

A person wearing a plaid shirt and blue jeans is shown from the waist down, holding a white document. The document has some text and a small image of a fingerprint. The background is a blurred airport security checkpoint with other people and equipment.

New fingerprint-based drug test helps airport and border control teams combat body packing

White Paper



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Addressing the challenge of airline drug smuggling via body packing

Governments across the world work to stop harmful drugs entering their countries, with border force officials focusing on preventing drugs being smuggled in and reaching the streets. The role of airport security staff is particularly important here, especially as international smuggling gangs frequently use drug mules – often referred to as body packers – to carry illegal drugs inside their bodies on airline flights as a means of avoiding customs detection.

Body packing is an established means of smuggling drugs, first occurring in the early 1970s and becoming more and more prevalent. It's a form of drug smuggling that specifically involves the swallowing or insertion of drug-filled packs inside the body. Primarily involving cocaine or heroin, the process involves considerable risk for the person involved, particularly due to the risk of acute drug toxicity resulting from a pack splitting or drug seepage.

Body packers typically swallow or insert between 50-100 drug-filled packets weighing around 10g each, concealing them in their intestinal tract. Carrying such large quantities of drugs inside their bodies can clearly lead to serious medical problems, including acute drug toxicity as well as complications such as bowel obstruction, bowel perforation and peritonitis. Unless addressed immediately, these conditions can prove either life-threatening or fatal.



Moving quickly to identify body packers at airports

Body packing is a real concern for airport and border control staff – not just because it is a widespread way of smuggling drugs, but also because of the potentially fatal risk of acute drug toxicity it poses to mules – should a drug packet split or seep internally.

For early body packers the process was highly dangerous, largely due to the failure of packing approaches such as condoms, latex gloves and balloons. Drug mule mortality rates were high, however high-quality latex packaging has now significantly reduced the chance of rupture, and increased the challenge for airport customs officials to identify body packers.

While airport and border control staff are trained to look for some of the indicators of body packing that can result from opioid toxicity – such as depressed mental status, lower respiration rates and constricted pupils, these aren't always easy to spot. In reality, intelligence proves a key factor in drug mule identification – ideally potential body packers are highlighted before they even have a chance to board a plane. However, if border control staff have intelligence that a drug mule could be arriving on a particular flight, it's important to have a way of moving quickly to confirm or rule out suspicions before they can pass through border control and enter a country.

Suspected body packers are typically sent to hospital for imaging investigations in order to confirm the presence of drugs in the body. Until now airport customs staff had to rely on traditional body fluid tests such as urine, which typically required specially prepared testing facilities, in order to gather intelligence on whether a passenger might be a drug mule. Urine tests can be costly to administer and take longer to screen potential drug users, making it a complex process for airport staff – and also potentially introducing delays into what could be a critical timeline for body packers.

Introducing a more convenient, fingerprint-based approach towards airport testing for body packers

Now, using the innovative Intelligent Fingerprinting Drug Screening System, simultaneous fingerprint drug testing for multiple drugs of abuse is a reality for airport and border control staff. The test is quick, easy-to-use and non-invasive, providing a hygienic and rapid means of testing body packers for drug toxicity – and giving airport staff rapid insight into whether suspected body packers should be sent to hospital for imaging investigations in order to confirm the presence of drugs in the body.

The Intelligent Fingerprinting system enables customs officials to act on intelligence received on possible body packers, and detect indications of body packing in around ten minutes. This contrasts with traditional body fluid tests such as urine, which usually require specially prepared testing facilities, are

costlier to administer and can take longer to screen potential drug smugglers.

The Intelligent Fingerprinting drug test works by collecting and analysing tiny traces of sweat from suspected body packers' fingerprints to test for the presence of drugs or drug metabolites. The latest test screens for four drug groups simultaneously – opiates, cocaine, methamphetamines and cannabis – providing a simple, non-invasive and hygienic solution that is both quick and easy for everyone involved.

This fingerprint-based approach offers rapid critical early intelligence to customs staff, helping them to not only prevent criminal drug smuggling but also to protect individuals who are often coerced into operating as drug mules.



