

Session Three - *Knowledge Gaps*

- What are the existing gaps in knowledge of the effective and cost-effective uses of FB? :
 - Knowledge of effective management strategies for controlling the collection and use of FB in both volume crime investigations and serious crime investigations;
 - Methods for measuring the cost-effectiveness of current and proposed uses of FB;
 - The relationship between knowledge of the effective uses of FB and knowledge of the effective uses of other intelligence and investigative methodologies.



Session Four – *Futures.*

- Potential developments in the demand for more information about the use of FB in support of criminal justice as well as improvements in what may be collected in the UK and elsewhere.
- The current work and future plans of key stakeholders to request or collect more information on the effective uses of FB;
- Government expectations of data and the future funding of FB;



Session Four – *Futures.*

- Whether the currently available range of data allow a sufficiently wide range of stakeholders and interested parties to come to well supported conclusions about the effectiveness and cost-effectiveness of the current uses of FB;
- What additional kinds of data can be collected to improve knowledge of the uses of FB;
- Whether lessons can be learned from efforts to collect such data in other jurisdictions.



Stockdale, Whitehead and Gresham: economic evaluation of policing (1999)



UNIVERSITY OF LEEDS



- Clarification of concepts and mode of analysis (1)
- Identifying cost of *inputs* and *outputs*
 - essential for basic transparency and accountability
- Need to also identify *outcomes*
- *Performance Indicators* (PIs)
 - an agreed measure of success not cost
- *Cost analysis*
 - Comparison of the cost of alternative options with a decision rule in favour of the lowest cost (or how an organisation can live within a set/reduced budget)

Stockdale, Whitehead and Gresham: economic evaluation of policing (1999)



UNIVERSITY OF LEEDS



- Clarification of concepts and mode of analysis (2)

- *Cost Effectiveness Analysis (CEA)*

- Used to compare input costs per unit of output with a decision rule to choose the option with the least cost per unit



- *Cost benefit analysis (CBA)*

- Having valued all inputs, outputs and outcomes in monetary terms used to compare competing options in order to identify the highest net benefit



The
Nuffield
Foundation

Stockdale, Whitehead and Gresham: economic evaluation of policing (1999)



UNIVERSITY OF LEEDS

Table 2: Key features of three major evaluation techniques: PIs, CEA and CBA

	PIs	CEA	CBA
Inputs			
Identify	No	Yes	Yes
Value	No	Yes	Yes
Outputs			
Identify	One (or more) measurable outputs	One (or more) measurable outputs	Yes
Value	No	No	Yes
Outcomes			
Identify	No	Probably not	Yes
Value	No	No	Yes
Definition of success	Achieve pre-determined level of performance or change in that level	Lowest cost per unit of output	Positive net value or highest net value as compared to other use of budget

Stockdale, Whitehead and Gresham: economic evaluation of policing (1999)



UNIVERSITY OF LEEDS

Table 3: Application of major evaluation techniques to different types of proactivity

Type of proactivity	Evaluation technique		
	PIs	CEA	CBA
Type 1 (specific operations)	Can be used for assessment of both specific activities and general effectiveness. Can only include what can readily be measured. Indicators may not relate closely to value.	Possible to implement when there are clear definitions and measures of inputs and outputs, but difficult to identify relevant output measures and to relate these to inputs.	In principle, the most comprehensive and valuable approach. Not currently practicable particularly because cannot fully identify and value benefits, either direct or indirect.
Type 2 (functional changes)	Can be used for assessment of both specific functions and general effectiveness. Can only include what can readily be measured. Indicators may not relate closely to value.	Possible to implement when there are clear definitions and measures of inputs and outputs, but difficult to identify relevant output measures and to relate these to specific changes in inputs.	In principle, the most comprehensive and valuable approach. Not currently practicable particularly because cannot fully identify and value benefits, either direct or indirect.

Stockdale, Whitehead and Gresham: economic evaluation of policing (1999)



UNIVERSITY OF LEEDS

Table 3: Application of major evaluation techniques to different types of proactivity

Type of proactivity	Evaluation technique		
	PIs	CEA	CBA
Type 3 (changes in ethos)	Activity normally too non-specific to evaluate directly. Can set PIs to measure general effectiveness.	Activity normally too non-specific to evaluate directly. Difficult to identify and measure relevant outputs and to relate these to inputs.	Unlikely to be possible, even in principle, as the activity is too non-specific to allow identification of costs and benefits.
Most important problems in applying technique	Adequacy of the PIs. Difficulty in monitoring change accurately. Lack of measures of cost.	Requires weighting when more than one output. Problems in defining both outputs and suitable comparators.	Identification and pricing of costs and benefits.

