



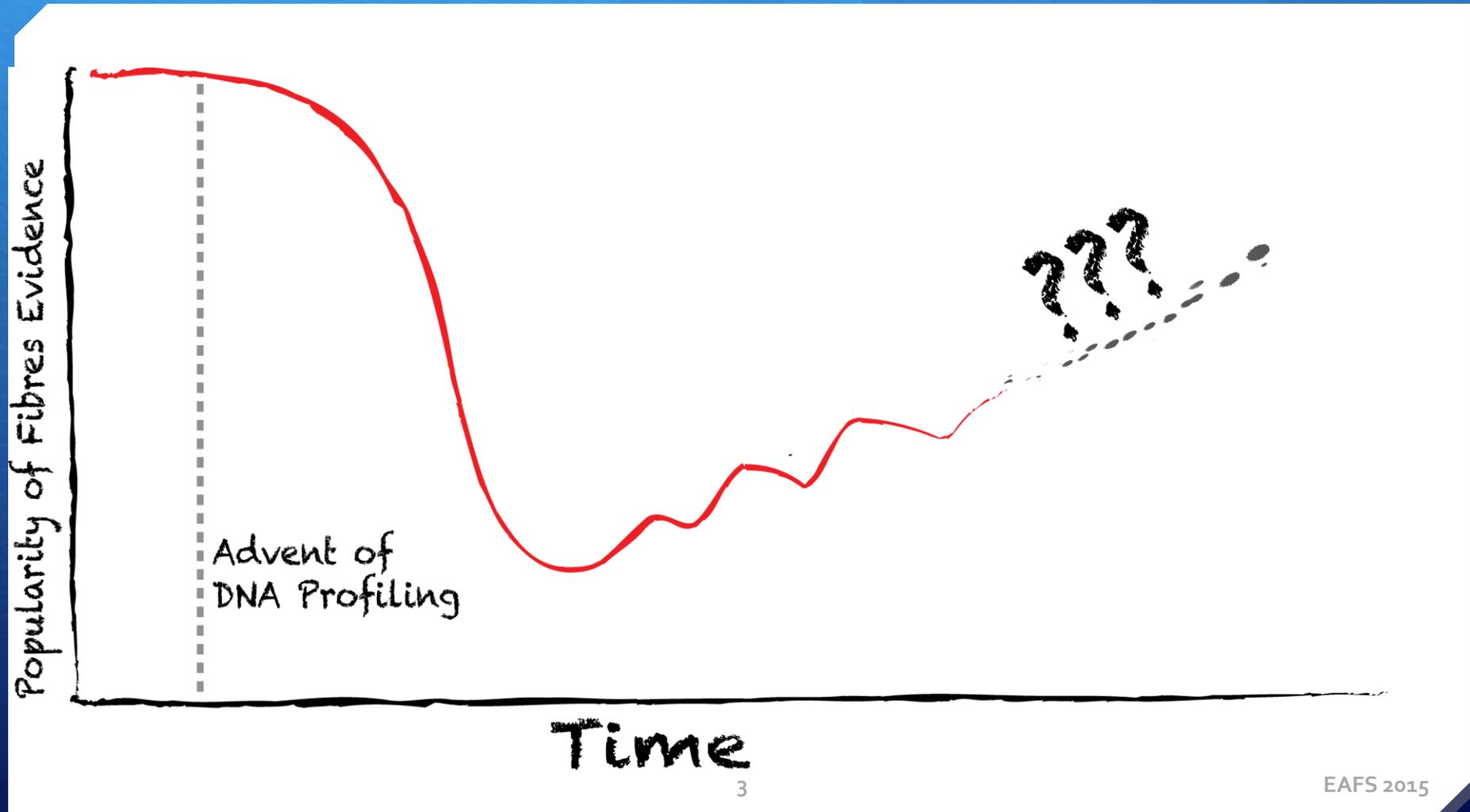
Easylift Three Years On: Use of this Novel Tapelifting System for Fibres Evidence Screening and Ventures into Automated Fibre Finding.

