Formal experiments are underused in criminal justice. Disposals matter. Are they effective? And how much do they cost for what they deliver? Good intentions are not evidence of effectiveness.\textsuperscript{1,2} The same standards of evidence\textsuperscript{1–9} should apply for judges prescribing a sentence as for doctors prescribing drugs. Given the benefits of good quality research, and the cost of ignoring it, health scientists should advocate for randomised controlled trials in the criminal justice system and confront common objections.

Offenders are also patients, with problems of infection, mental health, and addictions. In dealing with offender patients, judges deserve the same quality of evidence on “what works” as doctors take for granted. There is no methodological or ethical reason why equivalent standards of efficacy and cost effectiveness should not apply in criminal justice. The barriers are cultural and political. Biomedical scientists should raise awareness about the need for formal experiments in sentencing and support their implementation. We should complain about sentencing that is untried and not based on evidence, just as we criticise homeopathic medicine for its lack of evidence base.

As in medicine, interventions in criminal justice (sentencing and case management) aim to reduce harms through minimising reoffending, saving money, or saving lives. When resources are used wastefully\textsuperscript{5} or wrong decisions are made, people suffer, as in medicine. Offenders are harmed through their own actions\textsuperscript{13–16} or through the criminal justice system.\textsuperscript{14–17} Offenders are expensive to incarcerate and expensive to rehabilitate, and, when they reoffend, society bears the cost.

The most commonly raised objections to use of randomised controlled trials in criminal justice concern ethics and practicality. However, trials of biomedical interventions within criminal justice show that barriers to research can be overcome. For example, young offenders in Scotland are participating in a placebo controlled trial of 1000 volunteers to determine whether daily vitamins reduce disruptive behaviour by a quarter.\textsuperscript{18}

Internationally, randomised controlled trials on restorative justice\textsuperscript{2} are setting a new standard that special drugs courts (in which judges not only sentence drug using offenders but regularly review their progress) have sidestepped.\textsuperscript{4}

Commonly posited objections to randomisation at the time of sentencing can be countered.\textsuperscript{4}

Ethics approval is needed for randomisation and follow-up (to find out about recidivism and mortality) but is a wise investment of time if the alternative is that benefits and harms remain unknown. Pilot studies to establish whether an intervention is logistically feasible are not sufficient to determine effectiveness, a different question. The widespread belief that only judges can tailor sentence to offenders is a tenet that can itself be tested by randomisation.\textsuperscript{4}

Major policy questions, pertinent for any jurisdiction, require major science, often needing randomised controlled trial design to assure like with like comparison and that sufficient numbers are randomised to estimate effectiveness precisely. Ethics and practicality are the commonly cited barriers to randomisation, but evidence based practice in criminal justice has been held back mainly by cultural and political barriers and by deficits in training and knowledge.

The battle for good science in criminal justice is still to be won—and doctors can help. Doctors are familiar with the concept of an experimental evidence base. Their treatment failures are not hidden from view—they return as outpatients, are readmitted to hospital, and, sometimes, are looked after until death. For judges, castigating feedback is lacking—reoffenders appear before different courts.\textsuperscript{5} Even mortality data on offenders are unavailable. Both failure and success go largely unseen and, crucially, unmeasured.

Progress in medicine has been hard won. Both Iain Chalmers and Archie Cochrane, two of the pioneers of evidence based medicine, describe past confrontations with senior doctors for whom “empirical evidence” was an intolerable challenge to expertise.\textsuperscript{19} Doctors are thus well placed to work alongside judges to explain why medicines need rigorous testing before they are licensed and that cost effectiveness needs to be appraised to ensure rational prescribing.

If doctors explained the benefits flowing from earlier (and ongoing) randomisation of thousands of patients in multicentre trials, then judges might recognise the value of, and be advocates for, establishing criminal justice trials units\textsuperscript{20} to run the experiments that would answer judges’ questions on sentencing. Infrastructure is desperately needed to generate high quality evidence to help answer important policy questions that confront judges, police, and politicians.