Successful fingerprint-based testing trials at Italy's Leonardo da Vinci/Fiumicino airport

Early studies confirm that the fingerprint sweat testing approach is particularly applicable for this application as its shorter window of detection can deliver intelligence about whether a potential body packer has been affected by drug toxicity in the period immediately before their arrival at an airport.

Now, in trials of Intelligent Fingerprinting's testing approach conducted at Leonardo da Vinci-Fiumicino Airport in Italy by the Guardia di Finanza (GdF)*, the fingerprint-based drugs test is being used to aid intelligence-led investigations when travellers are suspected of trafficking drugs concealed within body cavities. Positive screening results have been obtained within the trial period using the fingerprint screening technique to test for opiates, cocaine, amphetamines and tetrahydrocannabinol (active ingredient of cannabis).

The trials clearly indicated the presence of drugs in the system of suspected body packers, giving airport and border control staff the rapid insight needed for them to carry out further investigations. In the following example case, a positive fingerprint drug test result led to clear confirmation via an abdominal x-ray which revealed that over 100 drug-filled packets were hidden within the suspect's large intestine.

Case report:

A traveller, identified as a suspected body packer, arrived at Fiumicino airport Italy on a flight from Colombia and was screened twice in succession using the Intelligent Fingerprinting Drug Screening System. On each occasion the test determined a positive outcome for opiates. Abdominal x-rays were then undertaken to investigate for the presence of drugs in the intestinal tract. Fig.1 shows visible evidence of 104 condoms later found to contain heroin.

The subject was arrested and given oral administration of a laxative in order to stimulate excretion. After the first two hours 54 condoms had been recovered. A toxicological analysis of the contents confirmed the presence of heroin. In total, 104 condoms were collected over a 24-hour period, collectively representing over 1kg of heroin with an approximate street value of over \$70,000.

Fortunately, in this case the subject demonstrated no ill effects of the ingested drug packages and recovered quickly. After being arrested, the subject was monitored for a number of days for withdrawal symptoms while remaining in custody pending prosecution.

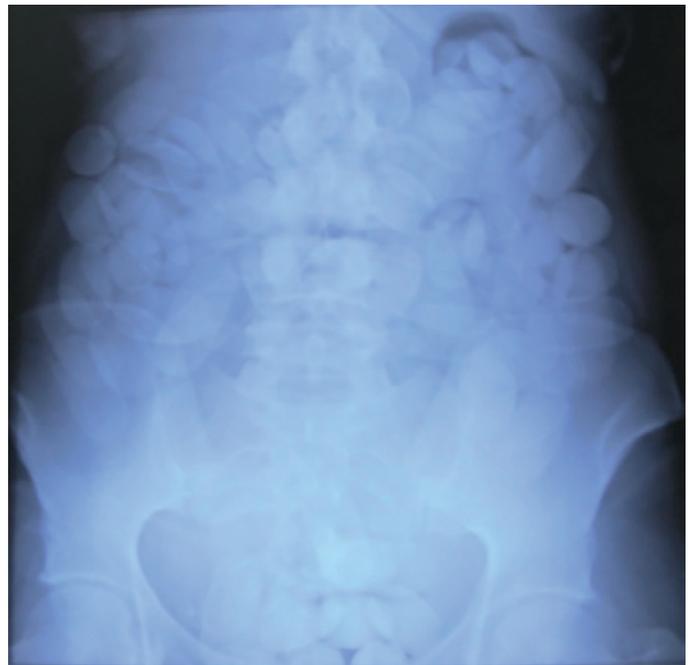


Fig.1 - X-ray image showing visible evidence of 104 condoms hidden inside the body packer, later found to contain heroin.

Fingerprint sample analysis approach and results from the airport trial

The non-invasive nature of fingerprint sample collection, and the rapid screening analysis which determines the likely presence or absence of the tested drugs in 10 minutes, makes Intelligent Fingerprinting highly suited to helping to detect body packers and illicit drug users in airports and other areas of border control.

Fingerprint-based drug screening test trial results

The fingerprint testing method's non-invasive nature fits well with the kind of low impact screening regime required for use in airports. Few other methods of screening provide this level of sensitivity and none can be conducted without inconvenience to the patient.

