

## Subtitles and transcriptions

Subtitles and transcriptions are available for selected materials for purpose of helping users understand the contents of the educational sessions.

Uncertain words have been indicated with **??** before and after the part. Parts that could not be understood at all have been indicated as **[Audio Not Clear]**.

Every effort has been made to faithfully reproduce the audio of the sessions as recorded. However, no responsibility is accepted for mistakes or omissions. ESO does not endorse any opinions expressed in the presentations.

## Caltagirone digital workflow

**Dr Fraggetta:** Good morning. My name is Filippo Fraggetta, I'm a surgical pathologist. I'm the elected President of the Italian Society of Pathology and Chair of The Scientific Committee of the European Society of Digital Pathology. And I'm really proud to stay here, to present the "Caltagirone" digital workflow because this is a really example of a successful implementation of digital technology workflow. So, let me tell you something about Caltagirone. Caltagirone is a small town located in the south of Italy in Sicily, in the east part of Sicily. And Caltagirone is very well known because of the production of the famous ceramics, full of colors and are really, really incredible. And they match this beautiful city. The life is really incredible. And, as I told you, the hospital of Caltagirone, named Gravina Hosapital is located in the east part of Sicily. It belongs to the national health system, the public health system. And it collects a wide area, from the east parts, as you can see here, belonging to the Catania area. If we want to summarize, the Pathology Department collects specimens not only from the Caltagirone hospital, but collects the specimens and samples, surgical specimen, cytology, molecular and so on from all the seven different hospitals belonging to this Catania region. Then, even more, it gets some outpatients coming to test the histological analysis. And now, we are implementing the collection of specimens creating a networking with Ragusa, Enna area and Caltanissetta area. And actually, we are part of the network, digital network connecting the Cannizzaro Hospital located in Catania to the Caltagirone Hospital. And this is a bidirectional connection within these two different hospitals. Some consideration about the actual characteristic of Caltagirone Hospital and the pathology department is that the pathology is fully tracked, fully digital. And we used to digitize histology samples and we are starting digitizing in also cytology sample and we render also molecular analyses. We have about 12,000 histological cases with four days of TAT. Actually, we are three pathologists, four, if you want to include me, and two biologists, one dedicated to the molecular and six technicians. So, the question that probably many of you would like to ask me is why Caltagirone decided to move fully digital and fully tracked? What was the background? The background was the high workloads because just one pathologist was present in Caltagirone about three years ago and the workload was really high for him. So, when I was contacted as pathologist to help this situation, to solve the situation, I had already a background represented by a fully digital workflow already implemented by myself at Cannizzaro Hospital in Catania area. So, I realized that to solve the majority of the problems present in Caltagirone we had to completely change the workflow, as a completely different approach of the workflow and implementing the digital pathology. So, digital pathology was the key to solve the majority of the problems of the Pathology Department in Caltagirone. And I can tell you that starting from this paper that we published in Catania in 2017, we completely realized a full digital

approach in Caltagirone. And the output was, it has been this recent published paper, A Survival Guide for the Rapid Transition to a Fully Digital Workflow, which is, the "Caltagirone" example, that I'm going to present. So, it means that if you're really committed, you can go fully digital and your results will be really incredible. And you can move from the analog to digital workflow. A few very simple steps and in few months. So, if you decide and if you're really committed to go digital and to facilitate this transition, I suggest you to implement some things before starting. First of all, you have to rearrange the spaces and office within your lab, according to a lean approach of the workflow. So, simplification of what are you doing within your lab. Then, you have to implement your information technology infrastructure in order to allow the possibility to share, and to look at all the images coming up from the digital transformation and, more important, implementation of a tracking system and the implementation of different checkpoint procedures, in order to achieve the best quality approach. And everything will be successful with the implementation of automation and the end of this workflow, implementation of the scanning, which allow us to convert to the glass slides into double slides, the virtual slides. So, the first thing that I did in making this transition was the lean approach of the workflow. And as you can see, it was very, very messy workflow with the people using to go up and down through the different rooms of the lab. Whereas in the lean approach, everything was linear. Everything was consequence to every different step that we have in our workflow. So, we have the Accessioning and then the Grossing, the Processing, the Embedding Section and so on. So, the different rooms of the lab, followed the logical process within the pathology workflow. So, very, very linear with no wasting time at moving, at searching, just very linear. And actually, the Caltagirone workflow is completely digital with the possibility to use the order entry for the oldest specimens that we have received from units and services of the different hospitals. And everything is managed by just one software, by the LIS. So, we decide to make everything very lean. Everything managed by the LIS. Everything managed by the tracking system and the production of the 2D barcode. So, you can see here, we created the window for the access of specimens. So, the accessioning and then this is the typical grossing room. And everything, I want to stress again, is managed by the presence of the 2D barcode within the LIS. And we implemented different quality assurance checkpoints through different steps. In this case, for example, we had THE possibility to print the 2D barcode within the block using a laser printer, but we have the possibility to acquire images. So, digital pathology starts from the accessioning through the different steps to acquire images not only of the gross and surgical specimens but also, of the images of the material that we are going to put within the cassette. So, this is digital pathology, everything is virtual, paper-less with only just presenting within the LIS. Another point that we realized is to check that all the produced cassettes presented with the 2D barcode are moving to the processing machine, and we can check this acquiring an image, and the system can check the different barcodes. After the processing, we have the embedding with the possibility to track every single step. And since we acquired the images at the grossing, at embedding, the technician has the possibility to look up material that we put within the block. And the next step for sure will be the automation, with the auto-embedding system. And then here in the embedding, we have the possibility to open images. The workflow goes on with the cutting station and everything is managed by the LIS. Everything is managed by the presence of the 2D barcode. With the technician having the possibility to read the barcodes and print directly the slide using a slide printer. Even on this step we have the possibility to acquire images of the cut surface of the block, so we can compare that all the material present on the slides is representing the cut surface of the block. And again, by using the 2D barcode we also can archive the blocks directly, in randomly order because of the presence of the tracking system. We have the possibility to stain, and after the staining and the coverslipping there is the gross closed looping, we do not assemble the slides, but we scan this slides and get glass slides into the WSI, in order to have everything completely virtual with the cases assembled automatically by the combination of the scanning system, in this case, we have the 3D scanner together with the LIS and after the scanning, we can have the possibility to archive the slides randomly by using the 2D barcode. And this is digital. This is really, really the example of the digital workflow. Nothing to manage, everything is made automatically by the LIS, by the presence of the 2D barcode, by the automation. So, what I can suggest you is, make your work digital, make your workflow more efficient and safer, because everything