ONS (UKCMGA):CJS Scoping Document (2008)



UNIVERSITY OF LEEDS



- CJS Productivity (National Statistics definition):
 - A ratio of CJS outputs to CJS inputs at constant prices
- For example, by *measuring* the impact of CJS inputs on CJS outputs such as the number of convictions
- ONS recognise, however, that it may be unclear which *observed or recorded* changes can be *attributed directly* to CJS productivity or result from other factors (e.g. CJS detection etc, or, alternatively, fear of CJS detection, better security or reduction in potential offenders' motivation or number of potential offenders etc)?

Comparative analysis should help to invalidate misleading claims



UNIVERSITY OF LEEDS

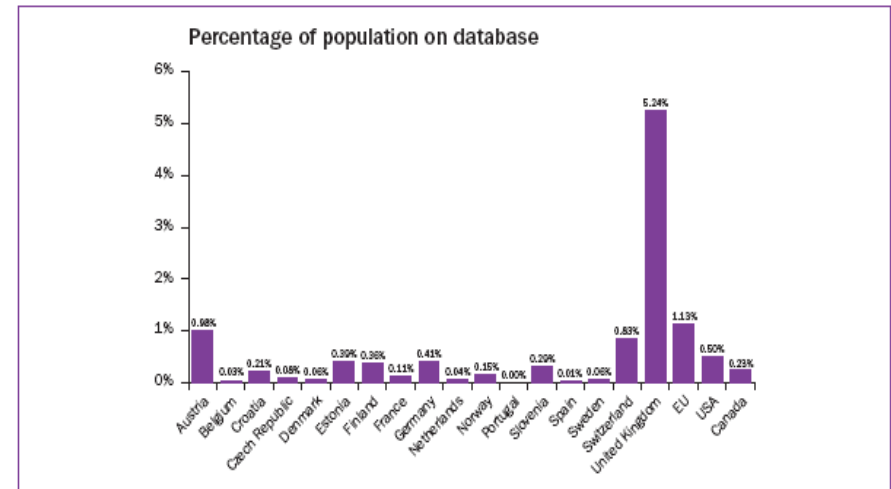
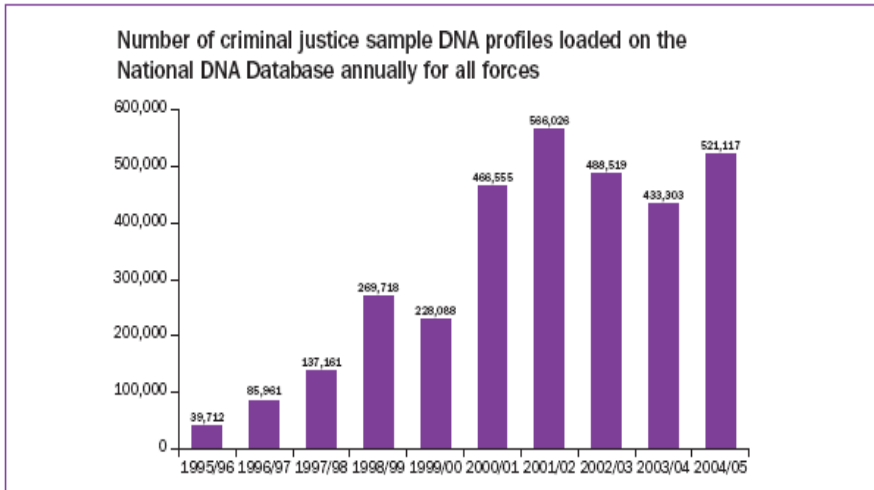
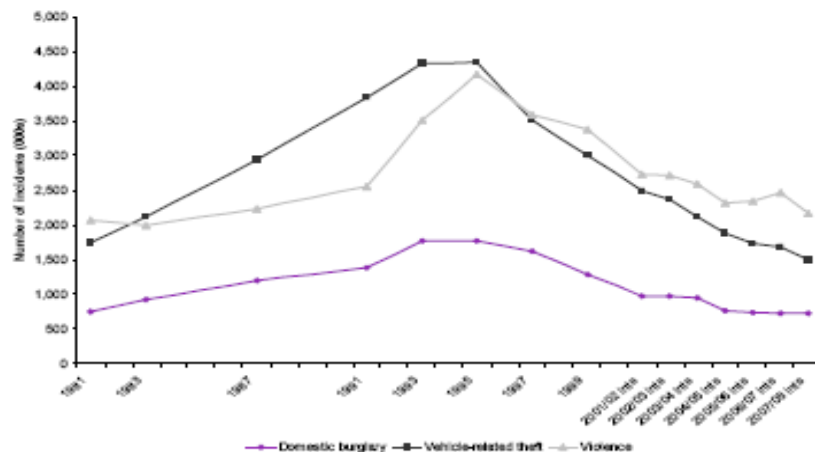
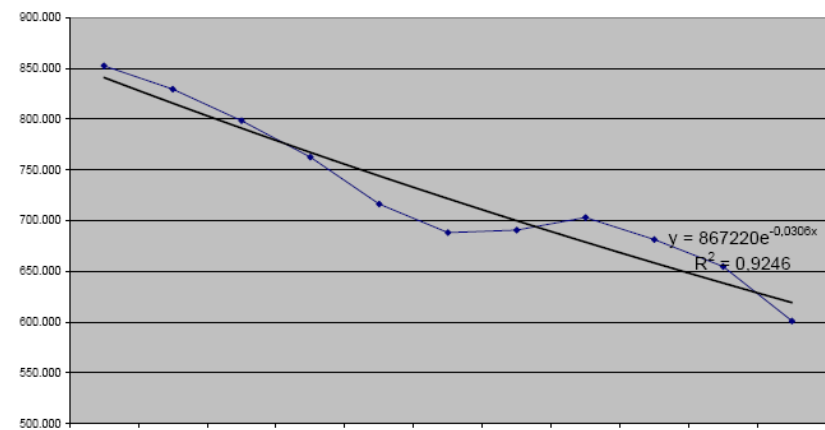