Dr Claire Gwinnett, Prof Andrew Jackson, Forensic and Crime Science Department, Staffordshire University, UK

Outline of Presentation

- + Brief overview of Easylift development and properties
- + Discuss the questions raised through internal/external review of Easylift
- + Evaluate the use of Easylift for screening for fibres from volume crime scenes
- + Proof of concept of a new fibre finding system

Current Status of Fibres Evidence in UK

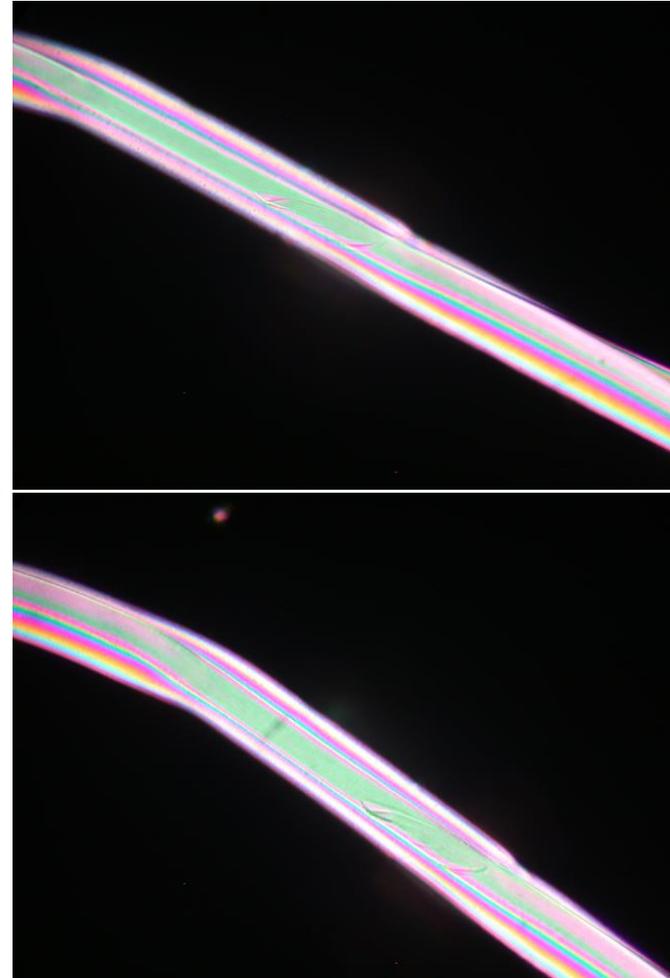


Development of Easylift



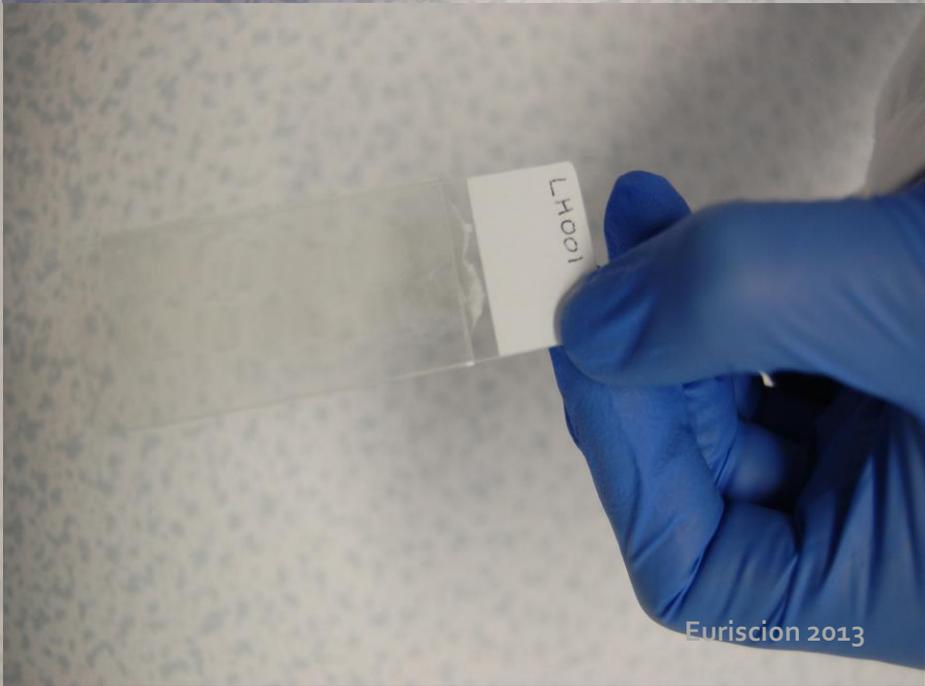
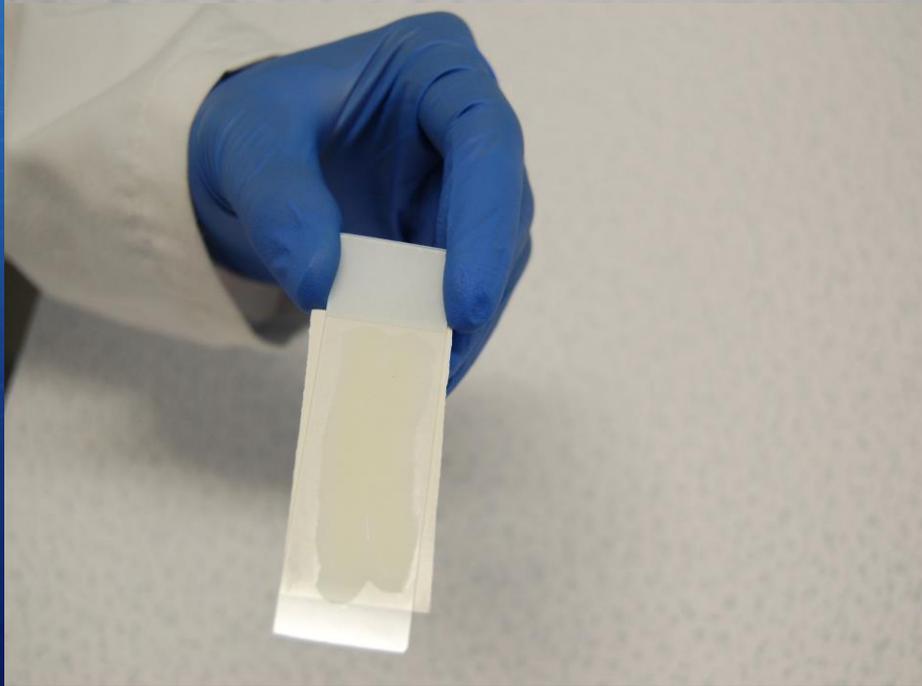
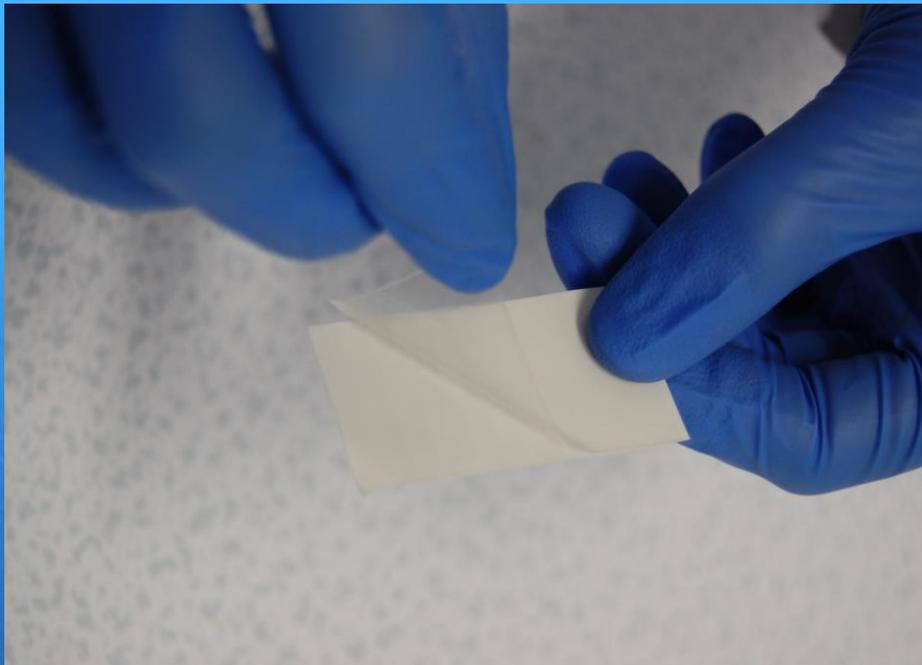
- + New tape system that allows analysis of fibres *in situ* without need for dissection
- + Non-birefringent
- + Tape and backing does not interfere with analysis
- + No air bubbles
- + Allows analysis by;
 - + Polarized light microscopy
 - + Fluorescence microscopy (some wavelengths)
 - + Raman spectroscopy
 - + Microspectrophotometry (MSP)

x 400 magnification



Entellan

Easylift



Questions Raised from Review



- + Laboratory review from practitioners in the UK, the Netherlands and Canada have provided feedback. Feedback also provided through international conference workshops.

Can Easylift be easily dissected if required?

