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**Follow the Learner:**  
**The Role of a Leader in Creating a Lean Culture**  
**Presented by the**  
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Chet Marchwinski: Hello, everyone. Welcome to the Lean Enterprise Institute's webinar, Follow the Learner: The Role of a Leader in Creating a Lean Culture with Dr. Sami Bahri, founder of Bahri Dental Group in Jacksonville, Florida and the world's first Lean dentist. I'm Chet Marchwinski, LEI Communications Director. There were about 5,000 registered for this webinar just before we went live. Welcome.

Today we'll take a close look at Lean in a job shop, a job shop that just happens to be a dentist's office. After all, dental offices and job shops specialize in custom work and setups in both places are common and wasteful. So, we'll see how Dr. Bahri adapted Lean concepts like Flow and Kanban and, perhaps most importantly, we'll see some best practices in demonstrating leadership and creating a learning organization.

But before we start, let me give you a few tips to make sure you get the most out of today's training and can participate in the Q&A. Use the volume controls on your computer to adjust the volume. Use the button beneath the slides on your display console to enlarge slides. To ask a

question, click the "Ask a Question" button on the left side of the screen, type your question in the popup box and hit submit. We'll save time at the end of the presentation to answer your questions, but you can submit questions at any time during the webinar.

Later, a survey form will pop up on your screen. Please take a moment to give us your feedback so we can keep improving these sessions and learn what topics you want to learn about.

Dr. Sami Bahri runs a private dental practice in Jacksonville, Florida that includes three general dentists, one orthodontist, 10 chairs for general dentistry, and 7 chairs for orthodontics. As you'll learn he's been applying lean to his practice for over 15 years. In 2007 he presented his work as a keynote speaker at the Shingo Prize Conference, where he was recognized as the "World's First Lean Dentist."

By the way, he's also the subject of a success story on the LEI website, Lean.org. Just type his name into the search box to find the story, "Dentist Drills Down to the Root Causes of Office Waste." Dr. Bahri also is a sought-after speaker on implementing Lean in dentistry. He is the author of the new book, Follow the Learner: The Role of a Leader in Creating a Lean Culture from the Lean Enterprise Institute.

And now with that, I will hand the virtual microphone over to Dr. Bahri. Doctor?

Dr. Sami Bahri: Hello, everyone. I'm Sami Bahri from Jacksonville, Florida. I'm happy to share with you today how we changed our practice from a batching queue to a Lean practice. Why did we change in the first place, you might ask me. We have changed because of need. We had a lot of problems. We had many problems. We have tried different approaches, TQM, reengineering and others, to be able to solve those problems. We found that Lean gave us the best results. That's why we changed to Lean.

Then I found in my first job as a Lean leader was to understand and believe that Lean principles directly address core business problems. If you believe that Lean is going to give you best results, then you might change to it. If you don't believe that Lean is going to give you some results that you're asking for, then you probably would not change to it.

Here are some of the problems we had at that time: uneven work load, relying on one front office person, those are classical problems you see in any dental office. And we tried to solve those problems. Lean was very good to us. Once we -- once I knew that Lean was the solution, then I had

to determine what scope of change I needed and what direction. The scope is something like that.

If you're happy with your system, with your management system, then you'd probably want to go into incremental improvements, small improvements. But if someone tells you that Lean is going to give you way better results than what you have, then you'd probably do the same thing that we've done, which is do a radical change. Then, you learn all these principles about Lean. You find enough to fill a lexicon, and you think what direction do I need to go now? And as you see in the rest of this presentation, we chose the one-piece flow. And I'm going to explain all of that during the presentation.

Okay. I was introduced to Lean thinking and the first -- and the one-piece flow, actually, in the book *Lean Thinking*. Then once I knew that that was a theory I would like really to investigate and learn more about, I went to the original works of Shingo, Ohno and the rest until we learned enough about the Toyota production system, or Lean. And then we came up with the understanding that one-piece flow is what's important.

Then what's the big question now? The big question is does one-piece flow apply to dentistry and is it actually achievable in dentistry? So, what is one-piece flow in dentistry and what is my next job as a leader? Now, I learned all those technical terms, all those principles, who is going to implement them in my office?

The social part. S is for social, T is for technical on your screen. The third job of a Lean leader is to balance the technical and the social dimensions of Lean.

Now, to put it simply, once you have learned the technical part of Lean, you could not implement faster than your people are ready to help you implement it. So actually, those people need to learn Lean. They need to believe in it. And you as a leader, you need to lead them through it and prove to them that Lean actually works.

So, how at the Bahri Dental Group did we pursue one-piece flow? This is what I consider ideal in dentistry. One-piece flow. We have 15 teeth belonging to 5 people. I'd be able to treat those teeth one after the other as if they belonged to one person, with no delay in-between. Actually, in real life it doesn't happen that way. You have different people, they have different needs. So, what really stands in the way of one-piece flow in dentistry?