Figure 2.5 Trends in BCS violence, vehicle-related theft and burglary, 1981 to 2007/08



EU-27 1995 - 2005, domestic burglary (14 countries)

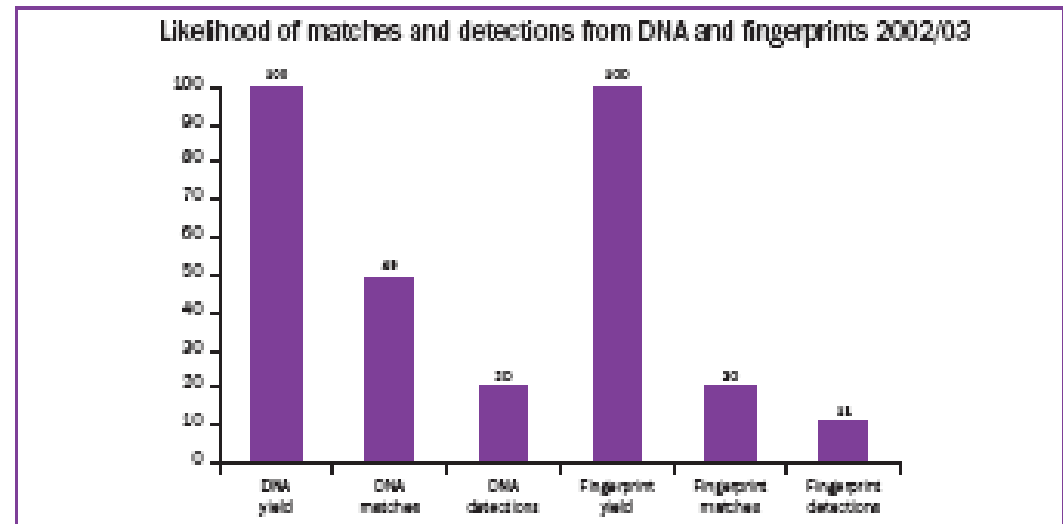
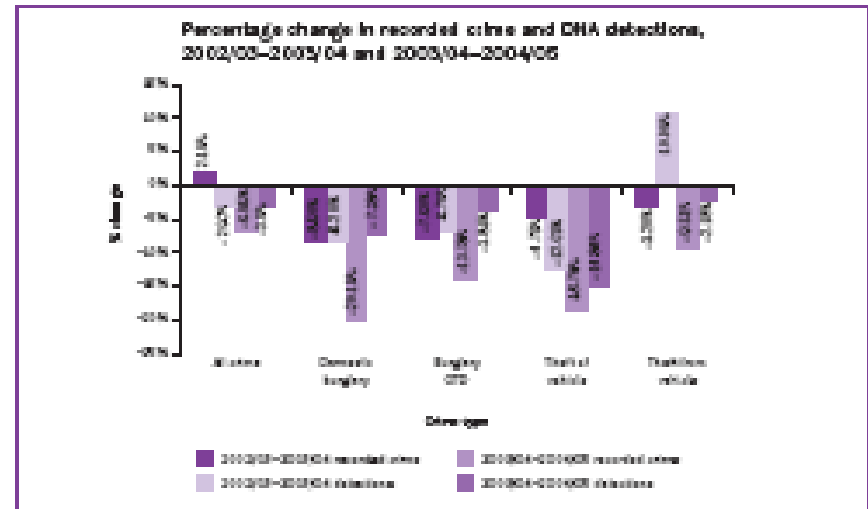
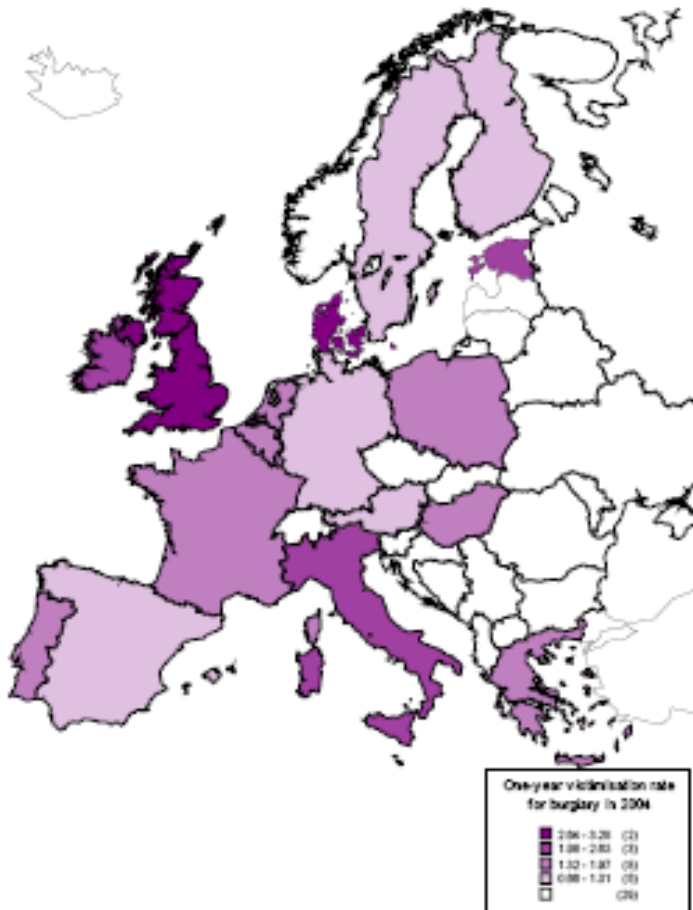