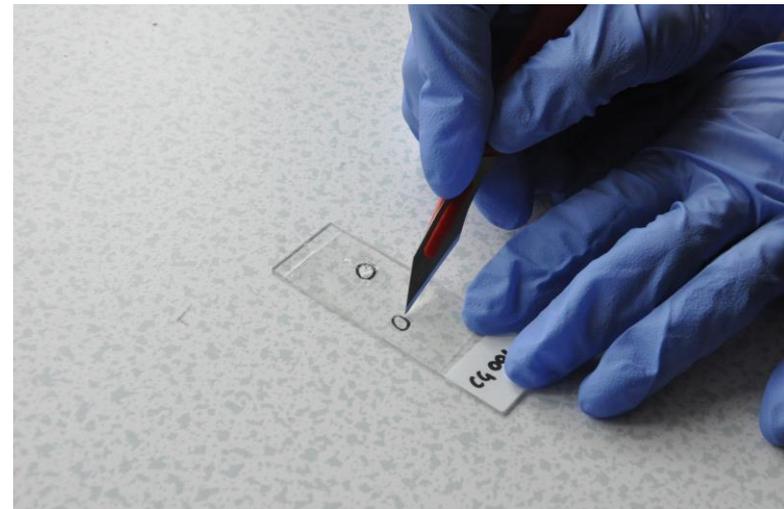
Does the system interfere with FTIR results?

Could Easylift be autoscanned to aid screening?

Can the tape be made in larger pieces?

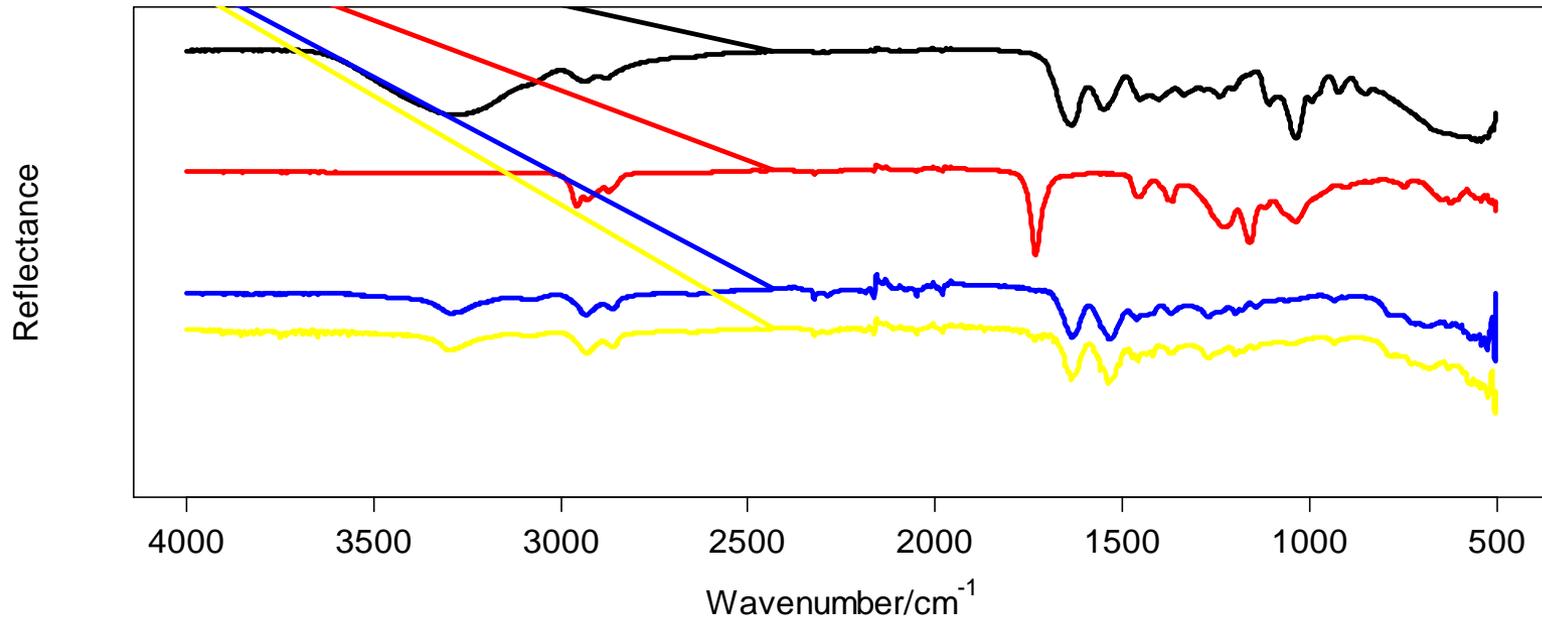
Dissection of Easylift

- + Easier than on acetate backing
- + Same solvents can be used for removal of adhesive