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References are on bmj.com
Inside art

This exhibition of art that exploits the latest radiographic techniques continues a tradition as old as radiography itself, says Arpan K Banerjee

Ars Intrinsica
An exhibition at Deutsches Röntgen Museum, Remscheid, North Rhine-Westphalia, Germany
Until 31 March 2010
www.ars-intrinsica.com; www.roentgenmuseum.de
Rating: ★★★★★

Instead of using paint and brushes to depict life Franz Fellner, an Austrian radiologist at the general hospital in Linz, has used modern investigative radiological tools to create unique images of the human form and of inanimate objects. His exhibition, Ars Intrinsica, shows the inside of the human body in detail. These depictions of the internal organs, the brain, and the body’s vast network of arteries and veins are reminiscent of images from Andreas Vesalius’s great anatomical opus of 1543, De Humanis Corporis Fabrica.

Fellner has used the latest techniques in digital imaging, such as multislice computed tomography and diffusion and tensor weighted magnetic resonance imaging. Modern scanners allow fast, three dimensional visualisation of the internal organs in different planes. The past two decades have seen vast improvements in computing technology, leading to the development of faster and more powerful scanners that enable ever more detailed visualisation.

The images have all been manipulated with computer software. Functional magnetic resonance imaging, which shows activity in different parts of the brain while different tasks are performed, such as listening to music or doing mathematics, has been turned into works of art. Fellner has also created unusual and revealing computed tomography images of musical instruments, including mandolins.

The use of radiographic techniques to create art is almost as old as radiology itself. John Hall-Edwards, the distinguished Birmingham radiologist, published a paper in 1913 entitled “The radiography of flowers” and used x rays to create artistic images of flowers (Arch Röntgen Ray 1914;19:30-1). Film directors have dabbled with radiographic imaging—for example, Roger Corman in his science fiction cult classic film from 1963, X: The Man with the X-Ray Eyes. The film, whose protagonist could see through objects, is notable for its early depiction of radiographic images of bodies and buildings and may have inspired subsequent generations of creators of radiographic art.

In the past decade or so the application of x ray techniques to create works of art has become more widespread, with Nick Veasey’s recent radiographic images of objects coming to mind in particular. Veasey, a photographer, used simple x rays to see through the surface of everyday objects, such as cups and saucers, shoes, and computers, to reveal their inner beauty. This technique pushed the boundaries of photographic art. Leaves and flowers, insects, and fish were displayed as never before.

The district of Lennep in Remscheid in Germany, a city about 20 km east of Düsseldorf, was the birthplace of Wilhelm Conrad Röntgen. It is the home to a museum devoted to the great scientist, whose discovery of x rays in 1895 changed the way medicine was to be practised for ever. Ars Intrinsica (“art from the interior”) is a temporary exhibition that was first shown in Linz, then at the Leopold Museum in Vienna in 2009, and will be at the Deutsches Röntgen Museum until April 2011.

The museum was founded in 1932 in the house where Röntgen was born. Filled with objects from Röntgen’s life and work, including early x ray apparatus, it describes the developments in radiology that occurred throughout the 20th century. The total collection comprises 65 000 items, with a quarter on display. These range from diagnostic and therapeutic equipment to examples of the use of radiographic techniques in applied spheres: analysis of materials, investigation of Egyptian mummies, and even modern security scanning of baggage. Included is Röntgen’s original Nobel prize medal from 1901, the first Nobel prize in physics. Photographs of Röntgen on holiday in Switzerland with his wife reveal the human side of the genius.

It is fitting that Ars Intrinsica is on display at the birthplace of one of the great scientific pioneers of the late 19th and early 20th centuries. A visit would be a pilgrimage for those whose clinical practice has been altered by Röntgen’s discoveries—that is, almost every doctor—but also gives us the opportunity to see a thought provoking exhibition of art.

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**BETWEEN THE LINES  Theodore Dalrymple**

**Tuberculosis and genius**

![Image of Jacobson](image)

There was a time when readers had to cut the pages of the books they bought, and real bibliophiles don’t cut the pages when they find such an old book in the state in which it was sold. To do so seems to them almost sacrilegious, but this is to make of books an object of fetish rather than a tool of culture and intellect.