For this reason, a combination of intelligence, together with positive drug screens using the Intelligent Fingerprinting system carried out on suspects, is sufficient evidence to

justify further investigation, including conducting x-ray investigation of the suspected body packer's abdomen.

Over a trial period a total of 105 fingerprint samples from suspects were analysed using the Intelligent Fingerprinting four-panel drugs screening cartridge and the company's reader instrument. In 12 of these samples, a positive fingerprint screening test was obtained that was subsequently confirmed by x-ray analysis. In 10 cases, where a positive fingerprint sample was obtained and the x-rays were negative, the suspects either confessed to being drug users, or to having recently handled drugs leading to the positive fingerprint screening test. In only four cases was a suspect screened as negative based on the fingerprint test, and then subsequently confirmed to be a body packer. In one interesting case, the suspect confessed to being a body packer prior to taking the fingerprint drug screen.



The Intelligent Fingerprinting Drug Screening System – how it works

The Intelligent Fingerprinting Drug Screening System consists of a small, tamper-evident Drug Screening Cartridge (for sample collection) and the portable DSR-Plus, which reads the Cartridge to provide the drug screening results.

Intelligent Fingerprinting offers several fingerprint-based drug screening tests including:

- DSC 5-Plus Drug Screening Cartridge – detects opiates, methamphetamine, cocaine and cannabis
- DSC 8-Plus Drug Screening Cartridge – detects opiates, methadone, benzodiazepines and buprenorphine

How the fingerprint drug screening test is carried out:

1. First, ten fingerprint sweat samples (one from each finger) are collected onto the Drug Screening Cartridge (Figure 1, Page 9) sample application pad.
2. After sample collection, the tester slides the Cartridge's protective cover across the pad, and it locks into place to protect against tampering or contamination.
3. Next, the Cartridge is activated by depressing the buffer clip. This releases buffer solution into the Cartridge containing reagents that have been configured to detect the presence of drugs (and/or their metabolites) within the collected fingerprint sweat sample. The fingerprints are dissolved during this process.
4. The Cartridge is inserted into the DSR-Plus (Figure 2, Page 9).
5. The tester follows the simple touch-screen instructions and analysis begins.
6. In 10 minutes, the test results are displayed on the DSR-Plus touchscreen, providing a positive or negative indicator for each of the drug groups in the screening panel.
7. The screening results can be printed using a separate portable label printer (available as an accessory) to provide a permanent record. Anonymised details of the sample donor are entered into the DSR-Plus as part of the analysis procedure and this information, along with the time and date, is recorded on the results print-out, which is important where evidence continuity is required.



Figure 1 – Intelligent Fingerprinting Drug Screening Cartridge:

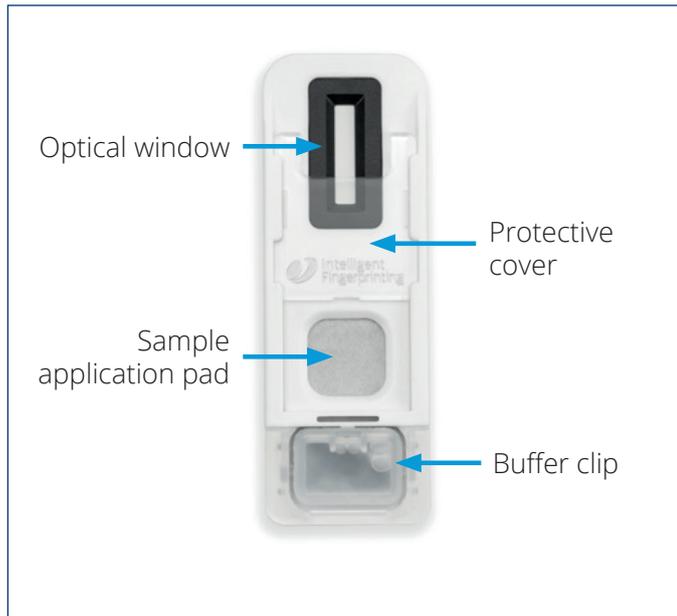


Figure 2 – Intelligent Fingerprinting DSR-Plus:



The Cartridge uses lateral flow assay technology and fluorescence-labelled antibodies to selectively detect specific drugs and drug metabolites in the eccrine sweat collected from fingerprints. Metabolites are chemicals produced by the body's metabolic processes when a substance is ingested or injected. Detection of specific metabolites in body fluids such as fingertip sweat can indicate recent drug use.

