



Project Document Cover Sheet

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- *This template is for completion by JISC funded project managers*
- *Text in italics is explanatory and should be deleted in completed documents.*
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- *Please see Project Management Guidelines for information about assigning version numbers.*

Project Information			
Project Acronym	Image Path		
Project Title	Digitising Pathology Slide Collections		
Start Date	1 st October 2008	End Date	30 th September 2009
Lead Institution	University of Leeds		
Project Director	Professor Philip Quirke		
Project Manager & contact details	Acting - Andy Pellow Faculty of Medicine and Health 0113 343 4709 a.j.h.pellow@leeds.ac.uk		
Partner Institutions	None		
Project Web URL			
Programme Name (and number)	<i>Jisc Digitisation Programme 0908</i>		
Programme Manager	Ben Showers		

Document Name			
Document Title	<i>Project Plan</i>		
Reporting Period			
Author(s) & project role	Andy Pellow, Project Manager (acting)		
Date	16/01/2009	Filename	image path project plan.doc
URL			
Access	<input type="checkbox"/> Project and JISC internal		<input type="checkbox"/> General dissemination

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Document History		
Version	Date	Comments
V0.1	5/11/2008	Draft initial document by Andy Pellow awaiting sign off by project director and steering group.
V1.0	30/11/2008	Signed off by project director and steering group. Submitted to JISC
V2.0	6/01/2008	Section 3 - Para. 3-6: additional information about slide selection process. Section 8 - Para. 2-4: additional information about technical and descriptive metadata standards and website standards. Section 10 - Para 1. added to state no IPR issues associated with slides

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Overview of Project

1. Background

1. The Matthew Stewart collection comprises slides of largely gastro-intestinal conditions. Matthew Stewart was Professor of Pathology at Leeds University from 1918 to 1951 and editor from 1934 to 1956 of the Journal of Pathology and Bacteriology. The CRC Soft Tissues Sarcoma national collection comprises slides of soft tissue sarcomas. Both of these collections are held in storage by the University Library. There is a further collection of pathology slides held in archive within the section. All of these collections date from the early part of the twentieth century and contain examples of conditions that are now rare and or disappearing.
2. The project will be located within the Section of Pathology and Tumour Biology, Leeds Institute of Molecular Medicine led by Professor Phil Quirke. The section has a strong record in translational research moving basic scientific advances into patient care and undergraduate and postgraduate education and training.
3. Pathology slides are microscope slides of tissues surgically removed for examination (a biopsy). Pathologists can use a variety of methods to help visualize the cells in the biopsy and diagnose the cause of the illness. Traditionally, these have been viewed through a microscope, however this has a number of limitations for research, learning and teaching and diagnosis.
4. Virtual microscopy creates high-magnification digital images of tissue sections, stored in a multi-resolution file format. Viewing these slides via a web browser can closely simulate examination of glass slides with a real microscope except entire-slide images can be remotely viewed, quantitatively analyzed, readily annotated, shared and managed.
5. The benefits of virtual microscopy can be summarised as:
 - Long-term archiving of important or rare tissue slides without loss of quality
 - Ability for multiple users to visualise the same slide from different locations around the world over the internet
 - Ready and immediate availability of slides over the internet
 - Availability of multiple copies of slide for different uses in different contexts
 - Ability to measure distances and areas directly as the resolution of a virtual slide is known,
 - Use snapshots in reports or in presentations
 - Research in developing innovative computer based diagnostic techniques
 - Development of new tools linking the virtual slide with case notes for diagnostic and medical education purposes.
 - Annotation of slides identifying areas of interest or key diagnostic features
6. In 2001, Professor Quirke was awarded an £800,000 grant by the Department of Health to develop virtual microscopy for diagnosis, quality assurance, education and research. Professor Quirke has led the development of the Virtual Pathology programme at Leeds which now has the largest slide scanning facility in the UK (and the second largest in the world). Information about and evidence of the uses of Virtual Pathology can be found at <http://www.virtualpathology.leeds.ac.uk>¹.
7. Leeds University Library recently led the JISC funded MIDESS² project (JISC call for proposals 03/05) which explored the management of digitised content in an institutional and cross-institutional context through the development of a distributed digital repository infrastructure. The repository created at Leeds as part of the MIDESS project was acknowledged nationally as leading edge, putting Leeds in advance of other institutions in its ability to provide digital images and multimedia for learning and teaching. The University has recently committed to funding the

¹ <http://www.virtualpathology.leeds.ac.uk>

² <http://ludos.leeds.ac.uk/midess/>

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repository on a long-term basis as an institutional repository service (called Leeds University Digital ObjectS or LUDOS³) which will provide central support, management and access for the wide range of digital content being created across the institution.

