

# **TEST AND TRAINING:** HOW IMAGES ARE CHOSEN



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(Prepare yourselves for excruciating 'death by PowerPoint')





# TEST AND TRAINING (TAT) - OVERVIEW

- TAT is the monthly EQA and CPD system for all NDESP graders in England
- NHSE-mandated EQA activity against relevant Standards
- Continuously provided to PHE/NHSE for NDESP for 14 years
- Unique monthly 'Test' sets and expanding 'Training' set of previous cases
- Over 1000 Grading users & 100's of Admin users from about 50 programmes
- Owned and provided by Gloucestershire Hospitals NHS Trust





#### INTERNATIONAL TAT

- We also provide an International version of TAT, called iTAT
- Identical cases and presentation to TAT
- Is also the *de-facto* mandated EQA system for DESP graders in Republic of Ireland, Northern Ireland and (recently) Wales and Guernsey
- Also provided to about 20 other countries, worldwide (not mandatory)
- Content can be displayed in Chinese, Spanish, Indonesian or Vietnamese
- Results per screen displayed as NDESP or ETDRS-equivalent levels





### BEFORE WE PROGRESS...

Let's be totally clear about something:

# IT IS ALL MY FAULT

I saw the need for TAT, designed it, got it approved by DESP Quality Assurance Committee and have run it ever since.

# Don't blame anyone else!





### TAT IN THE PAST

- Steve conceived of TAT in 2007/8, whilst National Education Lead, to address the need for an external QA system for NDESP (then ENSPDR) graders
- Approval by ENSPDR QA Committee/programme management boards to pilot TAT
- Pilot phase in 2009 to 8 screening sites, resulting in improvements to delivery system and reduction in TAT monthly cases (from 30 to 20)
- Delivery by Netsima Ltd (Kath and Wayne Prescott) since inception
- Cases initially 'ground-truthed' by Steve A and David Taylor, until Grading College initiated in 2011





### GRADING COLLEGE - COMPOSITION

- Grading College was formed in 2011 to help us to allocate TAT cases
- There are about 30 members at any one time
- Membership is by invitation only, after review of the previous year's TAT scores, for each 'membership refresh' about every 3 years
- Independent Medical Statistician Irene Stratton is provided with an anonymised 'flat file' of data from the TAT year for review
- Irene sorts by agreement with Guide Grade and lowest variance
- Anonymised results are sent to us, to identify and invite the 'best of the best'





### GRADING COLLEGE - SOURCE MATERIAL

- ullet We are totally reliant on DESPs providing us with the raw material for GC/TAT
- Heartlands Hospital (Birmingham) and Gloucestershire DESPs have been the main contributors of new cases
- We ask for/get about 1000 to 5000 unique cases provided to us in a batch,
   with fully anonymised images along with their 'outcome' DESP RM grade
- Cases are only from DESP patients who have consented for research/teaching
- We ask for new batches every 18 months or so (entirely dependent)





### HOW DO WE PROCESS UP TO 5000+ CASES?

- We review every case (both eyes) for quality, adherence to 'protocol' and potential suitability for inclusion in future TAT sets
- Eyes are placed into interim folders as 'YES', 'POSSIBLE' or 'NO', based on the quality etc. and RM grades provided by the supplying DESP
- As example recent batch of 7682 eyes: 81% Yes, 12% Possible & 7% No
- When the next GC Project is required, we select a case-mix from the 'YES' files





# GRADING COLLEGE - PROJECTS

- Grading College Projects generally consist of 4 to 6 Teams (of 3 members)
- Each Team is given (remote) access to a collection of 50 to 60 cases/eyes
- We build GC Projects of about 200-360 cases (single eyes)
- Each Team gets a similar case-mix of RM severities, for fairness and equity
- They (you?) grade these completely independently and with no results
- They assess quality, tick all features present and add detailed comments