But context may (partly?) explain different priorities & policies/laws



UNIVERSITY OF LEEDS

Figure 2.15. Levels of burglary across Member States of the European Union in 2004



ONS (UKCMGA):CJS Scoping Document (2008)



UNIVERSITY OF LEEDS



- Hence two approaches:
- Current/*short term* priority:

- Create or update a measure of CJS outputs for each type of agency e.g. police, CPS, courts and NOMS



- Longer term *aspirations*:

- Administration of Justice Approach: recognising the *interdependence* of CJS agencies



- Econometric approach: for gauging the impact of both CJS inputs and that of *other identified and measured* variables on e.g. level of recorded crime

The
Nuffield
Foundation

ONS (UKCMGA):CJS Scoping Document (2008)



UNIVERSITY OF LEEDS



- Two important additional points (1):
- Is the very notion of standard measures of CJS productivity rife with paradoxes? For example:



- A decline in productivity might reflect a switch of resources to more serious/harder to detect crimes



- More detections might simply reflect more crime or changed priorities/data manipulation

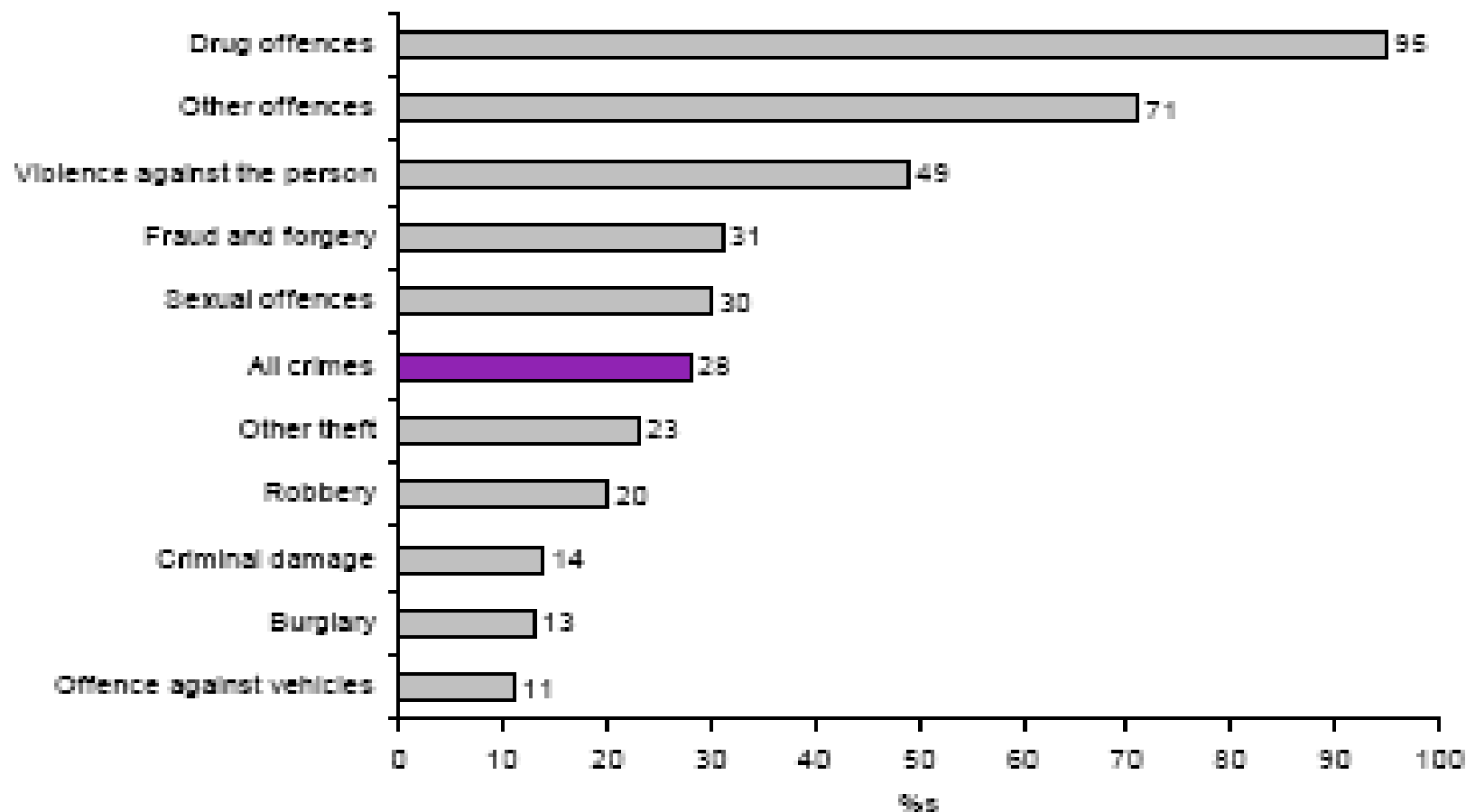


For example: drug offences (4.6% in 07/08): almost exclusively recorded through an act of detection



UNIVERSITY OF LEEDS

Sanction detection rates for police recorded crime, 2007/08



ONS (UKCMGA):CJS Scoping Document (2008)



UNIVERSITY OF LEEDS



- Two important additional points (2):
- ***Ideally* evaluation should reflect *value weighting* or *quality-adjustment* instead of basic numbers/costs:**



- Not all outcomes are of equal concern or importance (e.g. offences against vehicles (13.3% of 07/08 recorded crime) are more tolerable than burglary(5.7%))



- For example, *cost-utility analysis* in health economics as (e.g. 'quality adjusted life year' that reduces inherent discrimination in CBA against people with lower earning capacity)

The
Nuffield
Foundation

ONS (UKCMGA):CJS Scoping Document 2008)



UNIVERSITY OF LEEDS

Fig. 2 Possible Measures for CJS

Inputs

- e.g. Expenditure on solicitors
- e.g. Number of prison staff
- e.g. Police Officer time

Resources used in carrying out activities



Activities

- e.g. Number of prison nights
- e.g. Case preparation by prosecutors
- e.g. Time spent in court on sentence/trial/committal

Lead to outputs that are directly attributable to those activities



Outputs

- e.g. Detections
- e.g. Disposals
- e.g. Completed sentence/trial/committal

The direct product of activities. Contribute to outcomes



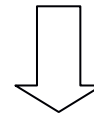
Outcomes

- e.g. Reduction in re-offending
- e.g. Reduction in the fear of crime
- e.g. Increase in the number of crimes for which an offender is brought to justice.

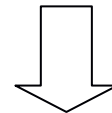
The anticipated or actual effects of activities/outputs.

Possible Measures for forensic bioinformation

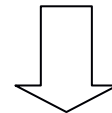
Inputs?



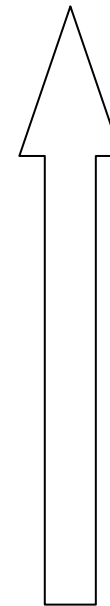
Activities?



Outputs?



Outcomes?

