Do’s and Don’ts
IN LIVE SURGERY TRANSMISSIONS

Over the last decades thanks to the development of audiovisual technologies it has become possible to bring the action and reality of the operating room or cathlab in the hospital to the medical conferences in the congress centre. The theoretic presentation can be combined with the day-to-day reality of the procedure, direct question and answer with expert professors in the field all leading to an improved educational impact and steeper learning curve.

Over the last 20 years mediAVentures has been involved in the transmission of more than 2,000 live surgery cases. Each year we perform live surgery transmissions from Europe, the Americas, Asia and Australia in cardiothoracic surgery, cardiology, neurosurgery, orthopaedics, urology, gynaecology, bariatric surgery... (basically all medical fields).

From this experience we have distilled a number of “do’s and don’ts”, from a medical and audiovisual point of view. With this pages we want to share some of our insights. It’s to be used for informative purposes only, it doesn’t has the ambition to be exhaustive nor to provide a complete guide to live surgery. Here we go...
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From a medical point of view...

• Respect the context: the patient’s rights, the surgeon, the nurses and technical hospital personnel, the medical procedure... they all have priority to the audiovisual aspect of the live surgery. The audiovisual crew must adapt and blend in the medical environment. It’s the professionalism, the use of the right equipment and the experience that allow to get the best shots in such an environment. Sterilisation of equipment, galvanic insulation of equipment, checking MSRA-status, scrubbing, respecting the sterile fields,... should all be seen in this context. Specific training for the audiovisual crew and knowledge/experience sharing is required.

• Prepare the audiovisual aspect of the procedure since not each surgeon has an audiovisual background. Discuss the procedure, the different steps, which medical sources are used, what camera is positioned where for which purpose... A good preparation avoids stress during the heat of the action. The live aspect should not add stress for the surgeons and OR-team, especially not when unexpected complications occur.

• Use the right cases for the right cases, with an educational value rather than exotic highly technical situations or rarely used techniques. We often see two or more cases are scheduled on the same day in one or more OR/cathlab and not everything is broadcasted nor used for production of medical videos.

• Patient confidentiality - Privacy regulations imply live surgery cases with anonymous patients. The medical history is shown in a number of slides but without names or any other references to a specific patient. Upfront written informed consent must be obtained by the surgeons from the patient. Also during editing of the video material this aspect remains a continuous point of attention.
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Use the right audiovisual techniques...

This not only comes down to the typical cameras, video mixer, audiosets, recorders, transmission tools... that must be state-of-the-art (and of broadcast quality) but one must use them in the right way. This goes from basics like white balancing, framing, focus, zooming, shading, grading over optimizing signal strength and stability to seamless projection setups and dynamic conversion settings for 3D... Some examples to illustrate:

- **Use** remote controlled **boom cameras** that “fly” over the operation field for **open surgery procedures** to provide a sometimes better view than the surgeon has himself.

- **Working in High-Definition** (or even better, **UltraHD**). We do it since nearly a decade now and is so much more than ‘putting the settings’ right or buying HD cameras. There are more and more medical sources (e.g. angio, echo, robot, endoscope, electrophysiology monitor...) and they all have different connections and resolutions. Most of the times there is a low quality, low resolution connection possible and quite often the easiest choice but not good enough for a high quality transmission and for the audience to appreciate the details of the images, assess the clinical problems and appreciate the chosen therapeutic solutions. Quite often every medical source needs a **dedicated scan converter**. Note we are now realising the first medical UltraHD transmissions in the world: 4 times the resolution of HD, sharper images, richer colours... always with a focus on the best image quality.

- **2D or 3D?** We choose **3D when it can add value to the medical imaging part**, not for the show aspect. For orthopaedic, dentistry, robot urological and plastic surgery procedures it’s an improvement, clearly showing the angle under which the technique is applied. Also for robotic surgery 3D shows exactly what the surgeon sees. And if we choose 3D, then we put all sources in 3D, with specific attention on the dynamic conversion leading to razor sharp images with the right depth vision and no headache for the viewers.

Who we are
mediAVentures is a full-service multimedia production company for the medical and scientific world. We specialise in all aspects of audiovisual support for doctors, societies/organisations, hospitals, congress organisers and pharmaceutical and device companies. We primarily facilitate high-end conferences, with a special focus on live surgery transmissions, live case demonstrations and interactive conferencing solutions.

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• **Create flexibility** in the workflow by equipping 2 instead of one OR (for alternative cases), booking more than sufficient satcap time, bringing in additional crew members when recommended, connect all medical sources even if only used for only 30 seconds.

• One of the most complicated technical parts of a live case transmission is… **audio**. For the audio to be perfect (understandable, but not intrusive, with low delay and certainly not at the edge of feedback) we need to have a perfect communication with the audio technician at the venue. Lots of companies choose to solve this with in-ear's (the surgeon has an ear-piece. The result is fine but for us it’s actually a fallback method. Using speakers in the OR involves the whole medical and audiovisual team and allows them to anticipate on questions, directions (we will come back to you in 5 minutes …) and so on.

• The **right way of transmission**: we mostly use DVB-S2 / 8 PSK – H.264 satellite transmissions (with bandwidth of 9,18 or more Mbps) or professional WiFi (when there is a line of sight, even up to 10 km, with even more bandwidth). We can do turn-arounds for satellite transmission all around the globe and multi-hop with a relay point to bridge longer distance or get around obstacles via WiFi. Multistrand reinforced fibre is a good alternative for in-house or nearby transmissions. And we work point-to-point… this is why, for most cases, the public internet isn’t reliable or powerful enough.

• The previous point brings us automatically to this last one: **control the complete audiovisual chain**, from the audiovisual support in the operating room or (hybrid) cathlab, over the transmission until the projection in the venue. This also includes the signal reception, management and the two way communication (content and technical). The only way to guarantee a perfect production is by taking responsibility of the result.
  If it is good: praise for us, if it is bad - no place to hide. The result is what the attendee sees, hears, learns…

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Contact us for more information or specific questions on: wimsamyn@mediaventures.be