We found out that in dentistry, like in any other business, what stands primarily in the way of one-piece flow are really setups. Here you see we have a big setup when we see patient A. Like, you need to clean the room; you need to sterilize the instruments, etc. I receive the patient. That takes time. Then you treat tooth number A1 with a filling, let's say. After you're done you want to treat tooth A1 with a root canal. You need a little setup to switch from filling to root canal. I called it little, but actually it still deterred us from doing everything in one time. So, we learned something called SMED, single minute exchange of dies, and we applied it to dentistry to eliminate and reduce those setups and we got much closer to one-piece flow.

Now, look at this slide. This slide is very important to me because when you learn Lean, you have so many principles that at the beginning we got lost. But here, you have six principles and that's all we have -- we needed to transform our practice. So, this really simplifies things for us.

Firstly, time needs to be reduced. We know that. Then, you look at leveling, synchronization, one-piece flow and smaller lot size. Each one independently would reduce that lead time by 90%. Combined, they would reduce it 500 times; which means if there's something that I usually do in 500 days, now I can do it maybe in one day. And Shingo says if you study SMED, which is the equivalent of setups for us, then you could treat the demand. If someone has a toothache, you can receive them now, you can treat the tooth now.

So, we took every one of these principles and studied them at three levels. First, what does it mean to manufacturer? Second, how do you translate it to dentistry? Third, how do you implement it?

So here, I'm going to show you the definition of leveling. Leveling, we define it as balancing the load, the amount of work, with capacity. Then distributing procedures according to takt time throughout the schedule.

For those who are new with us, takt time means the pace of demand. If we work 40 hours a week and our patients are asking for 80 cleanings, so how much time do I have available to finish one cleaning before I have to start the next one? Half an hour, obviously. That would be my takt time.

Then we had to define flow. Flow is different from the old way where we used to make one appointment with the hygienist, one appointment with the dentist, one appointment with the orthodontist. Now, you need one appointment. You sit in your chair. All providers come to you. Continuous treatment. They want one after the other and not gaps in-between them.

Then we have to define one-piece flow and one lot. We experimented with that for a long time. We came up to the conclusion that the most practical is to call a tooth one piece and a mouth one lot. You would want to finish the mouth in one sitting, if you can. But when I'm working inside the mouth I would want to do one tooth at a time. Like, close one tooth before I start the other one.

Here we see the definition of Ohno and lead time. He said lead time is from the moment someone orders something to cash, the moment is done. You need to reduce it by eliminating waste. We translated that in saying first call -- from first call until the mouth is totally healthy we want to finish it as fast as possible and, for us, that is one visit. That would be the fastest.

Okay. How did we implement flow? We went through these three steps, as you see: grouping activities by complexity and predictability, flow scheduling and crossing the functional barriers. Every time we study one of these principles, you see it will have some influence on our scheduling, the way we schedule, and also the way our staff responds to that schedule.

Grouping activities, you see simple and stable, complex and stable. Stable means I know how long it takes me. This schedule is very important. If I know how long it takes me, then I will try to finish it on the exam visit.

Now we go to the second phase of flow where we took care of our scheduling. This is how we used to schedule our patients. That scheduling focused on provider efficiency, meaning it focused on me working all of the time. So, I would have patients waiting in the chairs and I would hop from one chair to the other, then we -- look here. First line. We have dentist one -- had three chairs, actually. I had two hygienists helping me in chair four and five.

Now, in chair one I -- we're grouping the treatment by the kind of jobs, like crown preps, build-ups, inlays in chair number one, fillings in chair number two; and extractions, simple stuff, is chair number three; and cleanings in four. Now, imagine if a patient's needing several crowns, several fillings and a cleaning. What did we do? One appointment for crowns, one appointment for fillings, one appointment for cleaning.

In flow, you don't focus on the provider. You focus on the patient need. Now you see me -- that D1 is doctor one -- using chair number one full time. Chair number two, half of the time. The hygienist is sharing that chair with the doctor. In the morning she's cleaning someone's teeth. The

doctor is working on patient P1. And if that patient needs a cleaning, she will go to the other chair, to the P1 chair, and she'll clean their teeth.

That's how we do everything in one appointment. The hygienist and dentist and everybody else work on that patient. Then you see the same thing happening for doctor two in chair three and four. A distribution then we have chair number five for overflow, meaning if we are really late in our schedule, we weren't precise, or if we have an emergency then we can see them that day.

How did we cross the functional boundary? Very simple, we identified one patient who needed dental treatment and we called the hygienist. We said can you please come and clean her teeth when you have a break. And she accepted. The patient liked it. Other patients liked it. So, the hygienist thought it -- it became part of the practice. Then at the second stage, I started going to the hygienist's chairs. And if she found a cavity I would treat it that same day. Then we thought, why do we still call them hygiene chairs and dentist's chairs. We're going to just call them patient chairs. Everybody sits in every room.

Synchronization is our last principle. And you see scheduling again, but now we introduce just-in-time services. Now we're going to ask people to go where they're needed, exactly when they are needed.

First, we worked on our schedule. In the traditional way, when we started creating scheduling templates, we would think how many chairs do we have? Five. How many assistants? Three. And how many days are we working a year? So, now we know how many patients we can see and we would create a template from that. So, we were creating a template from capacity.