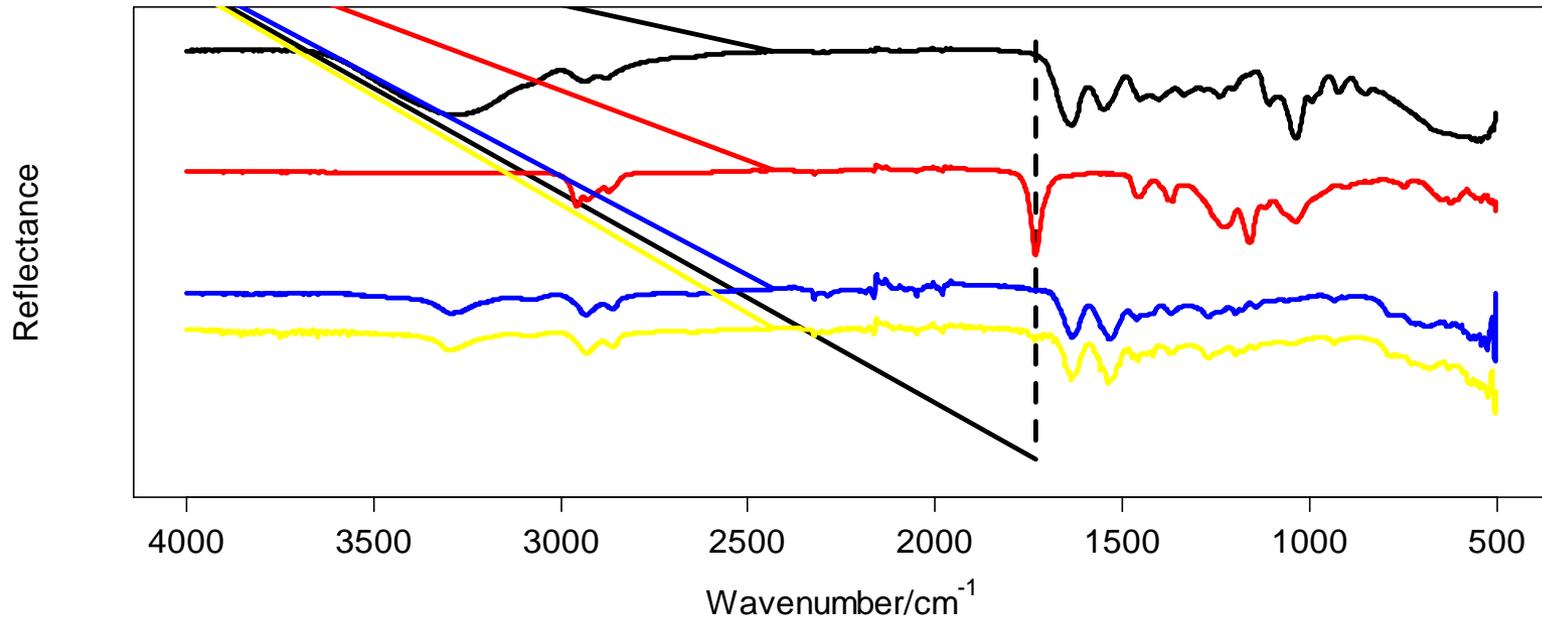
Dissection of Easylift

Black = Mountant, Red = Adhesive, Blue = Nylon, Yellow = Nylon in Easylift



Dissection of Easylift

Black = Mountant, Red = Adhesive, Blue = Nylon, Yellow = Nylon in Easylift

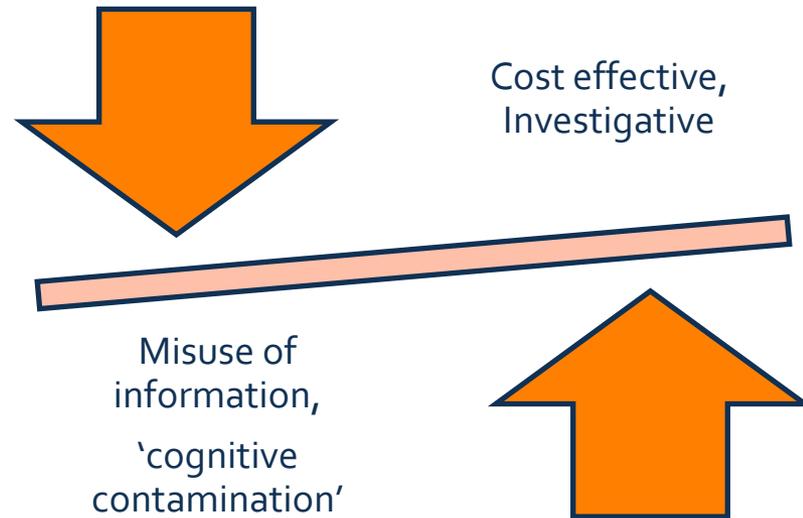


Sizes of Easylift

To Screen or Not to Screen?