8. This Project will bring together work from the MIDESS project with the Virtual Pathology programme to consider how best we can digitise, present and promote our collections in the future.
9. The aim of the project is to scan interesting cases from the early part of the twentieth century to provide a rich educational and research resource of diseases that is not available anywhere else. The slides contain valuable information about diseases that are rare or were common but are now not seen or are not seen at such advanced stages. They are currently stored in archives in the University and, without this project, would remain inaccessible and unused. This project will enable three large collections of pathology slides of significant interest and value to be digitised and made available and accessible to students and researchers.
10. As part of this project, we will undertake the selection of 5,000 to 10,000 digital slides from the collection representing the most interesting cases. The slides have case notes or histories associated with them.
11. The slides will be digitised, stored and presented for use within a number of different contexts within research, education and professional development.

2. Aims and Objectives

1. The aim of the project is to scan interesting cases from three collections of pathology slides held by the University of Leeds from the early part of the twentieth century to provide a rich educational and research resource of diseases that is not available anywhere else.
2. The objectives of the project are to:
 - a. provide access to valuable information about diseases that are rare or were common but are now not seen or are not seen at such advanced stages
 - b. support translational research, undergraduate medical education, postgraduate training and continuing professional development in Pathology
 - c. investigate the issues of presenting large scale digital images through the VLE using the Leeds University Digital Repository (LUDOS) and contribute to the information lifecycle management strategy of the University.

3. Overall Approach

1. The project will collate 5,000 to 10,000 pathology slides of interesting cases accompanied by relevant case notes and case histories from the collections ready for digitisation. The key operational activities of the project are well understood and practised through the Virtual Pathology programme.
2. We will establish a secure referencing system to ensure control and management of the collections. This will also provide greater understanding/knowledge of the content and value of the collections as whole and inform decision making about the future storage, management and use of the physical collections.
3. Slides are selected initially by the amount of supporting data available, nil or meagre/insufficient data excludes, and then by quality of slide as well as scanned image. The slides in the collections are by definition "text book" examples or of a very unusual or rare nature/presentation. We are also investigate what ledgers we have and trying to isolate the rare, eradicated or un mutated versions of conditions i.e. 1918 flu epidemic, cholera, syphilis in various forms etc.
4. The project officer is initially responsible for matching slides and available data by ensuring enough data is available then matching the relevant slides. Once they have been cleaned and scanned they are assessed for clarity and image definition. If there is any doubt as to quality, definition, sufficient data or relevance then the relevant member of the team are consulted.

³ <http://ludos.leeds.ac.uk/>

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5. Due to the time spans of the collections the only available information is what we can locate from the existing files. In some cases e.g. tumour classification there is a modern classification that was not around at that time. If this is the case they are re-examined and re-classified as needed. In some instances, samples may already been reclassified as part of an earlier check.
6. We will started using the Tumour Reference collection as this is the largest and best documented and it also incorporates specimens from the other historic collections. We anticipated and are achieving low numbers of discards i.e. 3 or 4 per hundred. We anticipate no difficulty achieving our target. Some of the discards are due to slide damage or slide quality. We have a large number of blocks and it is possible that new slides can be cut if necessary.
7. The slides will be digitised using an Aperio Scanscope slide scanner; loaded to a large server storage array adjacent to the scanner and then transferred to long term digital storage for presentation and analysis. A copy of the project protocol is attached as appendix C.
8. The project will create and establish formal descriptive metadata for both images and case notes. This work-package will ensure that the new pathology slide collections are available through the current Virtual Pathology interface, but will also explore ways that pockets of content can be made more noticeable/ searchable.
9. The Project will produce an evaluation and dissemination plan and will test the outputs and their impact on the user community.
10. The project will explore the issues of integrating large scale digital images within the University's digital repository and making pockets of content visible to and searchable by the wider community.
11. Critical success factors for the project are:
 - a. Selection and collation of interesting cases for digitisation
 - b. Digitisation of 5,000-10,000 slides and case notes
 - c. Presentation of slides and case notes
 - d. Access to content
 - e. Deliver within project plan

