

Is the biometrics emperor wearing any clothes?

The UK government's forthcoming identity card scheme relies on biometrics. But biometrics do not for the moment provide certainty. They provide only an insufficient probability that a person is who he says he is. Take away the supposed certainty of biometrics and there is no temptation left to deploy the government's scheme.

There are many hopes for biometrics	1
... DNA seems to be a reliable biometric but testing takes too long	1
... the NPL feasibility study shows that other biometrics are unreliable	1
... and the NPL's findings are confirmed by the UKPS biometrics trial	2
... the government's scheme is not offering fingerprints in the traditional sense	2
... it would be imprudent and unbusinesslike to deploy biometrics now	3
... they do not offer certainty	3
... they do not act as a deterrent	3
... the ICAO does not provide cover for the introduction of ID cards	3
... nor do the other precedents appealed to by the Home Office	4
... the Home Office makes questionable use of its budget figures	4
... the fact that other countries have deployed biometrics does not make them reliable	5

THERE ARE MANY HOPES FOR BIOMETRICS

1. The government want to include biometrics in their ID card scheme at a budgeted cost of £0.7bn ([Home Office 2002](#)). The budget figure gives an incomplete picture. The proprietary technologies used will attract royalties, payable every time anyone anywhere appeals to the biometric record to try to prove a person's identity. We do not know the value of these royalties. And we do not know the cost of the national network of ID card readers that will be needed.
2. The hope is that a biometric can be found which, throughout his or her life, identifies each person uniquely in a practical way such that, for example, a Jumbo jetful of people can be whisked quickly through the departures and arrivals procedures at airports while confirming each passenger's identity.
3. The biometric may be thought of as binding the person to their record on the National Identity Register. If such a biometric could be found, then it would greatly strengthen any ID voucher scheme. If no such biometric can be found, then the ID voucher scheme must proceed as best it can, without such a binding, as we always have done. Either that or it must not proceed at all. The choice depends on whether you regard a biometric binding as essential to the ID voucher scheme.

... DNA SEEMS TO BE A RELIABLE BIOMETRIC BUT TESTING TAKES TOO LONG

4. The biometric that people trust is DNA. DNA evidence is admissible in court. Unfortunately, DNA tests take too long to meet the requirements above.

... THE NPL FEASIBILITY STUDY SHOWS THAT OTHER BIOMETRICS ARE UNRELIABLE

5. Three apparently more practical biometrics are under consideration – facial geometry, iris-prints and fingerprints.
6. The National Physical Laboratory (NPL) were commissioned by the Home Office to study the feasibility of these three biometrics ([NPL 2003](#)). Their terms of reference were to calculate the probability that any of these biometrics could identify a person uniquely in a population of

50m, the likely number of UK ID cards in circulation. Given that UK residents travel abroad and overseas residents visit the UK, it might be argued that the real test is to see whether biometrics can be used to identify a person uniquely in the world population of 6.5bn ([CIA 2006](#)).

7. In email correspondence with us, the NPL have confirmed that they were surprised at their findings when they investigated biometrics for the government's feasibility report. They were surprised how poorly the biometrics performed. So much so that they felt it necessary to include in their report the results of investigations by other organisations, who had recorded even worse performance, so that it would be clear that the NPL's own findings were not freakish exceptions.

8. The NPL's findings were:

- Biometrics based on facial geometry do not work. This conclusion of theirs is unqualified. "Even under relatively good conditions, face recognition fails to approach the required performance", they say, and "facial recognition is not a feasible option". The Commissioner of the Metropolitan Police confirms that biometrics based on facial geometry are unlikely to be useful ([BBC 2005a](#)).
- Unlike facial geometry, irisprints almost never say that Person B is Person A (false positive), but too often they say that Person A is not Person A (false negative) and too often people cannot even register their irisprints in the first place.
- With many reservations, fingerprints might work if at least four and preferably all 10 prints are registered on enrolment into the scheme.

9. Some of these are major reservations. It can be difficult, they say, to register the fingerprints of some sections of the population, among which sections the NPL include "women, East Asians, manual labourers [and] older people," in addition to the obvious problems of people missing fingers and whole hands. Also, people associate being fingerprinted with being a suspected criminal. Further, some fingerprinting equipment can be spoofed with fake fingerprints.

... AND THE NPL'S FINDINGS ARE CONFIRMED BY THE UKPS BIOMETRICS TRIAL

10. In trials conducted on behalf of the United Kingdom Passport Service ([UKPS 2005](#)), facial geometry successfully verified identity a few minutes after registration only 69% of the time for able-bodied people and only 48% of the time for disabled people. Fingerprints verified identity successfully only 80% of the time. Irisprints were successful 96% of the time for able-bodied people and 91% of the time for disabled people, which is better than fingerprints, but only 90% of able-bodied people could be registered in the first place – as far as irisprints are concerned, 10% of able-bodied people do not exist and that figure rises to 39% for disabled people.