But demand never matches capacity. In Lean, we start from demand. So we studied the previous year's data and, from that data, we created a template. Now, everybody can schedule you from that template, but they can't be very precise. So, that's why we asked providers to go 15 days before your appointment to go and check their schedule to make sure it flows and you're not going to be waiting.

Now, it is different on the day of the appointment where everybody is working. The doctors don't have time to check their schedules. The hygienists don't have time to check their schedules. So, we created a position of flow manager. The manager has synchronized them. So, we're going to see in the next slides --. Okay. Here you see the flow manager. The tool that she uses is the Kanban. In the next slides you are going to see her job description. Actually, she's standing in the hallway looking at

the patients and making sure that value-added work is happening all the time for those patients. If she sees someone waiting, she calls someone to help them. If everybody's busy, she is trained to take over until someone is free and continue.

Now, Kanban is a signal in Japanese, just a signal. In our case, we have a flow chart that tells everybody where to go next. So actually, in a management environment, in a work environment, all you need is to know where to go next and the day can flow very easily.

So from that, we had some results. So, what are the results? In short, lean thinking is lean because it provides a way to do more with less; less human effort, time, equipment, space, while coming closer and closer to providing customers with exactly what they want. Now remember, you have to start with the human efforts. Everything starts with people. You have to save them some time so they could work on lean.

Did we match all those criteria? We started with lead time. That's what we started to measure to start with. So, we went a number of days; we went from seven to three in 2006. Today it's 10. Then we also measured it in number of hours. It went a number -- excuse me, number of days. We went from 2003 to 38; today it's 10 days.

Then we started getting nervous. Are we getting too -- are we going too fast for our patients. And we starting surveying them and here you see some of the results. We were prompt at scheduling them 100% of the time. They were happy with one visit treatment. They said their questions were addressed completely and they would refer friends to us. So in general, patients were happy with the system.

Then we started asking how do you rate our services. We started with good, average and poor. They scratched it and they put excellent. So, we redid the survey with 200 people and here are the results; 89 said excellent, 11 said good.

Doing more with less. How much did our doctors produce more in dentistry per visit? And you see the three doctors respectively; 18, 29 and 35% more with the new system. Less human effort. One hygienist had a baby and she wanted to stop working. So, we did not have to replace here. Two assistants had to leave for family reasons. We didn't have to replace them.

Here it shows you the number of patient visits. Look at the difference. We did 1,796 visits less in one year for the same amount of dentistry. Now, in the -- in this slide I multiplied by some of the procedures that we

normally do in each visit and this is the time that we saved. That's the time that actually allows us to see patients on short notice and gives us flexibility in our scheduling. We're using 6 chairs instead of 10. That's a 40% improvement in space. And now we have 140 hours instead of 77 hours available for doctors to treat patients. Actually, we can probably hire more doctors in the practice.

So, this is the technical journey. What did we learn from it? This journey has not been a straight line because we had no idea what the practice was going to look like at the end of the journey. So, we call it peaks and valleys. The first peak would be, let's say, learning SMED so you could reduce your setup time. And then once you're there, you see the next peak, which would probably be let's do flow in dentistry. You know, let's have the dentists finish everything.

And in the next slide, I'm going to show you a little bit how the learning journey went. See, we've seen the principles, but let's make it a little closer to reality and how it happened actually in our office.

We tried that one-visit treatment. We had too many setups. We couldn't do one-visit treatment. So, we learned SMED. The room changeover became faster. Now we've saved all that time, we had extra capacity. We'd treat the patients and we'd still have extra time. What do we do with it? So, we thought let's finish everything the patient needs during that visit. That flow and the dentist part of treatment, we did that.

Now, when the patients [unintelligible] or went out, we need to make an appointment with the hygienist. Then, why do we need to make an appointment? Let's talk to the hygienist, do mixed treatment and now the hygienist and the doctor are treating the patient. But when the doctor gets up he doesn't know where to go. The hygienist doesn't know where to go. We needed coordination.

So, we create the flow manager position. That flow manager needed to communicate with one person, couldn't communicate with the other one. How did Toyota solve that kind of problem? Kanban. So, we created a Kanban system and it's worked very well. That I consider the Kaikaku phase of our practice, which means the radical improvement.

Why did that improvement take me 13 years? We had all the information, but there was doubt and hesitation. Does it apply to my business? Does it apply to dentistry? That's only manufacturing. But take it from me, it applies to any business. I spent 13 years to find out. You don't need to.

Then the other factor, why we spent 13 years, is really because we didn't make any difference between value stream and operations. Here you see the value stream running horizontally and the operation running vertically. I spent 13 years improving the diagnosis and making an appointment. You see it as red in delay, and then improving the cleaning, making it go faster, more efficiently, maybe more comfortable for the patient and then make another appointment and improving treatment. So, I was improving operations one by one and still keeping those delays between the different steps. We did not see good results until we eliminated the delays.

So, my recommendation is you work on your value stream first and eliminating delays. Once you're reached that point, you work on your operations. The value stream phase is a Kaikaku phase or radical improvement, and the operations phase is the Kaizen phase where you keep improving your operations to make that value stream better.