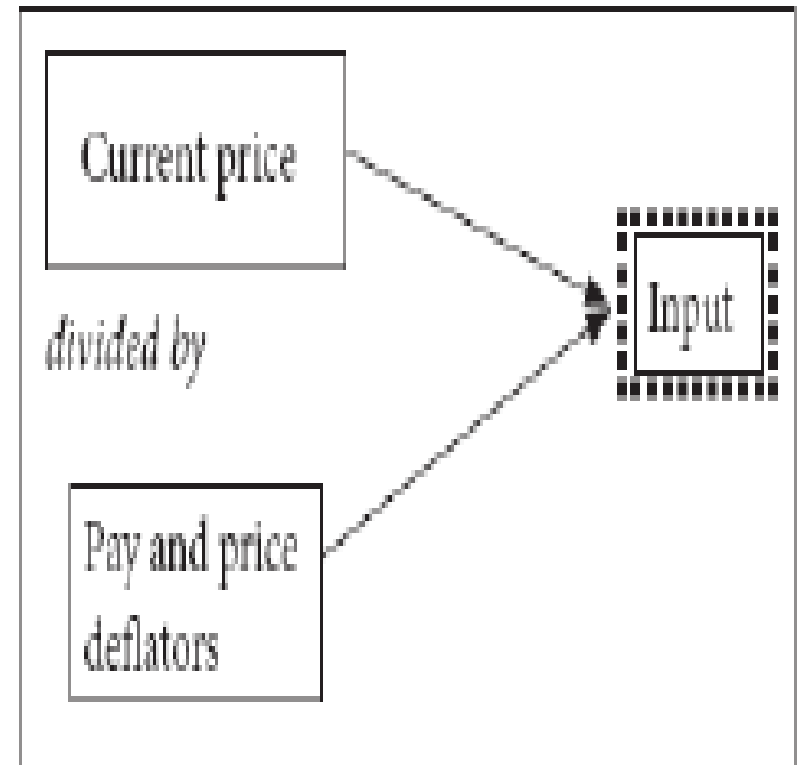


Value weighting?

Inputs (ONS descriptions)

- Labour: police staff
- Procurement: bioinformation services; bioinformation consumable; general consumables
- Capital: buildings, equipment and vehicles
- Also volume measures need to be at constant prices (see Figure 7) and quality adjusted for different skill sets within the police workforce

Fig. 7 Components of an Indirect Input Measure



Issue: different kind of offences and significance of their impact



UNIVERSITY OF LEEDS

Fig. 4 The range of crimes covered by the AOJ matrix

OFFENCE TYPE LABELS	DESCRIPTION OF CATEGORY
VATP	Violence Against Person
SEXOF	Sexual Offences
BURG	Burglary
ROBB	Robbery
THEFT	Theft And handling Stolen Goods
FRAUD	Fraud And Forgery
CRDAM	Criminal Damage
DRUG	Drug Offences
OTHIND	Other Indictable offences
INDMOT	Indictable Motoring Offences
SUMEX	Summary Offences (Excluding Motoring)
SUMMOT	Summary Motoring Offences
OTHVEH	Other vehicle crime

Issue: timeliness in investigations



UNIVERSITY OF LEEDS



Attend
Scene

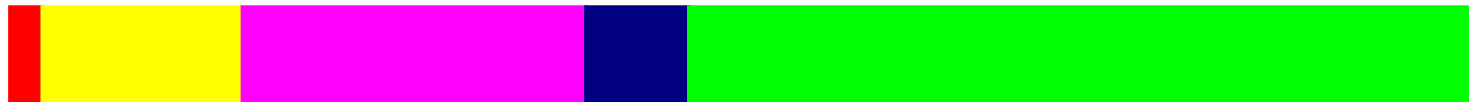
Transport
Evidence

Analyse
Evidence

Task
Identification

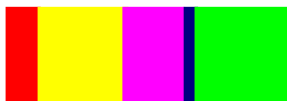
Action
Identification

Average Timings (Quarter 1, 2003/4)



Day 71

Simulation Predictions



Day 14

2004/5 (Actuals)