11. Suppose that 330 able-bodied people buy tickets for a long haul flight. Using the statistics above, 33 of them will not get as far as the Departures lounge, having been unable to register their irisprints. And what is going to happen at the Arrivals desk? Facial geometry will wrongly require 93 of them to be sent home, fingerprints will wrongly require 60 of them to be sent home and irisprints 12. Up to 198 of the original 330 ticket-holders – 60% of them – will be victims of the registration problems and the false negatives of biometrics. How many false negatives should there be? None. Biometrics are not ready to be relied on.

... THE GOVERNMENT'S SCHEME IS NOT OFFERING FINGERPRINTS IN THE TRADITIONAL SENSE

12. The fingerprinting method chosen for the government scheme will produce prints which are not admissible as evidence in court. These are not the fingerprints the public know and trust after 100 years of experience, rolled prints taken by police experts using ink. The chosen fingerprinting method is arguably no more than a glorified photocopy of people's fingers. These are referred to henceforth as "fingercopies" to distinguish them from fingerprints.

... IT WOULD BE IMPRUDENT AND UNBUSINESSLIKE TO DEPLOY BIOMETRICS NOW

13. The Home Office describe this unacceptable performance as “teething problems”. That is an inordinately lenient judgement and the panglossian response of Mr Tony McNulty MP is not businesslike: “... there are difficulties with the technology ... not least with people with brown eyes ... none of these problems are new, but increasingly as biometrics are more and more used ... we think the technology can only get better and better and better ...” ([BBC 2005b](#)). Given that today’s biometrics cannot verify identity with anything like adequate confidence, the only prudent and businesslike option is to delay any deployment of biometrics until they can be relied on.

14. The government point to widespread public support for the introduction of ID cards. That support exists but the support is based on the assumption that the ID cards will work. If they rely on biometrics, then they will not work and the support will evaporate.

15. The intellectual property rights in the algorithms used by fingerprint and irisprint biometrics are owned by various companies, who will therefore be owed royalties whenever the biometrics are used. It is obviously right to pay these royalties if the biometrics work. It is obviously wrong if they do not.

16. If biometrics are unreliable, then there is no point building and maintaining and staffing a national network of biometric registration centres. There is no need to pay royalties to the suppliers of proprietary biometric technology. And there is one less excuse to take up everybody’s time with interviews which require attendance in person to get a passport.

... THEY DO NOT OFFER CERTAINTY

17. The evidence given by David Blunkett to the Home Affairs Committee suggested that computers could use biometrics to deliver conclusive decisions about identity with mathematical certainty ([HAC 2004](#)). That raises the level of expectations.

18. The Commissioner of the Metropolitan Police has confirmed that biometric identification needs to be “almost perfect” if ID cards are to achieve their objectives. The NPL report reveals that, far from perfection, all that can be delivered is a probability that a given person is who he says he is. The evidence of biometrics trials suggests that this probability is too low to support conclusive decisions. That is the state of the art. Biometrics do not provide the basis for a reliable ID voucher scheme.

19. When biometric equipment at an airport, say, indicates that a passenger’s identity is suspect, that passenger will have to be investigated. There is a limit to how many investigations can be carried out by the given number of staff on duty. The tolerance levels on the biometric equipment will have to be set to suit the number of staff. That is a far cry from the offer of conclusive identification. The level of expectations with respect to biometrics in particular and to ID voucher schemes in general needs to be lowered.

... THEY DO NOT ACT AS A DETERRENT

20. There is a weak argument that biometrics have a deterrent effect even if they do not work ([New Scientist 2002](#)). That is a very expensive bluff with diminishing returns.

... THE ICAO DOES NOT PROVIDE COVER FOR THE INTRODUCTION OF ID CARDS

21. The members of the International Civil Aviation Organization (ICAO), including the UK, have agreed unanimously, in the Berlin Resolution, that all passports should in future include biometrics based on facial geometry ([ICAO 2003](#)).

22. The Berlin Resolution says “ICAO TAG-MRTD/NTWG endorses the use of face recognition as the globally interoperable biometric for machine assisted identity confirmation with machine readable travel documents”. But facial geometry is the least reliable biometric of all. Far from forcing the Home Office, as they suggest, to introduce biometric passports and ID cards, the Berlin Resolution surely needs to be reconsidered.

23. The Berlin Resolution also says: “ICAO TAG-MRTD/NTWG further recognizes that Member States may elect to use fingerprint and/or iris recognition as additional biometric technologies in support of machine assisted identity confirmation”. That is “may elect to”, not “are forced to”.

24. The ICAO list 13 considerations behind their reasoning in favour of the Berlin Resolution, including the following: “facial photographs do not disclose information that the person does not routinely disclose to the general public”; “it does not require new and costly enrolment procedures to be introduced”; and “[facial geometry] can be captured from an endorsed photograph, not requiring the person to be physically present”. If the ICAO believe that, then they cannot mean the same thing by “face recognition as the globally interoperable biometric” as the Home Office and the NPL and UKPS mean.