Well, that was the technical part. And the technical part is very easy if you want to study it in books and if you want to understand it, all that is easy. But people are going to implement it. People will implement it. So, the social dimension is as important, exactly as important as the technical. We need to know how we treat our people. We need to know how we treat our organization so that the technical part would be implemented properly. Actually, I think this is the hardest part of Lean implementation.

Here's how Jim Womack sees it. He says what we need is a clear and universally understood purpose dedicated to solving customer problems, supported by lean processes that are designed, performed and improved by engaged people with fulfilling work.. Purpose, process, people. So here, what he's describing is really the job of a leader. This is a job description of a leader. It is as important as the technical part. The separation between the two is really artificial.

Okay. How did we do it at the Bahri Dental Group? Our purpose, see, it has always to do with value. Purpose has always to do with value. We have to solve the customer's problem, but we also have to define the rules of the road. The rules by which the values, by which everyone needs to make decisions in the organization. And I'm going to go through those and show you what I have learned during those past years. Maybe you can improve on them or use them. I wish the best.

First, defining "true north." Our true north in dentistry is really to make quality dental care accessible to as many patients as possible. To do so, one-piece flow, the technical part, one-piece flow has helped us tremendously to the point where, if an improvement helps one-piece flow, we call it a good improvement. If an improvement does not help one-

piece flow, it is less important to us as an improvement. If I had to put it in other terms, I would say any improvement that improves one-piece flow is really the 20% of work that has given me a few to 80% of results. Twenty percent of work that will give you 80% of the results.

Put the customer first. See some of the lines are in blue, some of the lines are in black. The blue ones are the ones that are identified as very important to me and where we made a difference. The black ones I'm going to go faster. Each one has its own takt time. The blue one has, like, a 90-second takt time. I have to finish it before 90 seconds. The black one is probably 30 seconds.

So, put the customer service -- put the customer first. I learned that from Sam Walton, the founder of Wal-Mart. If he used to buy something for \$1.00 he would put, let's say 8% of profit on it. Then he would keep looking until he found it for \$0.50. What does he do then? He would still put 8% on it. He would not take advantage of the customer when the customer's not looking. So, that is a very important lesson he built his -- all his kingdom on.

Focus on reliability and responsiveness. That's from a book called Marketing Services. And they did a survey where people said most important for us is reliability and responsiveness. What is responsiveness? Responsiveness is timeliness. People want the service when they want it and that's what we do in our practice. Whenever you want your cleaning, we give it to you. Whenever you have -- whenever you want your treatment we give it to you.

Pursue quality and productivity with equal passion. Now, as a young dentist, you know, I didn't know how to balance quality and productivity. I tried to be productive and go fast and then I see that I'm going to start making mistakes. So, I go slowly, get better quality and now I'm going so slowly that I have to worry about my bills at the end of the month. What do we do? When I read The Machine that Changed the World, they found that people who do Lean actually improved productivity through improving quality. They go hand in hand. So, you could use -- improve your business and be proud of the quality you've given to your patients.

Minimize lead time, maximize flow to increase capacity. These are the three lessons that I think are most important that I learned from reading Ohno. Lead time has to be reduced. Maximize flow. He says you cannot go into a -- to your prediction of production system without flow. You cannot go to Kanban without flow. So, you have to do flow first.

And increased capacity. Sometimes we have to make decisions on the fly. We have an emergency coming in. What do we do? He said you change the way you store your materials around you and you change the sequence of your work and you'll be able to increase your capacity. And I'm here to attest to that. That's all we do every day. We change the sequence and we'll be able to see more people.

Understand and treat your organization as a system. Let's that a little more important stuff.

Pursue operational excellence. And discipline of market leaders. They told you that people and organizations are in three groups; those who pursue operational excellence, those who pursue great service and those who pursue innovation. And they found that, historically, the ones who have -- they'll pursue operational excellence are really a more sustainable advantage, competitive advantage than the others. Like, if we added a new gadget to the practice, anybody could imitate it. But if we work for 15 years, 20 years, until we have operational excellence, then it's going to be very hard to imitate. And then in the same time, once we are at a comfortable level, we could add the other innovation and good customer service.

Process. Process is really how you get to your purpose; how you get to your purpose. Obviously, we need to talk about PDCA, Plan-Do-Check-Act, and a continuous improvement here.

And I would like to talk about part learner and equal part teacher. When we talk about the leader being a teacher what are we assuming? We are assuming really that the leader knows the answer better than the person doing the job, all the time. Well, that is not true every time. Most of the time, in my case at last, the people doing the job have a better answer than I do. That's for one.

Then, when I was learning Lean, I would learn a principle and then go to the office and just maybe discuss it with one person and say what does that -- what do you think that means to us. Let's try this. Let's try that. Then the person gets more engaged. She gets more committed. She understands better. And then when we see the results, we go to the meeting and try to explain it to everybody else. But actually, when I was teaching that, I wasn't as excited when I was learning it. And the people listening to it were not as committed as the person who learned through me. So, I think that the leader as a learner is really a crucial part of sitting with our people and learning with them. Problem solving is very important to Lean, and that is a classical thing.