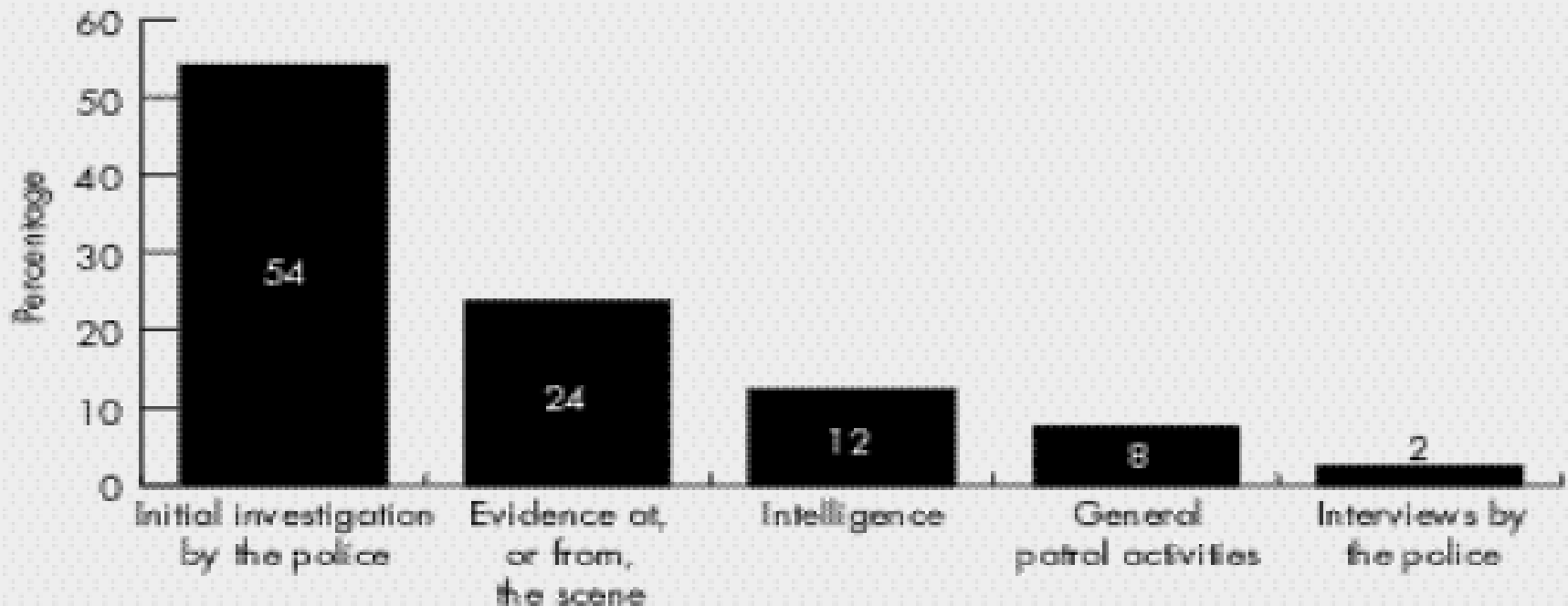
Day 23

Issue: significance of the bioinformation may change (1)



UNIVERSITY OF LEEDS

Figure 4.1: First links between the suspect and