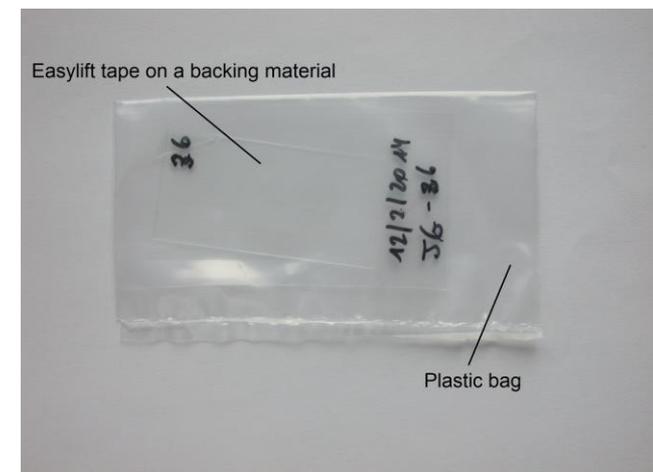
- + Use of screening is an investigative tool NOT an evaluative role
- + How do we put in place a system that does not allow the evaluative element to be damaged by the investigative process??
- + How do we screen appropriately?



Screening for Volume Crime Scenes



- + 3 police forces with one central scientific support unit uniquely utilising fibres in volume crime scenes
- + Easylift used at point of entries and car seats
- + Tapes screened (initially by USB microscope) now sent to Staffordshire University
- + Initial intelligence information gathered by colour, morphology and fluorescent properties in order to potentially link scenes
- + Identify potentially evidential fibres for further analysis
- + Prolific offenders to be identified



Screening Procedure



- + Training delivered to SOCOs
- + Samples from
 - + Burglary - dwellings
 - + Burglary – other dwellings
- + Samples taken from POEs and logical contact points;
 - + Door/window frames, broken glass
 - + Door handles, fork/spade handles
- + Samples sent to Staffordshire University for initial screening of colour - no need for fibre free room
- + Samples analysed through bag initially – report sent
- + After 3 months – evidence bags opened and tapes analysed using PLM – report sent