4. Project Outputs

1. A project plan
2. Two progress reports and a completion report to JISC
3. A draft final and a final project report.
4. A jorum deposit licence
5. Assessment of the physical state of the collections, collation with the existing case note
6. Documentation, and the establishment of a secure referencing system for the collection as a whole.
7. 5000 to 10000 digitised slides in TIFF format which are then compressed into jpeg2000 format. The slides will be stored on a storage array network within the Section
8. Metadata schema; case notes and/or additional descriptive data for each image
9. Project web site and presentation of the images through the website
10. Planning, testing and implementation of the images and metadata through the LUDOS repository
11. Investigation of the use of the Sitemap protocol to expose all images in the Virtual Pathology slides collections
12. Dissemination activities

5. Project Outcomes

1. Make interesting cases from three slide tissues collections readily and immediately available for multiple users at different locations by:
2. Support education, training and research into conditions that are rare or were common but are not now seen or are not seen at such advanced stages.

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3. Widen access to digital slide outputs by presentation through LUDOS.
4. Contribute to the development of the University of Leeds information lifecycle management strategy

6. Stakeholder Analysis

Stakeholder	Interest / stake	Importance
Students within Pathology	User Group	High
Researchers within Pathology	User Group	High
Section of Pathology and Tumour Biology	Grant holder	High
University of Leeds Library and Information Systems Services	Expertise and support	Medium
University of Leeds	Host organisation	Medium
JISC	Funding body	High

7. Risk Analysis

Risk	Categorisation of risk	Action to Prevent/Manage Risk
Staffing is not recruited in time for the start of the project	High	Risk has been mitigated by acting quickly to appoint project officer for start of project. AP to act as project manager until project officer takes over role.
Staff members leave during the course of the project	Medium	Split project officer role in two between experienced senior member of staff and junior role. Ensure that other key staff are closely involved in project, so disruption is minimal. Ensure that the project is well documented so new staff could take over if required.
(i) The slide collections prove more difficult to categorise than the current projection – through difficulties in identification and/or diversity of the collection (ii) Slide quality is not sufficiently good to enable slides to be immediately scanned	Medium	Early identification of a coherent portion of the collection and early finalisation of specific project deliverables. Where necessary agree changes to: <ul style="list-style-type: none"> • the size of collection to be digitised, • the range of material to be digitised, • the extent of the metadata to be presented alongside the digitised collection, • the method(s) of presentation of the digitised collection. Administrative support built into bid to manage and collate documentation. Technician support to de-coverslip and restrain slides where appropriate.
Key University staff are not available to support the project	Low	Finalise details of the project work involving University staff at an early stage and ensure all key staff are included in the Project Team. Ensure regular information flow to all team members.

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Key stakeholders do not buy in to/support the project	Low	Finalise the Project Steering Group at an early stage and ensure all key stakeholders are represented. Ensure regular information flow to all stakeholders, and seek feedback on direction and progress at every opportunity.
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8. Standards

1. Images
Images are captured in TIFF format and then converted into JPEG 2000 for presentation and storage of images
2. Technical metadata
We will include consideration of JHOVE (<http://hul.harvard.edu/jhove/>) and NISO MIX standard (<http://www.loc.gov/standards/mix/>) to extract and record image metadata to aid preservation. Also We will consider PREMIS metadata (<http://www.loc.gov/standards/premis/>) for other preservation issues.
3. Descriptive metadata
As part of the project we will need to consider translation of database contents to an appropriate metadata standard supported by LUDOS (Dublin Core, MODS, MARC, possibly other) For sharing LUDOS metadata with other repositories, then use of the OAI-PMH harvesting protocol (<http://www.openarchives.org/OAI/openarchivesprotocol.html>) requires translation of metadata to Dublin Core.
4. Web site
The project website will adopt the University of Leeds website standard guidelines. <http://campus.leeds.ac.uk/guidelines/how-to-publish.htm>. For accessibility, websites must meet all priority 2 checkpoints of the W3C AA accessibility standard.