offence: direct detections of all volume crimes



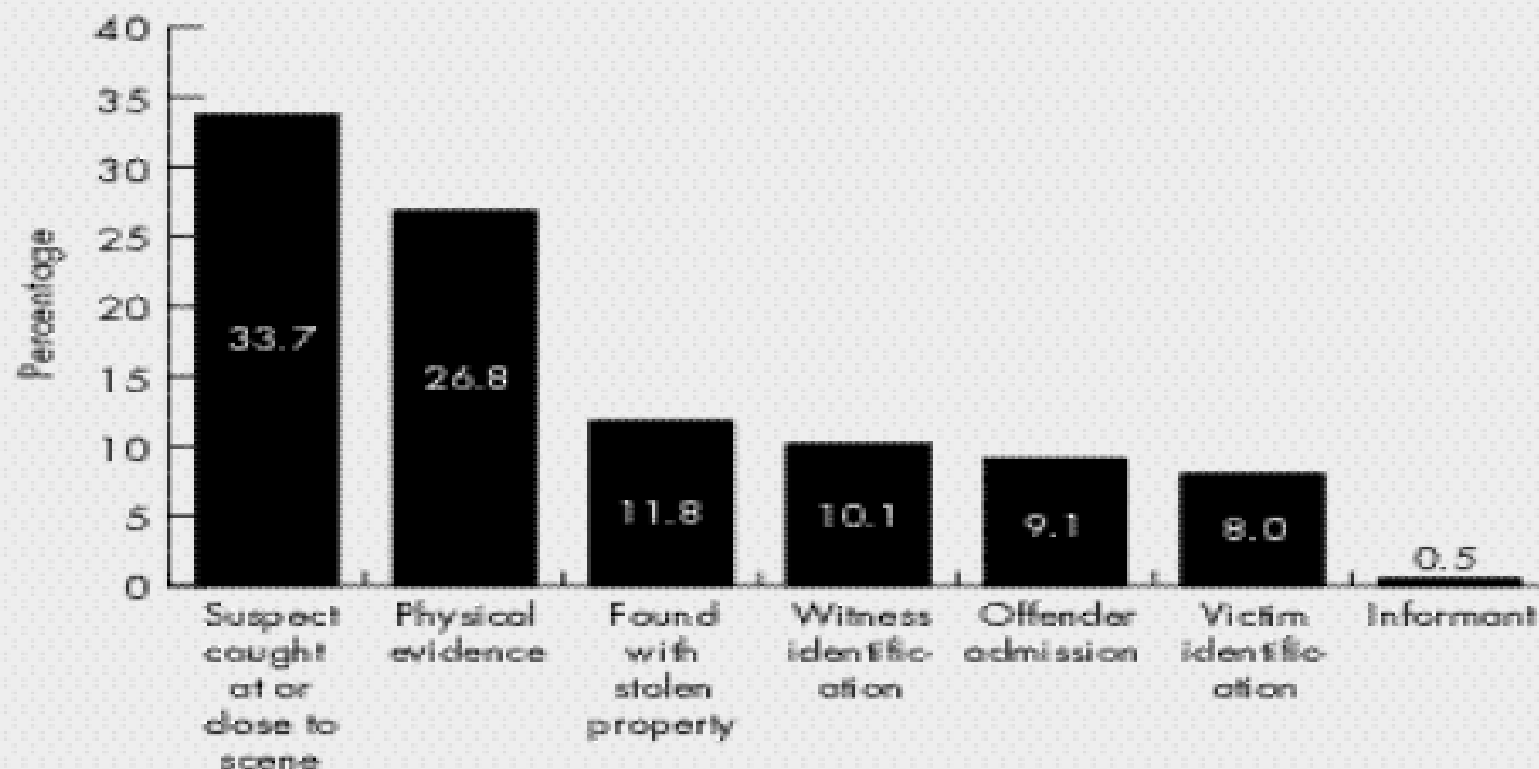
Unweighted. N = 950 cases (63 cases where the 'first link' was unclear were excluded)