is managed the by computers, not by units. And your slides will appear directly within the LIS, within the virtual tray which is completely integrated in the LIS. So, this is the typical work station of our pathologist, with the presence of two different monitors on the desk, one highlighting the LIS. And with a double-click the possibility to open the paper on the other monitor. Actually, we do not need medical-grade monitor because we validated commercial monitor by using some software. So, here again, the possibility to check the cut surface of the block that was acquired at the cutting station with the material appearing on the monitor, and this is again, that possibility to access at all the images present and acquire at a different level. I'm going to show you that not only surgical and bio-histological samples are digitized, but we are starting at digitizing also the cytology this will be the topic of another presentation, and we are using dedicated scanner for this. We started scanning different type of cytology specimens, but I can tell you that the best results are actually by using the liquid-based cytology. Even with the possibility to look at the presence of candidates with cancers, so, the quality of the images is really, really great. So, we have the possibility to set phases and the possibility in implementing the lean approach. Also, to implement the possibility of molecular-disruptive and non-disruptive-molecular. In this case also, the possibility to have efficient analysis that we can digitize because we have the scanner capable of digitizing also dark field slides. In this case, this is a matter of gastric cancer. So, the summary of benefits is the paperless, the integration with all the instruments. So, including the Immunohistochemistry specimen, the possibility to share slides, the networking, tracking and the possibility to involve molecular and AI. So, I can tell you that if you asked me how to implement the digital workflow, I refer to the recent paper published, but I can tell you that we didn't perform any study for the case for clinical adoption or business case, because these are already presented in literature and the results are always aligned with the implementation of the digital. For sure, you can think that the cost of the instruments and the IT implementation with the cost of the storage could be a problem, but I can tell you that I achieved all the results by just using public tenders and we are approaching the future. So, if you go back to the presentation of Ian Cree in 2020, "Why go digital? This is the pathology of the future." Even Ian Cree underlined that from the economical viewpoint there are lots of benefits at medium and long-term with the increase of efficiencies and the reduction of the TAT to report cases, then the possibility to implement the computer aided and assisted-diagnosis. So, this is the pathology of the future with the CAD, with the Immunohistochemistry managed by image analysis. With the possibility to integrate different whole data coming from molecular, digital and so on, in order to implement the computational pathology. So, what I'm going to present is that we implement AI tool within this project, not only in Catania, but also, in Caltagirone with the possibility of using standard protocols, such as the HL7, the 12, for example, and some AI tool for prostatic biopsies. So, we send the link, we have the possibility to have the pre-analyzed slides from the Context Vision AI tool, and they're also presented to the pathologist within the LIS as a flip of the images of the slides, if cancer is detected. So, what I'm going to present is the possibility to implement AI tool within your digital tool, digital workflow. And this will be the pathology of the future. So, complete, fully digital tracked with the implementation of AI. And the suspicious area is presented to the pathologist, as the red area as detected by the computer. So, I think that the new workflow will be something like this, with the LIS in the center of everything connecting all the instruments with the possibility for the pathologist to run the diagnosis with help of artificial intelligence, that can manage additional stainings such as FISH analysis, and can manage the Laser Microdissector with the molecular analysis, especially, with NGS, thus connecting all the big data in the next computational pathology. So, the question is, why we are not fully digital in the majority of the Pathology Department? What is holding us back? And I can tell you that I just dream the pathology department having no borders with the connection with all the pathology departments worldwide. With a mixture of pathologists, biologists, lab technicians and the computer scientists for the best precision medicine and therapeutic prognosis approach for the patient. So, just image, just image and you can do everything that you want. And at the end of this journey, you can ask me if it was easy, if it was really worth to be done, I would like probably at the end of this presentation, to tell you that not everything is easy. Probably, we can apply some Murphy's law, that new system generates new problems. But if you have some problems you can have, and you will have for sure solutions, and sometimes, probably the faster you want

be slower the computer will be. Okay! lots of problems but lots of solutions. So, you can convert to all the Murphy's law in a really, really in a [Audio Not Clear]. This was the starting point. When I arrived in Caltagirone I changed really many, many things. And I changed because I had a team working together with me. It is impossible to stay alone, to be just an island. You have to work, probably you will face a lot of problems, but don't worry. Keep calm, drink your coffee, and you will solve every problem. Even in this case, with some internet problems and loss of connection. But remember people, people you have to choose and you have to commit your team together, moving for the digital. And then if there is problem, keep calm, drink another coffee and go on, go on, go on because you can do it. So, at the end, I can tell you that it's not always easy, but it was worth. And probably it has been the best journey of my life. And remember that people are not technology or devices, are usually the driving force behind the change and the quality. And if you do want to trust, please come to visit Caltagirone not only the pathology department but the beauty of the city. So, thank you.