

Sir,
Reply to 'Evaluation of the effect of JPEG and JPEG2000 image compression on the detection of diabetic retinopathy'

The authors found good agreement for diabetic retinopathy (DR) detection between grading uncompressed tagged interchanged files format (TIFF) images taken with a nonmydriatic digital camera and their joint photographic experts group (JPEG) equivalents, compressed by JPEG2000 or classic JPEG algorithms. Both performed well for the detection of haemorrhages and microaneurysms (HMA), when preselected 'good quality' TIFF images were compressed at the lowest ratio. Our experience in the Gloucestershire Diabetic Eye Screening Service, using a Topcon TRN5s camera and Sony DXC-950 tri-CCD colour video camera, producing TIFF images of identical resolution (800 × 600 pixels) is that it *cannot reliably detect small DR lesions like HMA in the first place*.

The TIFF images of 99 eyes with microaneurysms within one disc diameter of the centre of the fovea (mas ≤ 1DD), identified by an experienced ophthalmologist (PS) using slit-lamp bio-microscopy, and their fellow 69 eyes with no DR were randomly presented to two experienced and masked independent medical retina specialists (EJ and VG) for grading among other images from 472 eyes with a variety of retinopathy levels. In Table 1, the grading of these TIFF images is compared with the clinical grading as reference. Only 6.1 and 5.1% of mas ≤ 1DD were detected by VG and EJ respectively. Even allowing for the misclassification of a microaneurysm as a haemorrhage, the detection rates remained poor. Nevertheless, the system did perform well for the detection of referable DR as reported in the Gloucestershire study.¹

In 2003, a Four Nations Working Group from England, Scotland, Wales, and Northern Ireland² recommended a minimum camera resolution of 20 pixels per degree of retinal image (equivalent to 1365 × 1000) for UK screening programmes. The same year, a Health Technology Assessment by Sharp *et al*³ reported that the sensitivity and specificity of digital imaging for the detection of early retinopathy were only 81% using a Topcon TRC-50XT with Kodak Megaplug 1.41 CCD camera (1024 × 1024 pixels in monochrome) compared to slit-lamp bio-microscopy by ophthalmologists. Since

then, more high-resolution cameras and camera backs are available to screening programmes resulting in large uncompressed image file sizes.

Studies to determine the maximum acceptable level of image compression have either scanned in high-quality images from film⁴ or used images of lower resolution such as Conrath's study. Based on current evidence, the English National Screening Committee recommends the highest quality JPEG compression setting on the digital camera back is used at capture (for example 12:1 rather than 20:1).² Subsequent compressions are more likely to result in the loss of clinically significant information.

Further research is required to determine appropriate levels of compression using higher resolution cameras for both referable retinopathy and any retinopathy.

References

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- 2 NSC. A national screening programme for sight-threatening diabetic retinopathy. In: www.nscetinopathy.org.uk, 2003.
- 3 Sharp PF, Olson J, Strachan F, Hipwell J, Ludbrook A, O'Donnell M *et al*. The value of digital imaging in diabetic retinopathy. *Health Technol Assess* 2003; 7(30): 1–119.
- 4 Wood I, Ritchings RT, Javadian S, Harding SP, Broadbent DM. Assessment of JPEG compression on the diagnostic quality of digitised diabetic retinopathy images. *ARVO Invest Ophthalmol Vis Sci* 1999; 40: S698.

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Table 1 Detection of micro-aneurysms or haemorrhages ≤ 1DD from the fovea in TIFF images compared with clinical grading as reference

	Sensitivity		Specificity	
	No. (%)	CI	No. (%)	CI
<i>(i) Detection of micro-aneurysms alone ≤ 1DD from fovea</i>				
VG	6/99 (6.1%)	2.6–12.9	68/69 (98.6%)	91.5–100
EJ	5/99 (5.1%)	1.9–11.6	67/69 (97.1%)	89.4–99.8
<i>(ii) Detection of micro-aneurysms or haemorrhages ≤ 1DD from fovea</i>				
VG	20/99 (20.2%)	13.4–29.2	66/69 (95.7%)	87.5–99.0
EJ	9/99 (9.1%)	4.7–16.6	67/69 (97.1%)	89.4–99.8

CI = 95% confidence intervals.

Sir,
Retinal pigment epithelial rip associated with idiopathic central serous chorioretinopathy
 Retinal pigment epithelial (RPE) rips have been reported in association with age-related macular degeneration and laser photocoagulation. Rarely, they occur in central serous chorioretinopathy (CSCR), particularly when the neurosensory detachment is associated with an underlying large pigment epithelial detachment (PED). We documented with fundus imaging, a patient with idiopathic CSCR who developed an RPE rip.