Besides, there is a satisfaction to be had from cutting the pages with a good knife and an excitement in looking at a page that no one has seen before. I recently experienced these joys with a book published in 1926, *Genius: Some Revaluations*, by the doctor Arthur C Jacobson (1872-1958).

Jacobson was a US doctor who practised in Brooklyn and published his book in 1926, *Genius: Some Revaluations*, by the doctor Arthur C Jacobson (1872-1958). Jacobson goes on to write that the great external midwives of genius, especially in its literary forms, are alcohol and tuberculosis. He does not claim that these two factors are themselves the cause of genius, which is the throw of the genetic dice, but that, for example, “the toxins of tuberculosis have facilitated the creative personalities in many notable instances,” including (in his opinion) Voltaire—to whom it also imparted his characteristic odour, according to Madame Delaunay-Staal, of “an embalmed corpse.”

Jacobson is of the opinion that the spur to creation that tuberculosis gives to the gifted is in some sense a compensation for its depredations on the human race: “In no other disease with equally extensive lesions is the psychical, and consequently the physical, status equally exalted, or we might truly say, exalted at all. Potential indeed must be the driving force which gets power out of a pitiable wreck.”

This is the famous “spes phthisica,” the euphoria of the dying tubercular patients, so well known to opera but not so well known, apparently, to doctors who conducted statistical surveys among dying patients in sanatoriums.

Written at the time of prohibition in the US, Jacobson’s book gives examples of writers in whom the creative impulse was released, though sometimes also destroyed, by alcohol. By prohibition, “Our Kultur has razed the cathedrals of the mind and only the squeak of the field mouse is heard over the ruins of our once mighty temples.”

And he opposed the fashionable eugenics of his time by pointing out how many great men had degenerate or drunken parents; though of course there have been many degenerate or drunken parents who did not raise great men or women.

But it is the decline in tuberculosis that has perhaps had the worst cultural effect. In 1940 Jacobson was quoted in *Time*: “The decline in TB coincides with the decline in creative writing.” There could, of course, be other reasons for our literary impoverishment.

Theodore Dalrymple is a writer and retired doctor

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**MEDICAL CLASSICS**

**One Fish, Two Fish, Blowfish, Blue Fish**

An episode of *The Simpsons*

Fox Television, 1991

As a medical student I was well and truly “Kübler-Rossed,” becoming a follower of the theory of five stages of grief outlined in the 1969 book *On Death and Dying*. It was only some time later that I realised we were at the receiving end of an evangelical zeitgeist wherein conviction seemed to over-rule calmer reflection. Instead of being viewed as an important practical and reflective addition to our ways of considering reactions to serious illness and death, disciples of Elisabeth Kübler-Ross, in their enthusiasm, often allowed the concept to assume the characteristics of dogma. Indeed in 1985 Kübler-Ross expressed regret for having referred to them as stages, because she thought that some people had come to believe that patients should progress through the stages in a step-like manner.

No finer deflation of this inflexibility can be found than in this early episode of *The Simpsons*. Homer eats some deadly fugu fish, and Dr Hibbert informs him that he has only 24 hours to live. In a screamingly funny sequence Dr Hibbert runs through the Kübler-Ross steps—denial, anger, fear, bargaining, and acceptance—in just under 20 seconds, gleefully ignoring every rule of breaking bad news. Dr Hibbert, a wonderful characterisation of cheerful medical callousness in a tradition ranging from Sir Lancelot Spratt, through M.A.S.H., to Dr Kelso in *Scrubs*, also gives him a leaflet, entitled “So You’re Going to Die,” just as he gave the pregnant but unmarried Marge the leaflet “So You’ve Ruined Your Life” in another episode.

The very casualness of the approach, the subtle reordering of the classic five stages, and Dr Hibbert’s unblinking welcoming of Homer’s acceptance are wonderful, consistent with his fantastic political incorrectness in another episode when he refers to Bart’s birth as a Siamese twin. When Lisa remonstrates that they prefer to be called conjoined twins, he replies, “And hillbillies prefer to be called ‘sons of the soil,’ but it ain’t gonna happen!”