Variety in number of tapes used

Documentation at Staffordshire University

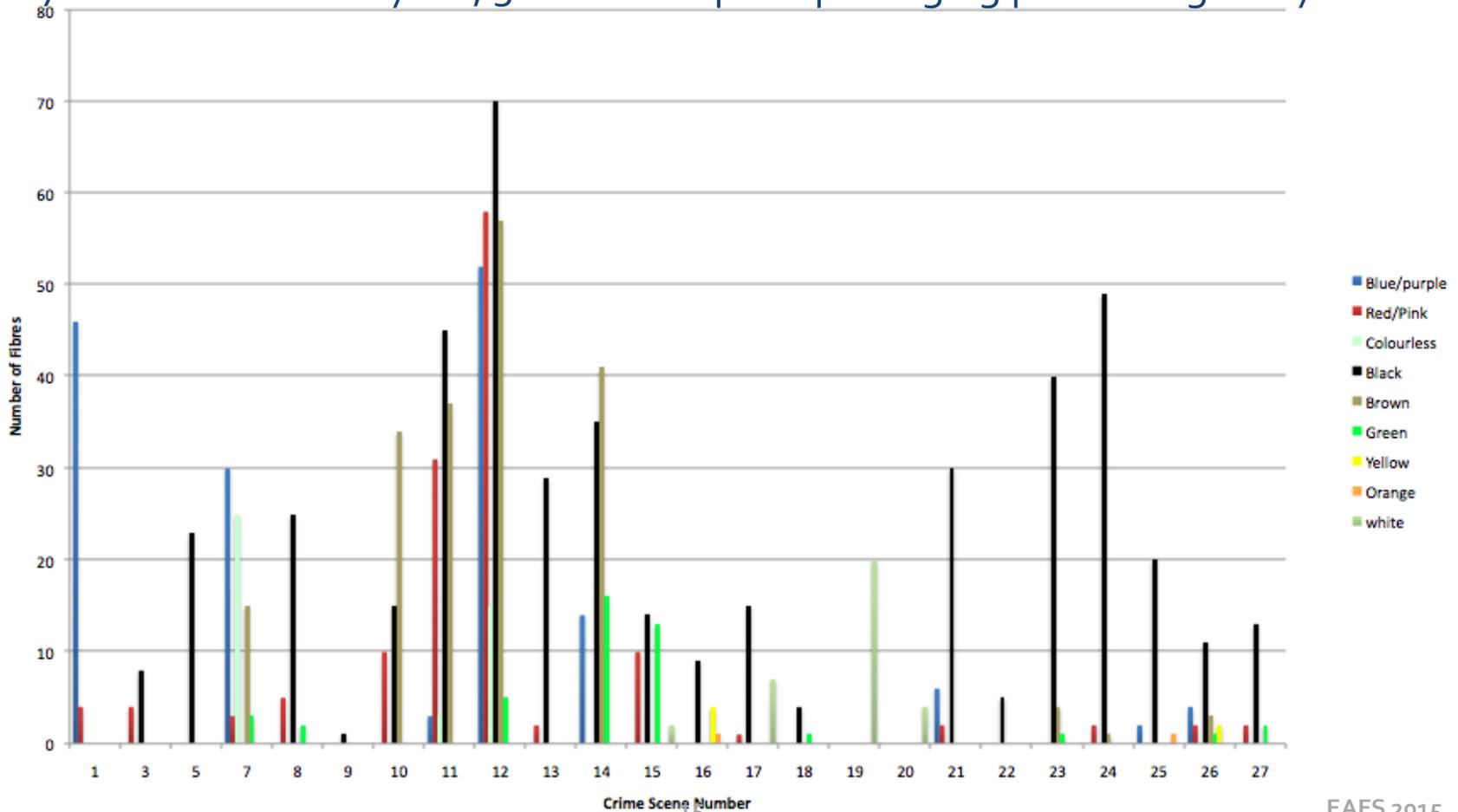


- + Evidence Number
- + Socrates Reference Number
- + Tape Reference Number
- + Location – not always noted
- + Colour of fibres (subjective but categories used to reduce this)
- + Time/date

Example of Initial Screenings



+ 27 crime scenes analysed, 3 had inadequate packaging preventing analysis



Initial Study to Identify Effectiveness of VSC in obtaining Fluorescence info

+ Idea:

- + To utilise a VSC 4 Plus to further discriminate between fibres held on tapes
- + Observe through full wavelength range and filter options
- + Easy to use and view
- + Provided additional albeit limited additional information
- + Needs high magnification
- + Requires non-fluorescing tape and backing
- + Subjective
- + Only a preliminary stage before use of a fluorescent microscope.



Advantages and Limitations

Advantages

- + Removes need for fibre free examination room – tapes analysed within evidence bag
- + Fast intelligence information in order to inform which samples to be sent to provider
- + Compatible with normal dissection – no interference from medium

Limitations

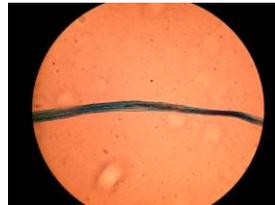
- Full potential for PLM screening not fully realised due to current police protocols
- Care needed in how information is used
- Large numbers of fibres still to be screened – automation still required
- Database required to ascertain evidential value

Potential Strategy for Screening?

- + National data to identify reliable colour data
- + Robust inferential process to provide links between scenes and people
- + Re-assessment of further features to identify whether still able to discriminate
- + If still unable to discriminate – use for intelligence

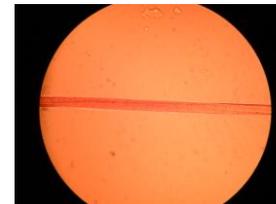
Fibre finder data

- + Images taken of 136 suspect fibres in **Easylift**, one fibre per image:



- + Extracted and saved the RGB values of each pixel of each suspect fibre image

- + Took image of control fibre in **DePeX**:



- + Cropped this, thus 

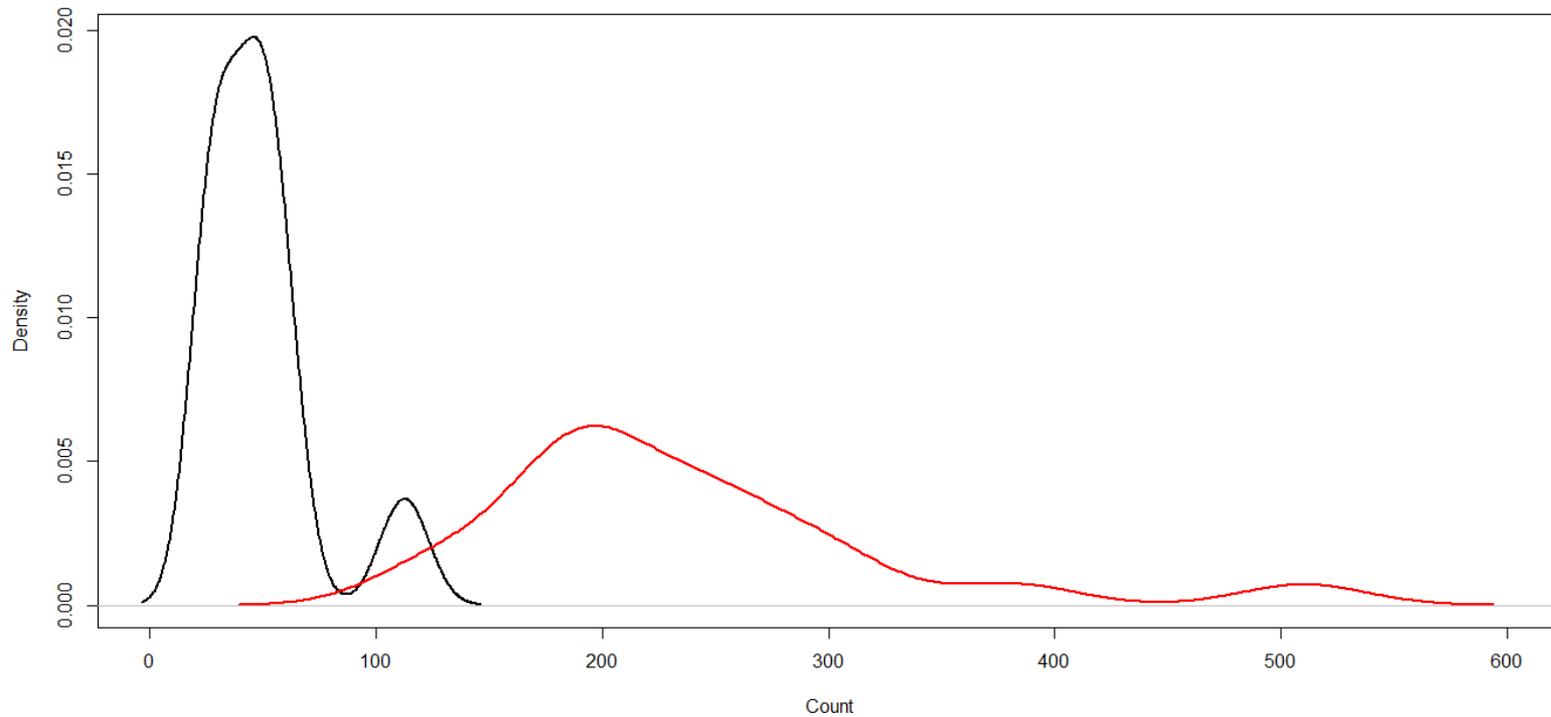
Fibre finder data

- + Extracted the RGB values of each pixel of the cropped image of the control fibre, then found the frequency of each of these values in the cropped image
- + Counted the number of times each of the 5 most frequently occurring control RGB values appears in each of the images of the suspect fibres.
- + Summed these values for each of the suspect fibres
- + Noted the colour of each of the suspect fibres (pink or not pink)
- + Ignored two outliers
- + Generated the kernel density plot on the next slide

Fibre finder data



Kernel Density Plot of Top 20 Pink (red line) and Top 20 Not-pink (black line) Fibre Count Data



Further Work

Easylift is currently in initial discussions regarding mass production with forensic consumables company;

- + Development of range of tape sizes and tackiness

Easylift project is being developed in 4 main areas:

1. Automation of tape scanning and imaging – use of 3D Hitech slide scanners
2. Fibre finding through colour and optical characteristics
3. Use of Easylift as a universal tape (including retrieval of biological evidence)
4. Generation of a database of fibre populations at volume crime scenes and non-crime scenes for intelligence and prevalence information

Thank you to:
Beds, Cambs and HertsPolice, Staffordshire Police,
RCMP, Netherlands Forensic Institute,
Tom Schotman, Priscilla Kuijt, Joachim Gotink, Sanne
Leers and Max Grundhill,



Scientific Services Unit

Thank you for listening