9. Technical Development

No technical development planned as part of project

10. Intellectual Property Rights

1. We are able to confirm that there are no IPR issues with making these slide images freely and publicly available. All data contained within and associated with the images will be entirely anonymised and none of the data subjects are alive. Hence, there are no data protection issues in making these images available. There are no relevant ethical issues involved in producing the digital images.
2. The intellectual property rights of materials brought to and used in the project will remain vested with the original copyright holder although the materials may be used within the project with the consent of the copyright holder. The copyright of any materials developed as part of the project will comply with the JISC requirements - the project team will consult with the JISC programme manager or appropriate service on this aspect of the project

Project Resources

11. Project Partners

There are no external project partners in this project

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12. Project Management

1. The Project will be informed by formal project methodologies and will conform to recognised good practice and will be managed in accordance with JISC project management protocols.
2. The Project Director will be Professor Philip Quirke who leads the Section of Pathology and Tumour Biology where the project will be physically located. Professor Quirke will line manage all staff associated with the project and have overall responsibility for the successful delivery of the project. Additional project management support will be provided by Andy Pellow who has significant experience in managing projects.
 - ensuring project activities are completed within the agreed deadlines.
 - formulating project specifications for each element of the project to ensure that scope, timeframe, outcomes and conditions of participating in the pilot exercises are clearly understood.
 - monitoring the quality and timeliness of project outputs
 - signing off project reports and outputs
3. A Project Steering Group (PSG) will be established to oversee the project, to monitor progress and to advise on key issues. The project steering group will contain representatives from Leeds University Library and Corporate IT services. The role of the project steering group board will be to:
 - Oversee project progress
 - Advise on maximising project impact and ensure lessons learnt are shared across partners
 - Advise on and sign off project outputs.

Project Team

Name	Role	Contact	Notes
Professor Phil Quirke	Project director	p.quirke@leeds.ac.uk	
Andy Pellow	Acting Project Manager	a.j.h.pellow@leeds.ac.uk	
Aidan Hindley	Project Officer		
Elizabeth Robinshaw	Project Technician		
Martin Waterhouse	Web support		
David Turner	Digitisation support		
Dr Darren Treanor	Academic Support		

13. Programme Support

1. Advice and support on
 - a. JISC project management documentation expectations.
 - b. Dissemination opportunities through JISC
 - c. Training opportunities
 - d. Potential future funding opportunities

14. Budget

See appendix A

Detailed Project Planning

15. Workpackages

See Appendix B

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16. Evaluation Plan

Timing	Factor to Evaluate	Questions to Address	Method(s)	Measure of Success
Jan 09	Physical state of the collections and collation with the existing case note	What is the physical state of the collections? Are relevant case notes available and correctly collated?	Review by project director	Selection and digitisation of 5,000 - 10,000 slides and relevant case notes from the three slide collections meeting quality criteria
Jul 09	Interest and usefulness of content	Is the content of interest and use to students and researchers within pathology?	Peer group review; analysis of usage logs of websites	Content meets quality criteria determined by project steering group
Sep 09	Searchable, discoverable and accessible content	Can the images be searched for, found and accessed through a range of widely available standard tools?	User group; assessment and testing by project team; review by library experts;	Use of appropriate standards Presentation of digitised slides meets user group requirements

17. Quality Plan

Output	<i>Project Documentation - Plans and Reports</i>				
Timing	Quality criteria	QA method(s)	Evidence of compliance	Quality responsibilities	Quality tools (if applicable)
Ongoing	Compliance with JISC guidelines and expectations	Comparison with published JISC guidelines	Consistent with JISC guidelines	Action by project team; review by project steering group and sign off by project director	

Output	<i>Assessment of the physical state of the collections, collation with the existing case note, selection of interesting cases and slide digitisation</i>				
Timing	Quality criteria	QA method(s)	Evidence of compliance	Quality responsibilities	Quality tools (if applicable)
Oct 09 - Jan 09	Project workflow process meet recognised good practice	Comparison with recognised good practice	Consistent with recognised quality standard e.g. TASI guidelines	Action by project team; review by project steering group and sign off by project director	
Ongoing	Project outputs are fit for purpose	Review by academic experts	Project outputs consistent with project requirements	Sign off by project director	