# BY THE WAY - WHO ARE THIS 'WE'?

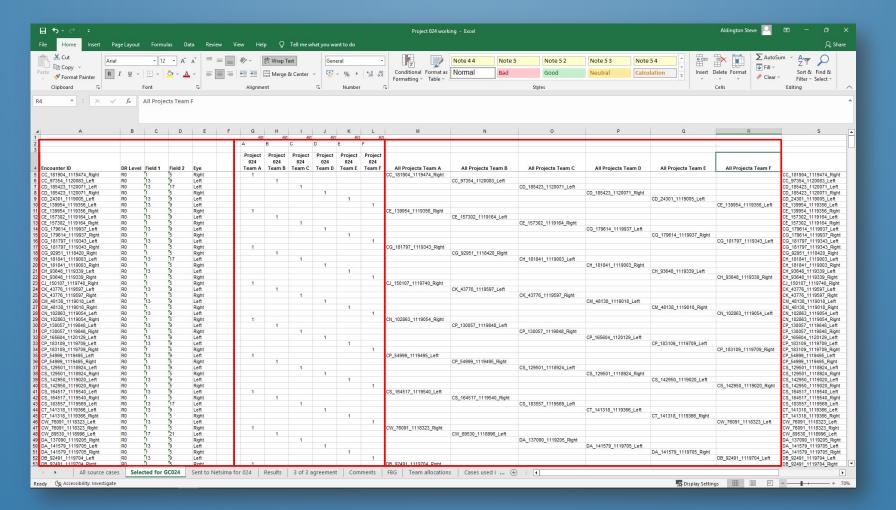
- Currently, the 'WE' I have mentioned is Karen Whitehouse & Steve Aldington
- Before Karen joined GHNHSFT in 2022, I was assisted by Gwen George
- Both Karen and Gwen are previous members of our Grading College, so are vastly experienced DR graders
- In the past, a few other people helped out, but were not specialist graders –

EXCEPT David Taylor: vastly experienced, who held various roles in NDESP





# OKAY - GRADING COLLEGE PROJECT BUILDING





# CREATING THE PROJECT ON NETSIMA SITE

Once the entire Project is allocated:

- Images are uploaded to the Grading College site, managed by Netsima
- We create and 'build' the Project Teams' grading 360 screens, one at a time
- We apply the 'grid' overlay to each macular image
- We test each Team's set to ensure operation, then 'release' it to that Team
- ...we wait... (and then we pay them for their services, of course)





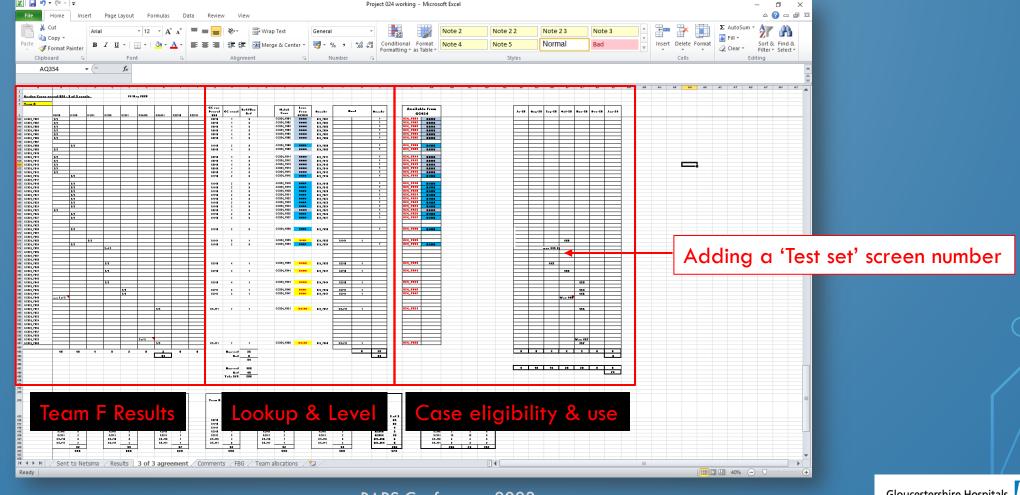
# GRADING COLLEGE - PROJECTS (CONT..)