Now, cross-train to meet the needs of the patients. We believe in cross-training. We believe very seriously in cross-training to the point where, for a couple of years, we used to take every Thursday, the whole day, we didn't take any patients, we just cross-trained the chair-side assistant and the front desk people in each other's jobs until everyone was able to handle a case from start to finish.

Create a learning environment safe for experimentation. What does safe for experimentation mean? I think it has a superficial level, a shadow level, and it has a deep level. First, safe means they're not scared of you. You're not going to fire them if they make mistakes. And I think nobody's going to do that. But what we do actually -- I'm going to tell you a little story about that, where it came from.

I was in my office one day at the dental school where I used to be in Lebanon. And then in one department three people were trying to implement a new improvement, and then the fourth one did not want to go with it. So, after a couple hours one of them came to me and said we're not getting anywhere; can you please come and help.

So, I went there and I looked at my friend. I said, we have three people here trying to implement something. Would you be willing to let us try? And if it doesn't work I promise we'll go back to what it is right now. He said no problem. Let's try and we'll see. Actually, it worked and he ended up helping in implementing it. And I've found that this approach has worked with me for the rest of my -- so far. I mean, I can't say for the rest of my career yet.

Then communicate clearly and honestly with patients.

Standardize first, then improve. We have three doctors working in the practice. If each one does their treatment differently, then how can they improve? We can improve one of them, but we cannot improve the whole practice. So, standardization needs to be the starting point for continuous improvement.

Gather decision makers together. That is very important. How did we get to that? See, one day I was looking at a schedule in color where I could tell where every provider goes. And Candace, the flow manager, was standing across the table from me and I was trying to explain and she couldn't understand. So, she came and sat next to me and as soon as she saw, now we can understand everything. We didn't need -- we didn't have any problems communicating. So she said, you know, Dr. Bahri, I'm going to leave my office. She had been in that office for probably seven years. She left the office in a heartbeat and found a place next to the clinic

where she can hear, where she can see everything, and she never went back to her office. Now decisions are much easier and much faster to make.

And we're going to talk about people. Obviously, people are the most important. People are going to implement the change. People are going to make or break the transformation. We show respect for people and their personal life. Respect for people we know. We respect them. But how about their personal lives? It's been a controversial issue. We are afraid that if we let people bring their personal problems to the office, then they might abuse the system. Well, I think if they have a small problem they're going to leave it at the door anyway. But if they have a big problem, you can't ask them to leave them at the door.

So, we decided we were going to help them. We decided we're gonna help them with their problems. It's always better. Most of the time, all it's going to take is probably filling in for one person to go take care of her child or her mother. We're always afraid that people are going to abuse us if we're nice to them and we understand their personal life. In 31 years, nobody has abused us. So, I think it's too late for me to think that anybody's going to abuse me if I help them.

Create an open business partnership. And that's about being very upfront with all the problems, including employee problems. Respect everyone's time. If we respect the patient's time, it's understandable. That's because they're paying us. We want to be nice to them. But if we talk about respect for people -- and everyone is people; the assistant is people, the hygienist, the lab technician; even the dentist. We have to respect everyone. In our office we respect everyone.

You know, one of the main problems in dentistry is the hygienist waiting for the dentist to come and check her patients. When you apply just-in-time flow using the Kanban, I am there within one or two minutes. I was going to say all the time, but she might be listening so I'm going to say most of the time.

Balancing competing interests.

Gain trust by providing proof. I'm going to tell you another story. I was living in the same building as my uncle. My uncle was a very outspoken man. And then he -- to me, he was probably the most stubborn person I've ever know. But he got very sick and I needed to stop working for a little while and take care of him. And while we were chatting, he said -- he started telling me a story on how flexible he was. So, I started laughing. He said, you know, I know why you're laughing. You're laughing because

you think I'm stubborn. Well, I'm going to tell you something. Convince me of your idea and you'll see that I'm not stubborn anymore. He has changed my life. Nobody stays stubborn if you prove to them. So, the job of a leader is to provide proof.

Build consensus. Again, I was working with government employees. And once you hire them, there's no way you can fire them, or almost no way. I had to convince people to do their job because I had almost no authority on them. I thought, I'm going to go to the United States. Over there, if someone doesn't listen to you, you fire them and that's what I've done. The first year, you don't listen to me you're fired. Well, I ended up having hire people with the same attitudes, people scared to tell me what they think. And training and retraining. It was awful. So, I decided we'd go back to consensus. And it has nothing to do with authority and firing. It is my job to convince people.

Decide to become a leader. If you always think am I material for a leader or not, well, I think everybody can be a leader. I read a book called Management of the Absurd. In that book, the author has noticed that you have leaders of all sorts. You have leaders of all kinds. So, his conclusion was it doesn't matter, just go do it. Just go do it. That is probably the most important message.

Okay, summary of advice. This is what I thought I would like to leave you with. It's a little summary of what we have seen so far.

Improved processes. That means value streams before you improve operations.