Output	<i>Documentation, establishment of a secure referencing system; Metadata schema; case</i>				
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<i>notes and/or additional descriptive data for each image</i>					
Timing	Quality criteria	QA method(s)	Evidence of compliance	Quality responsibilities	Quality tools (if applicable)
Jan 09 - May '09	Adherence to relevant standards	Comparison with relevant standards	Meets relevant standards	Action by project team; review by project steering group and sign off by project director	

<i>Project website; integration with LUDOS; use of SiteMap protocol</i>					
Timing	Quality criteria	QA method(s)	Evidence of compliance	Quality responsibilities	Quality tools (if applicable)
Feb 09 - Aug 09	Adherence to relevant standards	Comparison with relevant standards	Meets relevant standards	Action by project team; review by project steering group and sign off by project director	
Feb 09 - Aug 09	Fitness for purpose	Project evaluation	Meets agreed criteria	Project steering group	

18. Dissemination Plan

Timing	Dissemination Activity	Audience	Purpose	Key Message
Nov 08	Project website	UK HE and subject specialists	To publicise and explain purpose and outcomes of project	Evaluation of the application of the project to research and education
Ongoing	University of Leeds internal conferences and publications	University of Leeds staff and students	To publicise and explain purpose and outcomes of project	Positively influence and help develop research, L&T and IS/IT strategies.
Ongoing	JISC related activities e.g. JISC programme meetings	Related projects and HE community	To share experience and learn from other projects	Project progress and experience
Ongoing	Publication and conference submissions.	UK HE and subject specialists	To explain purpose and outcomes of project	Evaluation of the application of the project to research and education

19. Exit and Sustainability Plans

Project Outputs	Action for Take-up & Embedding	Action for Exit
Slide collections		Ensure slide collections are returned to storage
Documentation and secure referencing systems		Ensure all procedures, technical developments, standards are all

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		clearly documented and made available via the web site
Metadata schema	See work package 4	Ensure accurate documentation
Digitised slides and case notes; Project web site	See work package 5	Management and maintenance of digitised slide collections incorporated into Virtual Pathology programme

Project Outputs	Why Sustainable	Scenarios for Taking Forward	Issues to Address
Digitised slides and case notes	Supports pathology research and education	Incorporated into Virtual Pathology programme	Plan and implement incorporation into virtual pathology

Appendixes

Project Acronym: Image Path
Version: 2.0
Contact: Andy Pellow
Date: 06/01/2009

Appendix A. Project Budget

Appendix B. Workpackages



JISC WORK PACKAGE

Before completing this template please note:

- *The Project Management Guidelines have detailed instructions for preparing project plans and work packages..*
- *Please expand tables as appropriate.*
- *Fill in the information for the header, e.g. project acronym, version, and date.*
- *Text in italics is explanatory and should be deleted in completed documents.*

WORKPACKAGES	Month	1	2	3	4	5	6	7	8	9	10	11	12
1: Project Management	Oct 08	█	█	█	█	█	█	█	█	█	█	█	█
2: Assessment of slide collection	Oct 08	█	█	█									
3: Slide & documentation digitisation	Jan 09				█	█	█	█	█				
4: Create descriptive data and metadata	Dec 09			█	█	█	█	█	█				
5: Presentation	Feb 09					█	█	█	█	█	█	█	█
6: Evaluation and dissemination	Oct 08	█	█	█	█	█	█	█	█	█	█	█	█