The portable DSR-Plus is a highly sensitive, robust and effective fluorescence measurement instrument which is used to read the Cartridge, providing a positive or negative drug screening result for multiple drugs of abuse simultaneously.

Confirming the presence of drugs in a body packer's body

A combination of other intelligence, together with positive drug screens carried out on suspects, is sufficient evidence to justify further investigation, including x-ray of the abdomen. Should a suspected body packer receive a positive screening result for any of the tested drugs, then it is imperative that they are quickly sent to a hospital or medical facility for imaging investigations in order to verify the presence of drugs in the body.

Early studies confirm that the fingerprint sweat drug test, with its shorter window of detection, is a valuable tool to help airport and border control staff in delivering intelligence about a drug mule's body packing at border control. This helps to accelerate the detection and confirmation process, supporting the successful thwarting of illegal drug trafficking as well as protecting drug mules from potentially fatal consequences.

The non-invasive nature of the testing method fits well with the kind of low impact screening regime suitable for use in airports. Few other methods of screening provide this level of sensitivity, and none can be conducted without further inconvenience to the body packing subject. Perhaps as importantly, the use of fingerprint screening used in this way to detect negative subjects using non-invasive means, may avoid the unnecessary x-ray irradiation of suspected body packers who are in fact innocent.

Initial success with the Intelligent Fingerprinting technology trial at Leonardo da Vinci-Fiumicino Airport is leading to further investigation into the wider use of fingerprint-based drug testing within airport and border control environments.

Intelligent Fingerprinting – summary of key benefits for airports and border control

Fingerprint drug testing is easy to implement wherever and whenever it is needed. With the fingerprint method, airport teams can carry out drug testing at a time and place to suit, without advance preparation. A single cartridge is used to screen an individual for multiple substances simultaneously, and within minutes the Intelligent Fingerprinting portable reader provides a negative or positive screening result for each drug in the test. Consequently, airport security and border control teams are quickly alerted to potential body packing cases, allowing them to move quickly towards an x-ray of the abdomen to confirm the presence or absence of drugs.

- **Enabling faster, simpler implementation of airport/border control drug tests** – the latest product provides a rapid means of identifying the presence or absence of cannabis, cocaine, opiates or methamphetamine in suspected body packers – accelerating the time to formal confirmation by x-ray analysis
- **Non-invasive and hygienic approach for airports** - reducing reliance on the invasive collection of potentially biohazardous body-fluid samples, and removing the requirement for specially prepared collection facilities and gender-specific staff to supervise urine sample collection required for traditional tests
- **Enabling frequent drug testing within a busy airport environment** - with feedback indicating that the fingerprint-based solution is easier to use and more convenient than traditional drug testing methods, Intelligent Fingerprinting offers a smart choice for busy border control needs
- **Reduced environmental waste** – unlike conventional plastic urine cup tests which are bulky and typically weigh between 50-100g each, the Intelligent Fingerprinting Drug Screening Cartridge is compact and weighs just 11g, so it is easy to store and transport, making it ideal for airport environments



About Intelligent Fingerprinting

Launched in 2017, Intelligent Fingerprinting's portable Drug Screening System works by analysing fingerprint sweat. It is non-invasive, fast and cost-effective, with sample collection taking seconds and simultaneous screening for multiple drug groups in ten minutes. A laboratory confirmation service is also available.

The system has applications within many sectors and customers include employers in safety-critical industries such as construction, transport and logistics firms, drug treatment and family safeguarding organisations, as well as UK coroners. The company has distributors across the globe, including the USA.

Founded in 2007, Intelligent Fingerprinting is a spin-out company from the University of East Anglia (UEA). The company is based in Cambridge, England and employs around 40 people.



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