Run your value-adding operations in a series, meaning in my case it would be the filling, the root canal, the crown, right next to -- right one after the other. And the support functions, like for instance checking the patient out, making the next appointment, write your prescription would be done at the same time.

Start improvements on a small scale. We found that when you start on a smaller scale, it works better because you did it with less people to convince and you get your results faster. If you go on a large scale, you have to convince so many people at a time and your results are delayed.

So, we use those small-scale experiments to provide proof again, and then we look for flexible people. Flexibility is more important than talent. Flexible people are smart, flexible people are willing to learn, they're willing to change and they're willing to take care of other people. And put the decision makers together.

So, here is my presentation. This is what I wanted to tell you. But most important is start doing something. Acting is much more important than learning. Gibran had said, a little knowledge that acts is worth infinitely more than much knowledge that is idle. He says a little knowledge. Maybe we need to look for a lot of knowledge that acts. And I wish you good luck. Thank you very much.

Chet Marchwinski: Thanks very much, Dr. Bahri. There's a lot of good questions coming in. It looks like there's a lot of people in healthcare and some dentists out there, very specific questions. And a lot of them -- a lot of people seem to be trying to implement this so I think you'll be able to help them.

But first I wanted to mention that Dr. Bahri's new book is now available at [Lean.org](http://Lean.org) if you want to continue learning about this topic and learn about his implementation process. You can also continue your learning June 2nd to 4th in Dulles, Virginia, our Lean Implementation Workshops. We'll be there during that time. In July we'll be in Minneapolis with our workshop. Complete details about both of these events, other upcoming events, are at [Lean.org](http://Lean.org). You can get the content information, information about discounts and instructors there. So, please stop in and check it out.

Now, let's take some questions from the Lean community. Here's one pretty specific about takt time, Dr. Bahri.

Dr. Sami Bahri: Uh-huh.

Chet Marchwinski: When calculating takt time for healthcare services, where procedure times differ greatly, I always struggle with what to count, number of appointments versus total procedure minutes versus procedures by type. Each has advantages and disadvantages. I'd appreciate any insight and wish to know if you also contemplated the various options. I tend to think of -- I tend to think number of appointments could be the best option to calculate demand with.

Dr. Sami Bahri: Okay. Start with demand. Well, we have tried several times -- several things for years. And well, first thing, it took me a long time to realize that I don't have -- I do not need to separate between dentist and hygienist because we are working on the patient. So, we actually take what the patient looks at. They're having their teeth cleaned and their teeth fixed. They're not looking at dentist and hygienist. So, we mixed that together. Then, we took the most frequent -- we studied the frequency and we took the most frequency -- frequent, which is cleanings.

Now, I think more frequently than not the most frequent is also the most repetitive. So, in our case we took the frequency. I think that is what we need to consider. The frequency of a procedure. Because it's actually affecting the number of setups that this procedure is taking out from your staff.

Does that answer the question?

Chet Marchwinski: Yes, I think -- well, they can email us in if it didn't and we can answer it, you know, in a follow up question. So--.

Dr. Sami Bahri: --I would do a frequency study and take the most frequent one.

Chet Marchwinski: Okay. In our hospital we take the perspective that Lean basics should be in place first before implementing the more advanced concepts. We view basics as 5S and standard work. We view advanced as those you're covering. What are your thoughts on addressing takt, Kanban, etc., for scheduling before having good, standard work and 5S?

Dr. Sami Bahri: Okay. I personally do not believe that basics need to be in place before you start. I believe that you need to take the smallest parts you can and try to implement deeper. Like, it's one -- one-inch wide and one mile deep; not one inch -- not one inch deep and one mile wide. So, we need to go in-depth in the smallest part of the hospital first and implement to see results.

I don't -- if we do -- if you want to do 5S you do it in a small part of the hospital then do whatever else you want to do in that small part until that part is Lean, and then we transfer it to the rest of the hospital. Because implementing on a large scale is really batch thinking. That's very delicate because a lot of times we are programmed to think in batch. So, we want to do the whole hospital 5S and then you want to do the hospital leveling, and we want to do the whole hospital takt time. That is batch thinking. If I had to do it, I would go in a small part of the hospital, do all of it. Leveling, synchronization, takt time, whatever, study my lead time, and then transfer to the rest of the hospital.

Chet Marchwinski: Okay. There were a couple questions about SMED, which stands for Single Minute Exchange of Die. People are just basically asking you to repeat what that is. I guess it's a new concept to some. So, if you could just briefly describe Single Minute Exchange of Die in your environment.

Dr. Sami Bahri: In my environment. Well, in my environment it's just setting the room up. We have to study how we set the room up and how we -- how frequently we set the instruments up. And once we studied that, we created a bin

system behind us that we replenish constantly and that makes the materials constantly available to the provider. Anytime I sit in the chair, the materials I need to use and the masks are available.

If you're talking about SMED -- what is SMED in manufacturing, that is changing between a model and the other as fast as you can. You know, setting up to change model at Toyota -- models at Toyota, if I remember, was either 12 or 4 hours. And then they knew that they couldn't do one-piece flow with that. They hired Shingo and Shingo made it go in 3 to 10 minutes. So, just by studying how you set up in-between patients you can reduce -- you can keep reducing it to where the setup and changeover would not affect your operation and you could go into one-piece flow.

