



HCCG Audit Event

23rd June 2015

Digital Imaging – Proof of Concept





Aims

Testing of the :-

- Quality/ reliability/ usability of the slide scanners
- Quality of the software to create cases and manage workload
- Quality of the images in comparison to traditional microscopy
- User friendliness of image viewing workstations
- Speed of image analysis in comparison to traditional microscopy
- User friendliness of imaging tools – taking measurements
- Ability and speed for distant Consultant Pathologists to access the images
- Ability of Consultant Pathologists to review cases at home using web-technology
- Utilisation of digital imaging to save time in preparing for MDTs and reviewing slides within MDTs
- Potential for algorithmic analysis to improve quality of service





Objectives

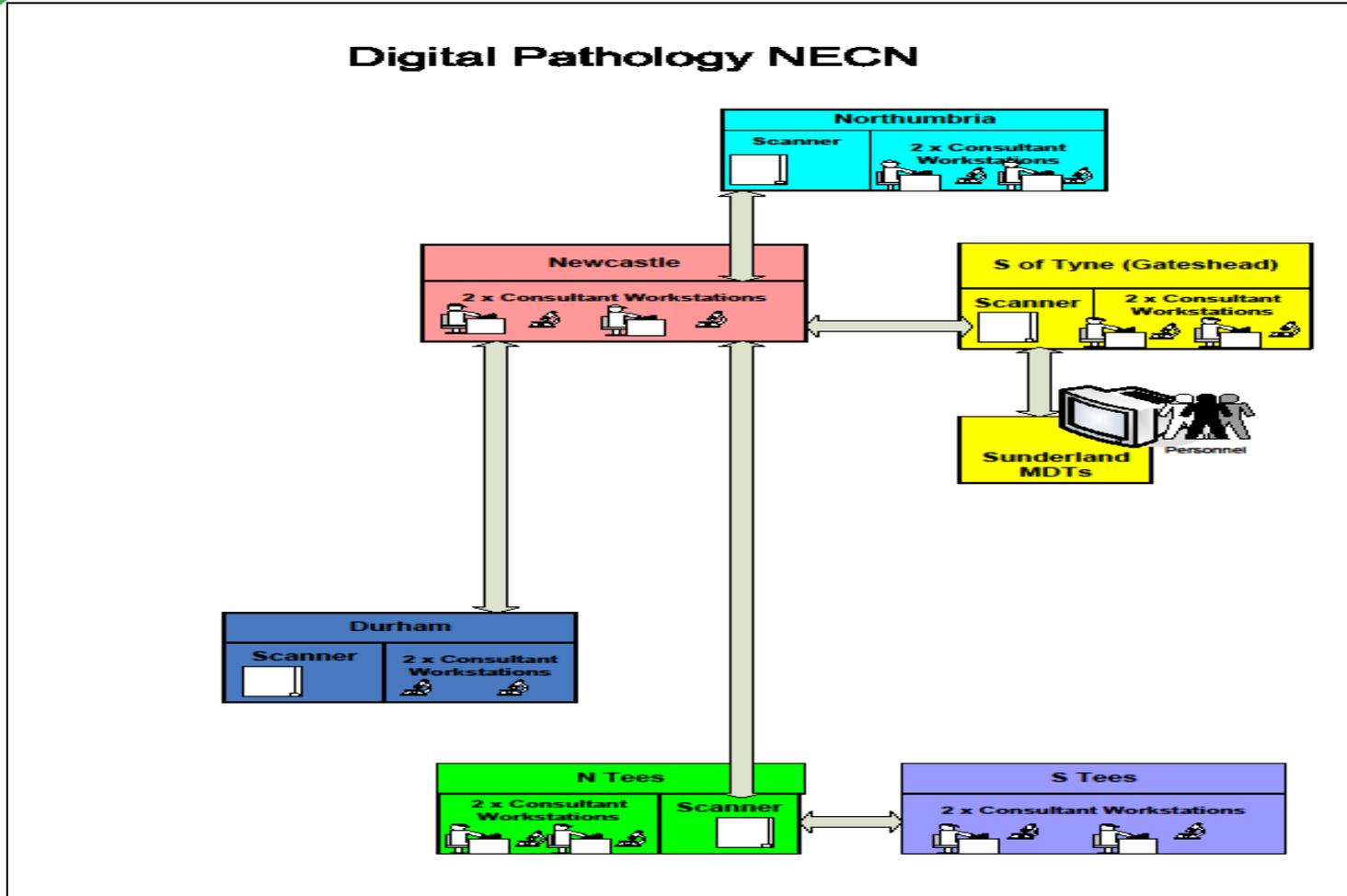
Outcome Views :-

- Does it improve the quality of diagnosis/ provide better outcomes ?
- Does it speed up diagnosis ?
- What are the constraints ?
- What would be the impact from an IM&T implementation and support perspective ?
- Is it 'affordable' ?





Scope of Involvement





Results

	No of Cases	Tissues
N Tees	983 (5 Consultants)	Breast, GI, Gynae, Head and Neck, Respiratory, Skin and Urology
CDDFT	320 (2 Consultants)	Breast (2), GI(49), Gyn(22) H&N(4), Skin (56),Uro(3), Other(9)
Gateshead	60 (1 Consultant)	Breast, GI, Gyn, H&N, Skin, Uro, Soft Tissue
Northumbria	32 (1 Consultant)	Breast, GI, Gynae, Head and Neck, Respiratory, Skin and Urology
Newcastle	A few (1 Consultant)	No details
S Tees	17 (3 Consultants)	Prostate cores, kidney endometrial, Lletz biopsy cervix, pleural, renal, GI



Key Issues

- Time available (for Pathologists to review cases)
- Trust to Trust Firewalls
- IM&T Resource/ Involvement
- IM&T Storage Strategy
- Technology currently does not accommodate megablocks, fluorescence, polarisation, gynaecytology