Issue: significance of the bioinformation may change (2)



UNIVERSITY OF LEEDS

Figure 5.1: The principal information enabling the offence to be detected: direct detections of all volume crimes



Unweighted. Base = 1,014 (excluding cases where principal information not known)

Issue: longer-term intelligence investment v case outputs/outcome



UNIVERSITY OF LEEDS

		DIFFERENT CRIME SCENES																
		A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	
DIFFERENT PERSONS	1	X	X	X	X													
	2			X			X			X		X				X		
	3		X			X		X			X						X	
	4	X						X	X				X	X				
	5															X	X	X
	6	X			X						X							

CRIMINAL COOPERATIONS															
Size (persons)	2	3	4	5	6	7	8	9	10	11	12	13	14	15	Total
Number	213	51	19	2	4	3	2	0	0	2	0	0	1	0	297

Issue: how to measure benefits when beneficiaries are dispersed?



UNIVERSITY OF LEEDS

Figure 4: Using DNA to link transnational crime and identify offenders

- A robbery in Amsterdam linked to similar crime in Belgium
- A robbery in Mill, North Brabant, with two separate crime stains linked to a convicted offender (robbery) and crime stains left by the second offender at a burglary in Belgium
- A murder in Cologne linked to arson in Belgium
- A robbery in Lille linked to a convicted offender in Belgium



Issue: potential value v ethical issues of some research models



UNIVERSITY OF LEEDS



- Epidemiological intervention studies offer potential models, in randomly allocated clinical trials based on:



- ‘Clusters’ whole groups or communities (pilot CJS projects are quite common)



- ‘Individuals’ (rare in CJS)
- ‘Stratified allocation’ to sub-groups within the community (some CJS research by being BCU based is perhaps approximately equivalent to this in terms of the national community)

The
Nuffield
Foundation

Does epidemiological descriptive data offer a model for a forensic science data base?



UNIVERSITY OF LEEDS



- Who – cases undertaken by individual laboratories and sole practitioners
- What – use of technique, product or skill on a case by case basis and the significance of its use in terms of contributing to intelligence product, detection or conviction
- Also failures in respect of laboratory, practitioner, technique, product or skill revealed during investigations or during legal or professional disciplinary proceedings and audits.

Does epidemiological descriptive data offer a model for a forensic science data base?



UNIVERSITY OF LEEDS



- Possible limitations on commercial confidentiality:
- Should descriptive register (as above) be a public record in the interests of justice, public confidence in professional integrity and accountability to the taxpayer?
- Also, should limitations and questions about the underlying scientific and professional techniques and their possible limitations be exposed as a matter of public record to assist lawyers, judges, juries and investigators in decision making?

Main references



UNIVERSITY OF LEEDS

- Stokedale, J.E., Whitehead, C.M..E. and Gresham, P.J.,(1999) *Police Research Series Paper 103 'Applying Economic Evaluation to Policing Activity'* (London, Home Office)
- UK Centre for the Measurement of Government Activity (2008), *Criminal Justice System: Scoping document* (Newport, ONS)