- We download the results into an active Project spreadsheet (..in a minute..)
- Only '3 of 3' agreement cases are eligible to be potentially used in TAT
- Disagreements are <u>not</u> adjudicated or used we just ignore and move on
- Usually max of 50% of GC Project cases achieve '3 of 3' level agreement
- This varies considerably by the features in a case and severity/level
- We then make a 'pre-final' decision whether a case is eligible for TAT





# GRADING COLLEGE - PROJECT RESULTS





# HOW BORED ARE YOU ALREADY?













### GRADING COLLEGE TO LIVE TAT

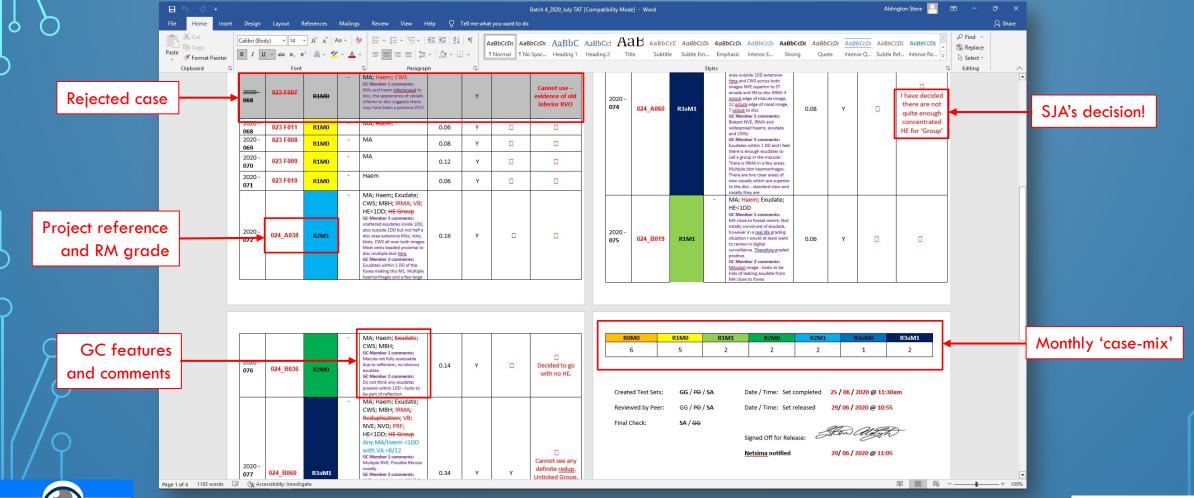
- Our TAT development software enables us to import '3 of 3' GC cases
- We select cases to meet the required monthly RxMx 'case mix'
- Monthly case mix varies (...) to meet agreed overall <u>annual</u> case-mix
- Some '3 of 3' cases are still rejected by us, if we feel they are too 'edgy'
- We then annotate important, indicative features on cases prior to TAT release
- Of course, we do this in time for every month's set



