**Video Creation Guide**

The following guidelines are meant to help you optimize your video content prior to submitting your article to an American Diabetes Association journal. Your video may contain an interview, experiment, technical demonstration, etc., or graphics and PowerPoint slides sequenced with audio. The information below should help you to avoid common pitfalls in the creation and/or editing of your video and offer some best practices for encoding. Successful filming is often a matter of experimentation to discover what works best in a particular scenario. We encourage you to explore the possibilities in this area, as moving images can make a substantial contribution to the understanding of academic research.

**Equipment**

There are a wide variety of relatively inexpensive video cameras that are capable of giving very good results. We would recommend using a high-definition camera with a 16:9 widescreen aspect ratio, ideally recording to a memory card. Ideally, you should always mount the camera on a tripod when you film. Shaky hand-held footage is not only hard to watch but won’t encode easily due to the large amount of random movement.

Some attention should also be paid to audio considerations. Many consumer cameras do not have additional audio inputs that enable the user to plug in an external microphone. As a result you are forced to rely on the internal camera microphone which can be inherently noisy and will also pick up more room reverberation and extraneous sounds from outside the room. If you are filming interviews or voice-over, an ideal solution is to use a lapel or tiepin microphone that you can plug directly into the camera, enabling you to capture good-quality close sound.

When filming you can either use available light or introduce your own additional lighting into the location. In some scenarios, the restrictions of the location will mean that you simply can’t add any additional lighting. In this scenario it is a good idea to switch on as many lights as you can within the room. Modern video cameras will work well in low light but tend to introduce gain amplification into the image if the lighting is too low. This adds video noise into the picture and can make it more difficult to edit and encode due to the lack of contrast. If you are thinking about adding additional lighting, the best results will be achieved through adding broad soft lighting rather than harsh spotlights.

**Filming location**

In general, you should aim to film in a quiet location with simple backgrounds. When choosing a location, listen carefully to what sounds you can hear in the area—for instance, air-conditioning, aircraft and traffic noises. Also check that the noise isn’t intermittent—for instance a refrigerator switching on and off. This can make it difficult to edit smoothly between sections as the sound will be present in some parts of the video and absent in others. If you have to film a demonstration in a noisy environment then it can be a good idea to record the voice-over explanation in a quieter place afterwards and edit the two together in post-production.

You should also think carefully about what is behind the subject you are filming. Be very cautious filming anything with a window behind as you run the risk of the subject becoming silhouetted on the video. The reason for this is that the light coming from outside is of a much higher intensity than the light inside. Video cameras will often adjust their exposure to accommodate the stronger outside light, but this will result in the under-exposure of the subject inside. You can get around this by shutting curtains and blinds or by adding more light within the room so it balances better with the light outside.
Filming anything in daylight—either outside or in rooms with a lot of glass—can also be problematic as light levels tend to rise and fall in intensity as clouds move across the sun. This can make it very difficult to edit between different parts of the video as in some the light level is going to be quite high and in others it will be relatively low. If filming with daylight you should also avoid shooting with the sunlight behind the subject or you run the risk of them appearing in shadow. It is better to move the camera round so that the sun is lighting the person from the front and to the side.

**After filming**

Transferring footage from the camera to your computer for editing will involve connecting the camera directly with a USB cable, or removing the memory card and inserting into an external card reader or internal slot on your computer. It is a good idea to keep a back up of the media, making sure you have the video files in two places at all times—for instance on your computer and an external hard-drive. Make sure this is done before deleting the clips from your camera or memory card.

Some cameras record in formats that can be edited natively—in other words you can simply drag the clips from the memory card onto your computer and begin editing. Alternatively, the footage from some cameras will need to be “ingested” into your computer—usually through a software application that comes with the camera. In the latter case you won’t be able to edit the files until they have been imported correctly.

There are numerous different types of editing software. At the basic end iMovie and Windows Movie Maker are more than capable of producing very good edits with easy addition of text. At the higher end, software like Apple Final Cut and Adobe Premiere are very powerful creative tools. In general, you should accept the default video standard that your editing software suggests. There are many different formats but most modern software will simply optimize for the format you recorded in.

**Exporting and encoding**

Once your video is edited you will need to encode it for delivery. In general, you will be editing in the format that your camera shoots. This will invariably mean that your video files are very large in data size. You should initially export a version of your video that is in the original format so you have a high-quality export for archiving. You can then either encode this export with separate encoding software, or export a lower-resolution version from your editing software. The reason for encoding is simply to reduce the file size so that it can be optimally uploaded and downloaded.

The ideal delivery format is a video codec called H264 or MP4. This is very widely used codec and produces very good quality video.

Your editing/encoding software might simply offer you the choice of small, medium, and large encodes, or refer to a delivery destination—for instance “iPad” or simply “web.” In this scenario you won’t have very much control over the encode parameters and should simply pick the one that is closest to the ideal. Alternatively your software might enable you to have quite precise control over the encode settings.

In this scenario you should ideally aim for the following settings:

- **Video Codec** – H264 or MP4
- **Encode method** – Multi-Pass
- **Aspect ratio** – 16:9
Video size in pixels – 640 x 360
Frame rate – 1:1
Key Frame – Auto or 200 frames
Data rate – 840 Kbps
Audio codec – AAC
Audio data rate – 128Kbps
Channels – Stereo or mono
Sample Size – 16

Other formats are possible—for instance WMV (windows media files) or AVI. If you have the option and the ability, it is preferable to send H264/MP4 files.

Regarding web delivery, ADA uses a video delivery system called Brightcove. This enables the upload of higher resolution videos which are then automatically encoded down into a variety of different encode sizes. This means that if someone is watching the video on a very good internet connection—for instance at a university—they will get a very high resolution file. Conversely, if they are watching on a poor quality internet connection then they will get a lower resolution version of the file.

As a result, it is preferable to supply a high resolution encode that can be uploaded by ADA to this system. You should therefore keep the original screen size and encode to H264. If you don’t have much control over the encode settings within your software then simply chose high-quality or YouTube or similar. If you do have control over the settings then the following would be appropriate for high definition video:

Video Codec – H264 or MP4
Encode method – Multi-Pass
Aspect ratio – 16:9
Video size in pixels – 1920 x 1080
Frame rate – 1:1
Key Frame – Auto or 200 frames
Data rate – 3,000 Kbps
Audio codec – AAC
Audio data rate – 128Kbps
Channels – Stereo or mono
Sample Size - 16

If you have been filming in standard definition (for instance in a DV tape-based camera system) then the settings would be as follows:

Video Codec – H264 or MP4
Encode method – Multi-Pass
Aspect ratio – 16:9
Video size in pixels – 1024 x 576
Frame rate – 1:1
Key Frame – Auto or 200 frames
Data rate – 2,000 Kbps
Audio codec – AAC
Audio data rate – 128Kbps
Channels – Stereo or mono
Sample Size – 16