Project start date: *01/10/2008*

Project completion date: *30/09/2008*

Duration: *12* months

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				Milestone	Responsibility
YEAR 1					
WORKPACKAGE 1: Project Management					
<u>Objective:</u> Overall management of the Project					
1. Develop and maintain project plan	05/11/08	30/09/2009	Project plan submitted to JISC		PM
2. Recruit and induct project team	01/10/08	30/10/08			PD
3. Organise Project steering group	01/10/08	30/11/08			PM
4. Develop and maintain project documentation	01/01/08	30/09/2009			PM
5. Produce first progress report	01/01/09	31/01/09	Progress report submitted to JISC		PM
6. Produce second progress report	01/07/09	31/07/09	Progress report submitted to JISC		PM
7. Produce draft final report	01/08/09	31/08/09	Draft report		PM
8. Produce final report		30/09/08	Final project report		PM
9. Produce completion report		30/09/08	Completion report		PM/PD
WORKPACKAGE 2: Assessment of slide collections					
<u>Objective:</u> Familiarisation with and assessment of slide collections					
10. Collate slides and case notes	1/10/08	31/12/08	Case notes and slides collated		PD, PO, PT
11. Establish secure referencing system	1/10/08	31/12/08	Secure referencing system		PD, PO, PT
12. Select interesting cases for digitisation	1/10/08	31/12/08	5,000 to 10,000 slides and case note	X	PD, PO, PT

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			selected for digitisation		
WORKPACKAGE 3: Slide and documentation digitisation					
<u>Objective:</u> To digitise 5,000 to 10,000 slides and case notes and transfer to long term storage					
13. Digitise slides and case notes	01/01/09	31/05/09	5,000 to 10,000 slides and associated case notes digitised	X	PO, PT, DS
WORKPACKAGE 4: Create descriptive data and metadata					
<u>Objective:</u> To create descriptive data and metadata					
14. Review current technical metadata and associated case notes	01/12/08	31/05/09			PD, PO, PT
15. Establish metadata schema for both images and case notes	01/12/08	31/05/09	Metadata and additional descriptive notes for each image		PD, PO, PT
WORKPACKAGE 5: Presentation					
<u>Objective:</u>					
16. Sign JORUM development licence	01/10/08	31/12/08			PM
17. Plan, test and implement presentation of images through Virtual Pathology website (VP)	01/02/09	31/08/09	Digital images and case notes presented through Virtual Pathology (VP) website	X	PD, PO, PT, WS
18. Plan, test and implement presentation of images via digital objects in LUDOS	01/02/09	31/08/09	Digital images and case notes presented through Ludos		WS, UoL Library

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19. Investigate use of sitemap protocol for Virtual Pathology	01/02/09	31/08/09	VP content visible to third party search engines		UoL Library
20. Analyse Virtual Pathology website logs	01/02/09	31/08/09	Analysis of VP website logs		PO, PT, WS
WORKPACKAGE 6: Evaluation and dissemination					
<u>Objective:</u> Evaluate and disseminate project outputs					
21. Agree evaluation plan	27/11/08	27/11/08			PM, PD, PO
22. Project website	01/10/08	30/11/08	Project website	X	WS, PO, PT
23. Disseminate project outcomes	01/10/08	30/09/08	Dissemination activity		PD, PM, PO
24. Undertake evaluation activities	01/11/08	30/09/08			PD, PM, PO
25. Produce final project report	31/08/09	30/09/08		X	PM, PD, PO

Members of Project Team:

[e.g. JB =Joe Bloggs]

PD	Project Director
PM	Project Manager
PO	Project Officer
PT	Project Technician
WS	Web support
DS	Digitisation Support

Appendix C - JISC project: Protocol

Last updated: 18th December 2008

1. Pull slide from collection
2. Match slide with paperwork
3. Clean slide
With propyl alcohol
4. Record contents of case
e.g. 3 H&E slides, 2 unstained slides, 3 blocks, 4 photos, 2 reports
5. Establish any labwork to do
6. Add Barcode sticker on slides and paperwork
TODO: decide if unique number is is case or slide level
TODO: look at nicelabel functionality
7. Send slides for scanning
 - a. Barcode goes into spectrum
 - b. Unique ID of case is linked to SVS number in Spectrum
 - c. Each case gets own folder on the imageserver
8. Scan paperwork to N drive (shared windows drive)
 - a. Scan images
grayscale 300 dpi ' JPEG Q 70
Save as JISC_1_1.jpeg
 - b. Scan report and correspondence paperwork
300 dpi grayscale
Save as JISC_1_2.pdf
TODO What OCR functionality do we have?
9. Add metadata to case (clinical details, age, sex) in Access database
TODO: Martin to add review diagnosis to fields
10. Quality control virtual slide image in spectrum
 - a. Open the image
 - b. Zoom to 10x magnification
 - c. Jump around the entire slide to ensure its in focus and free of artefact
 - d. Rescan if needed