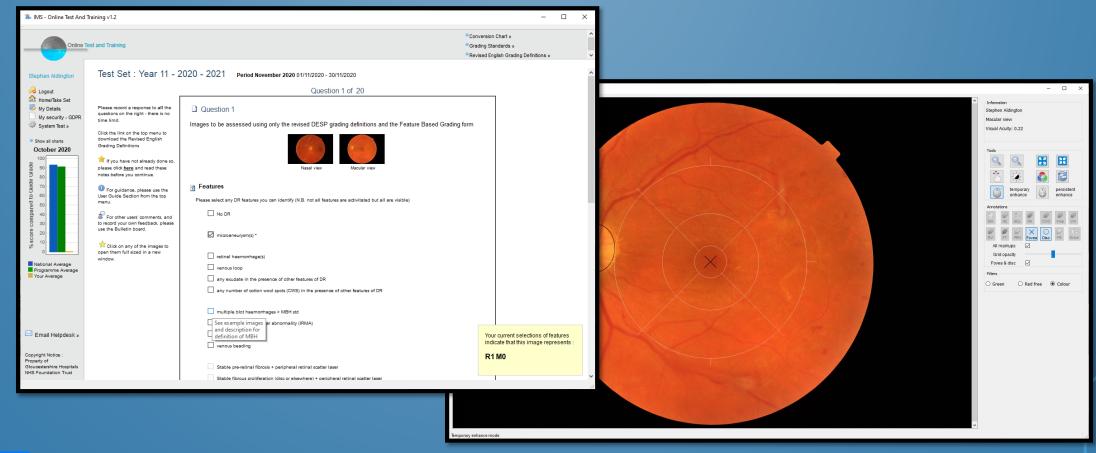


### EXAMPLE MONTHLY ALLOCATION SHEET

Gloucestershire Retinal Education Group

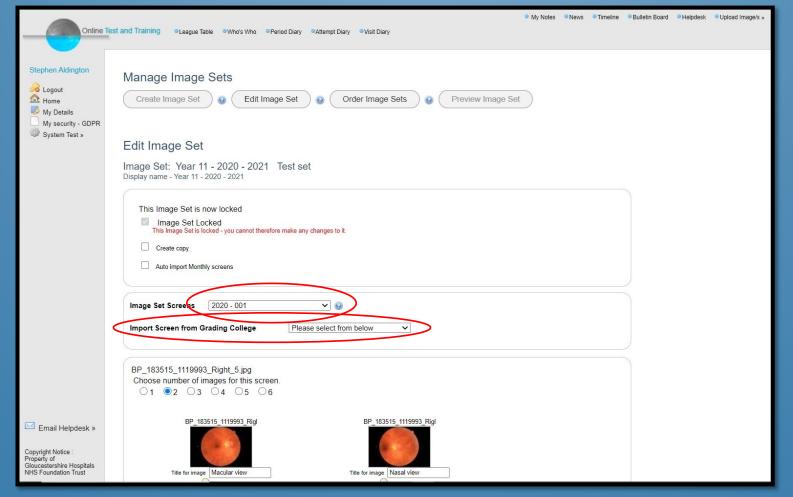


# WHAT TAT LOOKS LIKE - TO YOU AS USERS



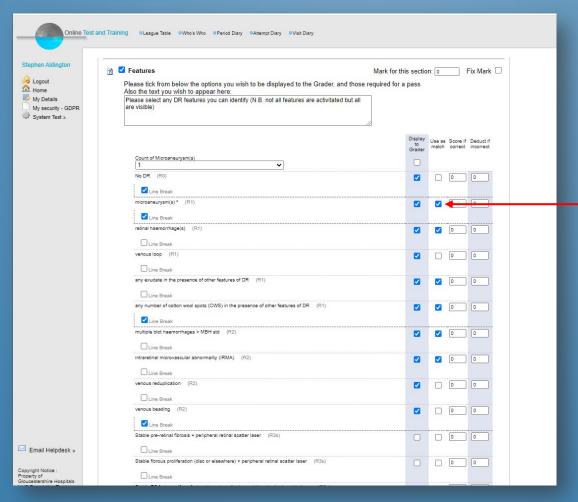


### WHAT TAT LOOKS LIKE TO 'US' — CREATE SCREEN





# WE SELECT FEATURES THAT ARE RECORDED BY THE GC



'Tick' to select feature present





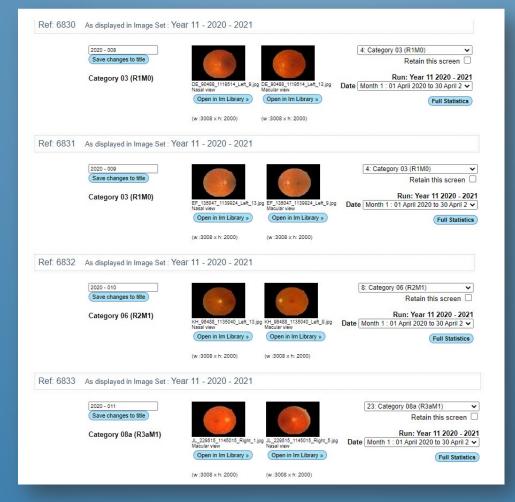
# OUR IMAGE VIEWER/ANNOTATION SCREEN

File data box

Feature annotation toolbar

Image manipulation toolbar

# WE BUILD THE MONTH'S SET OF 20 SCREENS...



Gloucestershire Retinal Education Group



# ...AS PART OF THE YEAR'S COLLECTION OF 12 SETS

Screen Schedule »	Search by category			
Order Screens »	Search by Image Set (Live only)   Show only where no period has been set			
	Show all unarchived screens			
arch by screen reference/title:	Search for match »			
STATE OF THE STATE				
Show Screen selection boxes for all years »				
Year 7 2016 - 2017	Year 8 2017 - 2018	Year 9 2018 - 2019	Year 10 2019 - 2020	Year 11 2020 - 2021
O 1 April 2016	O 1 April 2017	O 1 April 2018	O 1 April 2019	O 1 April 2020
O 2 May 2016	O 2 May 2017	O 2 May 2018	O 2 May 2019	O 2 May 2020
○ 3 June 2016	3 June 2017	3 June 2018	3 June 2019	O 3 June 2020
	O 4 July 2017	O 4 July 2018	O 4 July 2019	O 4 July 2020
O 4 July 2016				
	_ ,	O 5 August 2018	O 5 August 2019	O 5 August 2020
O 5 August 2016	O 5 August 2017	○ 5 August 2018 ○ 6 September 2018	○ 5 August 2019 ○ 6 September 2019	5 August 2020 6 September 2020
	_ ,		5 August 2019 6 September 2019 7 October 2019	
○ 5 August 2016 ○ 6 September 2016	○ 5 August 2017 ○ 6 September 2017	O 6 September 2018	O 6 September 2019	O 6 September 2020
○ 5 August 2016 ○ 6 September 2016 ○ 7 October 2016	<ul><li>5 August 2017</li><li>6 September 2017</li><li>7 October 2017</li></ul>	○ 6 September 2018 ○ 7 October 2018	○ 6 September 2019 ○ 7 October 2019	○ 6 September 2020 ○ 7 October 2020