Chet Marchwinski: Okay. So, even though there's -- as you said, in the factory you were talking about equipment, but in the office, in your case you're talking about the tools--.

Dr. Sami Bahri: --Smaller equipment.

Chet Marchwinski: Yeah. Yeah.

Dr. Sami Bahri: Just smaller equipment, actually.

Chet Marchwinski: But the concept is -- it still applies, it just has to be adapted a little bit.

Dr. Sami Bahri: Oh, it's the same. [Inaudible.]

Chet Marchwinski: There are a couple questions about insurance and issues like that. Here's one. "Dr. Bahri, while asking patients to consider additional treatment during a service visit, such as hygienist on a patients originally scheduled for a filling, etc., do you see any unfavorable affect in patient payments since the treatment estimate does not consider additional services. We are currently struggling with this issue. Many thanks."

Dr. Sami Bahri: Well, remember, our goal -- maybe from this presentation I gave you the impression that my goal is to treat it in one appointment. Actually, my goal is to have the capability of treating in one appointment if the patient wants it. My real goal is to meet the customers -- the voice of the customer, meaning to meet whatever the patient wants. If they want it in two appointments, it would be wrong for me to try to promote one appointment. So, I'm trying to meet the customer's wish.

Now, to go back to the question, at the beginning, you know, you start asking your patients and you do the ones who are willing. Then it becomes more of a common knowledge that you go to that office and they

do everything in one time. And you start attracting the kind of patients who are busy, who don't have a lot of time, business people, or mothers who have kids at home they can't spend -- now we see more and more people short on time. So, they start valuing their time.

Do we have any problems? We try to make payments easier by going with outside companies and financing. Now, some patients like it, some patients don't like it. I think you would have a problem if you tried to force it. But if you present it as an advantage to your patients, then I don't see the problem. But anyone can email and I'm willing to discuss that more.

Chet Marchwinski: Okay. And some listeners want to know more about your cross-training. This kind of sums it up. "Cross-training, I don't get it. You didn't have front desk people cleaning teeth, did you?"

Dr. Sami Bahri: No, I had them assisting. I had assisting and with -- assisting the hygienist, assisting the doctors. And I had -- I still have assistance from the back answer the phones and make appointments and collect payments and all the function.

Chet Marchwinski: Okay.

Dr. Sami Bahri: I mean, I see where that's not traditional but that's who we do it. Everybody's cross-training.

Chet Marchwinski: Yeah. Well, that's -- well, that clears it up. It's not -- they were assisting, as you said. It wasn't like they were doing work that they weren't qualified for. Simply-.

Dr. Sami Bahri: --That's right.

Chet Marchwinski: Yeah.

Dr. Sami Bahri: That's right.

Chet Marchwinski: Were you able to benchmark against other dental facilities? I think you were pretty much alone at the beginning.

Dr. Sami Bahri: I am, yeah. I am pretty much alone. I am alone. I don't know exactly what's behind the question. If they're talking about -- I don't -- I say no. I would say no.

Chet Marchwinski: Okay. Did you visit other, you know, offices or factories implementing Lean to learn the concepts? When you--.

Dr. Sami Bahri: --Not at the beginning. After I implemented it and people knew about me, I started having many friends in the Lean world and then I started talking to them. The only facility that I visited is really Medtronic in Jacksonville with Jerry Bussel where he showed me what they were doing. But that was after the fact.

Chet Marchwinski: Okay. So, it was a matter of just cracking open the books, learning the concepts and then thinking about it and discussing it with people at work.

Dr. Sami Bahri: That's right. That's right.

Chet Marchwinski: Here's another medical related question, I think. How do you standardize the time each patient needs if all of them have different needs?

Dr. Sami Bahri: Well, actually, you don't standardize the time. What you -- first, we take whatever is repetitive and whatever is predictable. Like, I know how long a cleaning takes me. I know how long a simple filling takes me. I know how long a crown takes me, approximately. And then, when I'm trying to do a full -- a whole treatment plan, like finishing a mouth in one day, if I can and if the patient allows me, then I tried to evaluate how much time that takes. I give it a little bit more time. I give it a little bit more time.

What do I do in that extra time? The hygienist is going to find a cavity with one patient. Then I'll do -- I'll go do it in my extra time. Someone calls -- it becomes like an open access, you know. But by consolidating treatment, you are actually saving a lot of time in making appointments and cleaning chairs. And it doesn't matter if you work slowly, you're still doing more work than [unintelligible] chair.

Chet Marchwinski: And so, even though everybody -- everybody's different, everybody has different treatments, there are common elements, like you said, the cleaning and the simple fillings that can be standardize and are predictable.

Dr. Sami Bahri: That's right. Most of it is predictable for any dentist, not just for me.

Chet Marchwinski: Okay. People want -- there were a couple questions about your Kanban system, if you can talk more about that.

