the same thing. It's in the best interest of your customers, the patients, and it will make your industry more productive and more competitive.

We expect that will be the result of a new Boeing health care program that we're offering to employees who require intensive outpatient care. We developed this new approach to health care in conjunction with Regence, our insurance provider, and three local health care providers: the Everett Clinic up north, Virginia Mason here in Seattle, and Valley Medical, which is down in Renton, south of Seattle.

Patients who choose this approach are assigned a physician-led specialized care team that will supplement — not replace, but supplement — the care being provided by the primary care physician. The team comprises a doctor, nurses and other team members who provide help through e-mails, phone calls and in-person visits.

This program is just getting started and we're tracking it to see how it improves health, reduces emergency room visits, lowers costs and provides better prescription drug management and, ultimately, better patient satisfaction. It's Lean because it eliminates unnecessary treatment, which is the goal. It's Lean because it delivers evidence-based medicine efficiently, lowers costs, improves quality and provides for continuous improvement through a feedback loop that measures results.

One reason gatherings such as these are so vitally important is that they provide us with the opportunity to share ideas and successes. And by *us*, I mean representatives of the health care sector, companies that purchase health care services and others that are so instrumental in the success of this industry.

Our national health care system is high on the Boeing agenda. It has to be. It's a huge budget item for us. As I mentioned, as a health care customer, we're spending almost \$2 billion a year on health care for employees, retirees and families. To stay competitive, we have to be able to control that expense if not reduce it.

We have to work for public policies and industry improvements that deliver quality health care at a reasonable and stable cost. We have to work as partners with health care suppliers to ensure that our employees are getting high-quality health care and that costs are contained.

The Puget Sound Health Care Alliance has embraced this idea and is taking a collaborative approach to identifying and implementing best practices based on national standards.

And collaboration is the key. We do the same thing with our thousands of global suppliers around the world who provide us with the millions of components that we integrate into our aircraft. We engage in Lean activities with them, helping them smooth out their processes so they can deliver us high-quality, zero-defect parts, on schedule and at low cost.

And so our suppliers have come to share our passion for continuous improvement that must become ingrained in the business culture once Lean principles are understood and embraced. By working with suppliers in this way, we are making their businesses stronger and more competitive.

Just as our suppliers can lower cost by using standard forms and standard software, so can health care providers lower costs by working toward those same standards.

Although cost is certainly a big concern to us, as it is to all of American industry, we are also very concerned about quality — the quality of every medical experience our employees and their families have. That means we are concerned about safety and efficiency.

We believe we have the best employees in the world. They are engaged and excited about what they do, they love the product, they love the company and they are proud to be Boeing employees. We want them to be healthy and productive. We don't want them to be worried about care they and their families receive. And we don't want them to be at risk when they are receiving medical care.

So we've made this clear to our health care suppliers. And we are working together with them and with union leadership to ensure that our employees get the best from our health care suppliers. We expect our health care suppliers to be committed to continuous improvement and to work toward zero-defect health care delivery.

Our efforts also go beyond the specific needs of our own company.

As corporate citizens, we are advocates of public policy reform at the national level and in our largest markets. We believe that the private sector is the best way to deliver a high-quality health care system, but the present system needs change to make it better.

We are involved in projects to initiate such change through coalitions and alliances with organizations that share our point of view. One of these alliances is the Leapfrog Initiative. Like the Aligning Forces for Quality project, Leapfrog also enjoys the support of the Robert Wood Johnson Foundation.

Leapfrog is a coalition of more than 150 public and private organizations, including key employers like Boeing, General Motors and General Electric, representing 37 million covered patients.

Leapfrog is promoting computerized physician order entry. We know this works because we've discovered that computerized work orders on the factory floor have drastically reduced errors resulting from illegibility and lost paperwork. Leapfrog also promotes evidence-based referral,

getting patients to the hospitals offering the best performance. Again, we have been managing our supply chain this way for years.

We also believe in getting the right people to do the right job, for example, reducing mortality risk in intensive care units by increasing staffing with specialized doctors.

We were one of the first groups of employers to join Leapfrog, back in 1999. It was easy for us to see the value of Leapfrog because of our own Lean thinking, our own risk-management strategies and our own zero-defect philosophy.

Leapfrog was formed as an initiative to address the fact that up to 98,000 Americans die every year from preventable medical errors in hospitals. As someone who has spent most of his career in the aerospace industry, I find that number unacceptable.

The world's airlines conduct nearly 44,000 flights a day, more than 16 million flights a year, carrying more than 2 billion passengers, 75 percent of them on Boeing aircraft.

In 2005, the last year for which worldwide statistics are available, there were 20 accidents and 1,035 fatalities. We work with the entire industry, including our competition, to strive to reduce that number year over year over year.

If commercial air travel had the safety record of U.S. hospitals, we might be out of business. And deservedly so.

The large numbers of preventable deaths in hospitals illustrate why the work you're involved in is so critically important.

Like all of you, Boeing will continue working on many fronts to address this issue. On policy, on process, on our patients, with our employees, families, friends and neighbors.

We realize that improving our health care system is a huge challenge.

We build very complex products and we integrate millions of parts from all over the world. That's a huge challenge. To meet that challenge, we have to develop innovative solutions. We have to make dreams, like the dream of flight, a reality.

We know that complex problems can be solved by people committed and passionate about their work and by strategic partnerships. You are the people who are dreaming of making our health care system, which, throughout the years has generated so many miracles, even better. You are the people whose dedication will make this dream a reality. That's yet another reason why an event like this is so important and so useful.

So on behalf of Boeing, I want to thank you again for the great work you are doing. We are committed to working with you, taking this journey with you and helping you in any way we can.

We wish you the very best as you come together to continue to find solutions and renew your commitment and your passion for improvements in the health care system, which we so drastically need, and which we will attain through great work like this.

I want to thank you again on behalf of the company for having us. And I applaud your efforts, I applaud your commitment and I applaud your passion.

So keep at it. Thank you.