○ 5 August 2016 ○ 6 September 2016 ○ 7 October 2016 ○ 8 November 2016 ○ 9 December 2016	<ul> <li>5 August 2017</li> <li>6 September 2017</li> <li>7 October 2017</li> <li>8 November 2017</li> <li>9 December 2017</li> </ul>	○ 6 September 2018 ○ 7 October 2018 ○ 8 November 2018 ○ 9 December 2018	6 September 2019 7 October 2019 8 November 2019 9 December 2019	○ 6 September 2020 ○ 7 October 2020 ○ 8 November 2020 ○ 9 December 2020
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#### TAT AT THE MOMENT

- The TAT system (and GC system) are using 10+ year-old software
- The User's Image Viewer software is relatively new (<5 years)</li>
- But we get relatively few reports of software problems from Users
- Our own preparation processes (GC and TAT) however are very tedious
- TAT provision to NHSE currently subject to rolling 6-month contract extensions





#### NEXT STEPS FOR TAT

- NHSE Tender Process for TAT (or replacement) is due soon
- As software is very old, requires complete re-write/redevelopment
- We have funded Netsima to develop new software over the last year or so
- BUT we must continue providing monthly TAT (and iTAT) without interruption
- As long as there is a need and contract, we will continue to provide TAT (and Karen and Steve don't want to fully retire just yet!)





#### **ACKNOWLEDGEMENTS**

- TAT would not currently be possible without Karen Whitehouse, who:
  - Manages the Grading College and liaises with its members (incl. invoicing)
  - Helps to review all 'new' cases we receive
  - Creates much of the Grading College Project content
  - Assigns, creates and annotates much of the TAT monthly set content
- Danielle Meek administers payments to GC members
- Kath and Wayne Prescott (Netsima Ltd.) work with us to provide GC & TAT
- Professor Peter Scanlon supports us, but necessarily keeps at "arm's length"









# THANKS FOR YOU TIME, YOU'VE BEEN MOST ATTENTIVE

# ANY FINAL QUESTIONS?

Incidentally, this entire talk on TAT contained only 2 retinal images! HA!