Dr. Sami Bahri: Okay. My Kanban system is just a paper. It's just a paper. Now, the secret about it is not to use electronics, to have something physical that we can actually see that -- I'll give you an example. The patient arrives at 9:00. So, on the Kanban we say "signed in" and we have to put the time. And then next to it we have "brought back" and we have to put the time.

So, how long did it take us from the time the patient signed in until the moment the patient is brought back. On that paper we want those two times to match, which means zero seconds. If the patient sits in the chair we failed.

So then, we give the Kanban let's say to the dentist. I'm going to skip to the dentist. Someone gives me the Kanban at 9:00. They tell me we need you there at 9:15. They're giving me 15 minutes to transition, whatever I need to do. Then at 9:15 I will be there and I write on the Kanban the time that I arrived at the chair. So now we have the time they gave me the Kanban, the time they want me there and the time that I need to be there. And every -- all of that needs to be precise to the minute.

Now, we go let's say to the hygienist and we do the same thing. We say the time now is 10:00. We need you there at 10:15. And then she goes there and writes her time in, whether she was on time or not.

What is that doing? That is directing the flow of people to meet the flow of dentistry. So, every provider is told where he or she is needed next. Now, it's not an authority thing. It's something that we're guiding people with their consent after consulting with them.

I don't know if that explains it enough. It's just a piece of paper.

Chet Marchwinski: No, that--.

Dr. Sami Bahri: Yeah. That shows the flow and where everybody is needed.

Chet Marchwinski: Okay. Here's another. How do you see this applying to healthcare -- and I mean this by Lean concepts, how do you see that applying to healthcare in general, you know, such as with primary care physicians?

Dr. Sami Bahri: Oh, primary care physicians. Primary care physicians -- I have an example here in Jacksonville. My friend, my good friend B.J. Aberica [ph], he has a practice -- he's an internist and he has his practice in Jacksonville. We tried those concepts where he tries to get the results right away, the results on his tests right away, in two hours instead of two weeks.

So, we found that he multiplied the number of patients he can see a day maybe four times. We identified 30 patients in 10 months who would have either had amputations or strokes or heart attacks that, just by going faster, doing the one-piece flow and the diagnosis and the treatment have been saved from that. Thirty patients, like three patients a month in one

practice. That gives you the power of just improving the management without any improvement in the medical knowledge.

Chet Marchwinski: Yeah. Or more capacity. You know, you haven't built an extension or bought new equipment or anything like that.

Dr. Sami Bahri: Well, he actually bought the equipment that he needed for the tests instead of sending them out.

Chet Marchwinski: Um-hum.

Dr. Sami Bahri: He bought the equipment that he needs for his tests.

Chet Marchwinski: So, that saves even--.

Dr. Sami Bahri: --So he would have the results right away.

Chet Marchwinski: Um-hum. Here's a question. How do you -- oh, any special message to handle cancellations to fill in the gaps? Do you provide incentives for patients to be on a quick-call list?

Dr. Sami Bahri: No, we don't do any of that. See, I think -- I think first, when people know -- at least I'll tell you from experience. When people started learning that if your appointment for a cleaning is at 12:00, they're going to get you in at 12, exactly. You're going to be out maybe by 12:30. Now it's predictable. We're starting to see people coming in to their appointment before time. See, I think what discourages people is mainly having to wait and having the treatment take too long. And many appointments. Spending too much time at the dentist office.

Cancellations, we still have cancellations. We still have -- we don't do anything about it, we just make them another appointment. We try to be nice to people. The thing is it doesn't affect me that much because any patients in the chair -- see, we have two hygienists working. Any patients who need anything -- we see like four or five new patients a day -- we do it right away. So, I'm always available to treat my patients and we always have patients that are willing to have treatment done right away. So, I really don't give that much attention to cancellations.

Chet Marchwinski: Okay. This will have to be our last question. We only have -- we have less than a minute left. It's supply chain related. To what extent have you worked with your vendors, with suppliers of materials? Have you been able to work with them with JIT principles in mind?

Dr. Sami Bahri: We have fit, actually, the vendor that delivers in 24 hours. That allowed us to reduce our stock to the minimum that is used in the chairs, actually. So, we have just a little cart for seven chairs. Now, at a different level I have met with some companies. I cannot talk about it right now, but I have with some companies and talked about packaging actually the materials for the dentists to be more practical so they would go from the manufacturer to the chair without having to be stored.

Chet Marchwinski: Um-hum. Okay. Well, unfortunately we are out of time. Thanks to Dr. Bahri for sharing the lessons he's learned so far along his Lean journey. And thanks to everyone who is listening. In a few days we'll send everyone a link to an archive of the webinar. That will include the slides, audio and text so you can refer to it or share it with colleagues.

We'll -- there's a lot of questions. They're still coming in. We'll review them and summarize them and Dr. Bahri's kind enough to answer them off line and then we'll post the answers at Lean.org and let you know when they're up. While you're at Lean.org, don't forget to explore the free resources, such as success stories, articles, the forum and book excerpts. Thanks again.

On behalf of Dr. Bahri and everyone here at the Lean Enterprise Institute, we wish you continued success in making the Lean leap.