25. The Home Office are certainly not being forced by the ICAO to introduce an expensive system of compulsory attendance at a national network of 2,000 biometric registration centres ([NPL 2003](#)) where people will have their fingerprints taken like criminals in order to obtain a UK passport. That is their own initiative.

... NOR DO THE OTHER PRECEDENTS APPEALED TO BY THE HOME OFFICE

26. The Home Office has several more of these unconvincing arguments for introducing biometric passports ([Home Office 2005](#)):

- They cite the US-VISIT scheme in the US as a reason for registering everyone’s fingercopies on biometric passports. There is no point, for the US or for the UK, introducing a scheme which will fail to verify the identity of 20% of visitors to the US.
- They cite the EU’s decision to record facial geometry and fingercopies on passports issued by members of the Shengen area. This does not alter the fact that facial geometry and fingercopies are unreliable. Further, the UK is not in the Shengen area.
- They cite the EU decision to move towards introducing the same unreliable biometrics based on facial geometry and fingercopies on residence permits and visas issued to Third Country Nationals. The relevance of this point is unclear. UK citizens are not Third Country Nationals.
- They mention the existing practice in the UK of recording fingerprints on the Application Registration Cards (ARCs) issued to asylum seekers. But these are proper rolled prints, taken by fingerprint experts and admissible as evidence in court, unlike the fingercopies envisaged for UK citizens.

... THE HOME OFFICE MAKES QUESTIONABLE USE OF ITS BUDGET FIGURES

27. The attempt is being made to use these poor precedents as cover for the introduction of ID cards. We have to do so much work anyway to abide by the Berlin Resolution and the other initiatives above that we might as well, it is argued, spend just the little bit extra which is needed for ID cards.

28. This cockeyed reasoning based on marginal costs was used by David Blunkett, when he gave evidence to the Home Affairs Committee, to suggest that the cost of an ID card would be only £4. He went further and argued that the cost of ID cards is tiny if you look at it on an annual

basis. The Home Office's July 2002 budget covered a 13-year period. Of course if you divide any positive number by 13, then you get a smaller number. 13 times smaller.

29. You still have to pay the whole bill and that is rising fast. In July 2002, the Home Office estimated the budget for ID cards, covering three years of development work and the first 10 years of operation, to be between £1.318bn and £3.145bn. Their latest estimate is £5.8bn. The LSE estimate it to be between £10.6bn and £19.2bn, more like £157-£286 per card than £4 per card (LSE 2005).

30. The budget for passports is being confused with the budget for ID cards. One minute the focus is on the whole budget, next it is on the marginal cost. One minute the focus is on the whole budget, next it is on just one year's worth.

31. These tricks with budgets cannot disguise the fact that the NPL's findings and many other reports confirm that biometrics based on fingerprint and iris prints are unreliable and biometrics based on facial geometry are particularly unreliable. That means that biometric passports are unreliable. The Berlin Resolution should be renegotiated. It is a separate case of money being wasted. It does not provide cover for the introduction of ID cards and neither do the other precedents.

... THE FACT THAT OTHER COUNTRIES HAVE DEPLOYED BIOMETRICS DOES NOT MAKE THEM RELIABLE

32. If biometrics are unreliable for passports, then they are unreliable for ID cards. If biometrics are unreliable in the UK, then they are unreliable in the rest of the EU and in the US and everywhere else where they are being considered or being adopted. The argument that other countries are relying on biometrics and therefore the UK has to rely on them does not hold water. This emperor has no clothes.

References

BBC (2005a) *ID Technology must be 'foolproof'* [WWW] Available from: <http://news.bbc.co.uk/1/hi/uk/4095830.stm>

BBC (2005b) *ID cards scheme dubbed 'a farce'* [WWW] Available from: http://news.bbc.co.uk/1/hi/uk_politics/4348942.stm

CIA (2006) *The World Factbook* [WWW] Available from: <http://www.cia.gov/cia/publications/factbook/geos/xx.html>

HAC (2004) *Examination of Witnesses (Questions 608-619)* Home Affairs Committee – Minutes of Evidence, Identity Cards [WWW] Available from: <http://www.publications.parliament.uk/pa/cm200304/cmselect/cmhaff/130/4050402.htm>

Home Office (2002) *Entitlement Cards and Identity Fraud – a Consultation Paper*

Home Office (2005) *Identity Cards Briefing*

ICAO (2003) *Biometrics Deployment of Machine Readable Travel Documents* Version 1.9

LSE (2005) *The Identity Project – an assessment of the UK Identity cards Bill and its implications* The London School of Economics and Political Science

New Scientist (2002) *Face-off* Michael Brooks, Issue 2359

NPL (2003) *Feasibility Study on the Use of Biometrics in an Entitlement Scheme* Version 3 Issued February 2003, National Physical Laboratory

UKPS (2005) *UK Passport Service Biometrics Enrolment Trial Report* May 2005, Atos Origin
