Medical Photography task force
Teleconference
20 March 2014 • 10:00 (EDT)

The meeting was called to order at 10:00 am (EDT) by Craig Revie, chair of MIWG, with the following attendees:

James Chang	Sharp Laboratories
Wei-Chung Cheng	FDA
David Clunie	Bioclinica & PixelMed
John Dalrymple	Independent Consultant
Michael Flynn	Henry Ford Health System
Phil Green	ICC
William Li	Kodak
Andy Masia	X-rite
Masahiro Nishibori	International University of Health and Welfare
John Penczek	NIST
Craig Revie	Fujifilm
Thomas Schopf	University Hospital of North Norway
Stein Olav Skrøvseth	University Hospital of North Norway
John Sweeney	matchmycolor LLC
Yves Vander Haeghen	University of Ghent
Stephen Vastagh	DICOM
Hong Wei	Datacolor
Masahiro Yamaguchi	Tokyo Institute of Technology

After a check of the sound quality Mr. Revie outlined future meeting plans. In addition to the face-to-face meetings planned for Maryland in June and Boston in November, conference call dates have been set for 17 April (Mobile Displays), 15 May (Opthalmology), 17 July (TBD), 18 September (WSI), 18 October (TBD) and 11 December (WSI). He invited any of the activity leaders to use the TBD dates for their activity.

Andy Masia, activity leader for the Mobile Displays meeting, welcomed input on topics for the 17 April meeting.

Mr Revie provided an update on the Consensus paper from the May 2013 summit. BMC Medicine had declined the paper as they considered it more suitable to BMC Medical Imaging. He and Mr Aldo Badano were considering other alternatives including Telemedicine and e-Health. Mr Michael Flynn suggested the Journal of Digital Imaging and undertook to provide details to Mr Revie.

Mr Revie handed the meeting over to Mr John Penczek, who presented an update on 'Best Practices for Digital Photography in Medicine' [see attached]. He reviewed the mission and scope of the activity, and listed contributors and showed a draft outline of the document.

Dr Penczek reviewed the colour errors he had found in the work presented at the Summit, and noted factors contributing to these errors. They were large and dependent on both the specific colour in the test target and the illumination used. He stated that he had used auto white balance and a uniform background when capturing the test targets. He concluded that a smooth, daylight spectrum was better but this would depend on the camera white balance presets available.

Dr Phil Green noted that the errors were relatively large, and suggested the chromatic adaptation steps in the workflow might contribute to these. He also noted that rendered RGB JPEG images inevitably included adjustments to colour.

Dr Yves Vander Haeghen reported that he had data sets for different cameras, using different illumination sources, and can use this to analyze the effect of illumination. He agreed to consider sharing this data and providing an analysis.

Dr Penczek showed suggested recommendations on camera setup. The meeting discussed the appropriate white balance to use, and the use of rendered vs. RAW images. Dr Penczek reported that Nikon had proposed using manual white balance, using the setting for the appropriate illumination, at the Tokyo meeting. Dr Vander Haeghen stated that he had found the use of white balance variable, and had not found improvements by using manual white balance.

The meeting agreed that rendered images included colour enhancements, and that camera RAW might be better than rendered JPEGs where accuracy is needed. Dr Penczek noted that the Nikon 'neutral' setting minimises enhancements. Mr Andy Masia indicated that camera RGB was usually very scene content dependent, and rendering adjustments such as grey balance correction and contrast correction made it impossible to calibrate such cameras.

Dr Green noted that a single study might not be enough to base recommendations on, particularly as the errors reported were larger than other studies and his own experience. He suggested a camera characterization procedure to convert from camera RGB to XYZ, rather than using the rendered sRGB camera output, would give better results. Dr Penczek showed how errors could be reduced by using profiling software applied to the rendered RGB images, and reported that University of Ghent had also described a colour correction procedure.

Dr Penczek discussed the target design. Although larger targets gave smaller errors, the small 'Passport' chart was considered more useful for first responders who could not expect to carry large calibration targets to medical emergencies. He felt more flesh tone colours were desirable. Dr Vander Haeghen noted that durability of targets should be considered in medical use. His group had made new charts using different colours intended for interpolation, and these gave better characterization results with fewer patches. Mr Masia stated that his company, X-Rite, manufacture the ColorChecker targets, and could consider developing an alternative design if a different set of colours and target layout would meet the needs of the industry.

Dr David Clunie raised the issue of how important was accuracy, and noted that it was important to know how much improvement to colour errors was actually necessary. He felt that adopting a 'best practices' document would invariably lead to expectations that the recommendations should be followed, even if there was no medical justification. 'Optimising consistency in digital photography' might be a better title for the proposed document. Others agreed that it was important to have evidence on the accuracy recommendations. Dr Clunie emphasised that simply asking the opinions of clinicians was not sufficient, and it would be possible to design a trial that followed a diagnostic task and provided statistics. Dr Penczek

considered this was out of scope for the activity, and the goal was not to set requirements but to identify best practices.

Dr Penczek invited any further comments and suggestions on the recommendations. Mr Revie proposed holding an ad-hoc call to focus on measurement in more detail (on April 9). Dr Penczek agreed to coordinate this meeting.

A full recording of the meeting is available at http://www.npes.org/Portals/0/standards/2014-03-20%2010.08%20MIWG_%20Digital%20Color%20Photography%20in%20Medicine.wmv

Action items from the meeting:

MIWG-14-19	Provide details Journal of Digital Imaging to Mr Revie (Flynn)
MIWG-14-20	Consider sharing scene analysis data with group (Vander Haeghen)
MIWG-14-21	Coordinate ad-hoc meeting on Measurement for Medical Photography (Penczek)