- RC Path guidance – (in the making)
- ‘Challenging’ for larger cases



Key Benefits

- Faster for 80% of general work
- Measurements considerably quicker and reproducible
- Algorithms save considerable time – reproducible
- Significantly reduces ‘wrong slide’ risks
- Helps manage the workload
- Can provide better outcomes for patients – grading/ staging
- Excellent for ‘sharing’ expertise/ knowledge/ opinions
- Saves technical time – tissue exchange/ slide retrieval/ MDT prep/ archiving
- Better access via web – mortuaries/ MDT rooms/ Home
- Excellent for training & education



Financial Assessments

- Cost Calculations

	Co Durham	Ncle	S of Tyne (Ghd)	S Tees	Nbria	N Tees	N Cumb
Workload per anum (slides)	180,000	300,000	200,000	200,000	180,000	100,000	100,000
Consultant Workstations	17K	34K	25K	25K	17K	15K	15K
Application / Webserver Hardware	22K	22K	22K	22K	22K	22K	22K
Data Storage Hardware	120K	240K	180	180K	120K	90K	90K
VL120 Scanners	42K+42K	42K+42K+42K+42K	42K+42K+42K	42K+42K+42K	42K+42K	42K+42K	42K+42K
Hist Workstn	2K	4K	3K	3K	2K	2K	2K
Omnyx Software License	45K+45K	45K+45K+45K+45K	45K+45K+45K	45K+45K+45K	45K+45K	45K+45K	45K+45K
Interface (GE Omnyx)	17K	17K	17K	17K	17K	17K	17K
Training/ PM/ Install	17K	17K	17K	17K	17K	17K	17K
Annual Support Costs – 5 Years	30K	30K	30K	30K	30K	30K	30K
Total – 5 Years	529K	852K	690K	690K	529K	497K	497K



Financial Assessments

Additional Costs

- Interface to LIMS
 - ? £50K per system – NRR
 - £10K support per annum



Financial Assessments

- Savings
 - Locums
 - Backlogs
 - Microscopes
 - Slide Storage/ Retrieval Costs
 - Tissue/ Slide Exchange costs (post, packing, transport)
 - Chemotherapy
 - Breeches/ Litigation



Financial Assessments

- Cost Avoidance
 - Workforce Expansion to cater for increases in workload
 - Clinical – additional consultants
 - Laboratory staff – additional staff Band 2/3



Quality

- Quality Improvements (1)
 - Quicker diagnosis for referral cases
 - Workload Balancing
 - Expedited cases
 - Measurements
 - Annotations
 - Comparative analysis – re history
 - Better staging/ grading
 - Lab to Consultant Transfer Times for some sites



Quality

- Quality Improvements (2)
 - MDT Prep/ Viewing
 - Workload Balancing
 - Risk Reduction
 - Wrong Case reporting
 - Breakages/ Loss of slides tissues – less likely
 - Improved Teaching/ Mentoring/ Failsafe / Audit
 - Annotations
 - Links to Haemato-oncology
 - Better Audit trails / Management Info



Clinical Opinions – N Tees

- Digital images sharper/ crisper
- It has a huge quality benefit for reporting breast resections, prostate cores and cervical loops with cancer
- For NHSBCSP and colorectal resections I have not seen any objective quality improvement vs glass
- IHC – no problems experienced
- There is a steep learning curve to negotiate and confidence will come only with experience
- It is a beneficial tool for workload allocation and management with remote site working and virtual academy of specialists/generalists and is ideal for working from home
- It is tremendously useful for breast, prostate core and cervix work
- For easy cases (single slide, few fragments, skin, GI, endometrium etc) analogue is by far quicker
- We are yet a long way off before we can do difficult or challenging cases in digital
- Caution advocated for cases with multiple small fragments in which subtle malignancy can lurk ie prostate TURP and bladder resection and post treatment breast/colon
- Future algorithm development should facilitate this modality to be irreplaceable and fully entrenched in surgical pathology.

Dr K Dasgupta



Clinical Opinions – S Tees

- I had a little play with the measuring tools on a scanned North Tees breast case. Wonderful & you can mark the images so that any reviewing pathologist can see how the margins or tumour measurements have been made; it's so much easier & quicker than how I currently measure on glass slides.
- Because we have a large plastic surgery workload at JCUH I seem to spend significant time measuring thickness & margins, once I've almost corrected for the section misaligned on the slide – my productivity would definitely be increased if I were reporting these cases digitally

Dr U Earl



Clinical Opinions – S Tees

- ‘The digital images produced by the Omnyx system are of a very high quality and immediate benefits are evident with respect to the ease, speed and accuracy of assessing microscopic measurements compared with conventional methods’
- The little experience I’ve had of prostate core review has proved significantly slower than looking at the glass slides – some of this may be due to the difficult nature of the particular biopsies examined (hence request for MDT review!) but I do not think it’s just that.
- Would wholeheartedly agree with Ursula – the measurement and annotating function is wonderful.

Dr A Mutton



Clinical Opinions – Newcastle

- Image transfer times from NTH and CDD are fine – 1-2 seconds only
- No pixellation – ie the image streaming ‘keeps up’.
- Not slowed by system as able to multi-task
- All images seen were of diagnostic quality
- Measuring was far easier and reproducible.
- Case management software was very helpful and much liked
- With a LIMS interface it would significantly reduce the chances of wrong slide reporting
- Audit trails of who did what when would be a stride forward
- 80% of MDM referrals could be done digitally far quicker (no additional workup required)
- Prob only about 20% of specialist opinion work would benefit in same way as additional workup would be required but workup would be known before tissues arrived

Dr F Charlton



Clinical Opinions – Gateshead

- MDTs – better, quicker images -saves on microscope and camera, tissue / slide transport
- Orientation useful
- Measuring quicker, easier
- Quicker to flick between slides
- Algorithms can free up Consultant time/ reproducible
- Lack of megablocks, polarisation, cytology are drawbacks

Dr R Bentley



What Next ?

- Provision of a template Business Case for Trusts to advance if they see fit
- ? Liaison between Trusts (? via Cancer Network) to undertake joint procurements to ensure single supplier purchase and guard against non-compatible technologies and avoid additional interfacing costs



Thanks

- To All Consultants and Lab staff who took part
- Staff from GE Omnyx for their generous support of the project
- To Trust IM&T depts. for supporting the interconnectivity infrastructure