Any sensitive soul who fears that such cynical humour undermines the cause of better communication with those who are in serious trouble or dying definitely needs a happy meal. They should in the first instance gain enormous reassurance that the Kübler-Ross concept is sufficiently embedded in popular culture to be mocked in the Simpsons—definitely a case whereby the only thing worse than being talked about is not being talked about.

But they should also take heart in the intelligence and wit of doctors and medical students: the tradition of absorbing and learning from acerbic humour is of long standing, including Shaw’s *Doctor’s Dilemma*, the *Doctor in the House* series, and *House of God*. The many narratives implicit in a doctor-patient interaction include that of the physician with society. Dr Julius Hibbert is now embedded as one of the threads in the backdrop to this dialogue: few will wish to follow in his footsteps, but his grinning presence will be a caution against becoming blasé, cynical, and mechanistic with our patients—and will always raise an inner smile.

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** bmj.com archive**

- Medical Classics: The Doctor’s Dilemma (BMJ 2007;335:263)
- Medical Classics: Doctor in the House (BMJ 2007;334:159)
Bad medicine: cardiology

The only certainty of science is uncertainty. Medicine is often little more than an opinion, a faith system: we believe that what we do is right. This is despite history telling us that what we do now is almost certainly wrong. Our faith has invented words, rituals, elaborate costumes, and a culture of reverence and deference. And, with clinical signs so subtle that you might question their existence, cardiologists are the highest caste of all.

Cardiovascular disease is a killer, and no family is untouched. We have a current construct of accepted risk factors, such as high cholesterol, hypertension, C reactive protein, and chronic kidney disease. This has produced modelling that in turn has seen large numbers of people taking lifelong drugs as a “preventive” measure, and this policy is now encroaching on the young. The market is worth billions of dollars. And the developing world’s rising incidence of vascular disease is a Klondike of commercial opportunity.

But I object. It is not that I doubt that risk modification has some modest effect in patients with established vascular disease. It is not the fact that much of the research is conflicting. It is not the fact that risk assessment modelling scores have not been properly tested prospectively. It is not the fact that the recent doubling in the use of statins has had no effect in the real world.

It is not even that clinicians often don’t bother with the “risk assessment” but simply treat “the numbers” for hypertension and cholesterol. It is not that many people simply don’t understand probability, numbers needed to treat, or the treatment paradox (that those taking drugs never directly benefit). It is not even the fact that illegitimate terms such as “prehypertension” have been coined. Nor is it the international conferences, for which pharma anointed experts receive undisclosed fees and research grants. Nor is it that the research sponsored by the industry is stopped early or that the authors have potential financial conflicts of interest.

Vascular disease is in decline, and the epidemiology is changing, with a near halving in deaths over 20 years. Some of this reduction may be related to better medical care, but there are as yet other unidentified confounding factors at play. These increase the numbers needed to treat and limit the benefit of widespread primary prevention. Nevertheless, there are moves to consider widening treatment to all those aged over 50, a “statins in the water policy.” But what if risk modification policy is wrong? My objection is cardiology’s certainty, because certainty is always bad medicine.

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References are on bmj.com
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Definitely not acceptable

With a dismissive kick a cartoon man in a ridiculous hat sends a small drug capsule flying. Questionable frivolity in a serious medical publication, some might say. But they’d be wrong.

It’s the device used by France’s La Revue Prescrire (and its English language sister Prescrire International) to tag a therapeutic product as “not acceptable”—that is, “without evident benefit but with real or potential disadvantages.” And it’s just the lowest of seven potential ratings. For example, at the other extreme there’s “bravo,” where the man jumps for joy to signal “a major therapeutic advance in an area where previously no treatment was available.”

Generating such views is the lifeblood of independent drug bulletins such as Prescrire, The Medical Letter, the Drug and Therapeutics Bulletin, and many others. For such publications the fence is an uncomfortable place to sit, and a key objective is advising healthcare professionals clearly on whether, or why and how, new treatments should be used in clinical practice.

Such opinions aren’t arrived at easily. In another tradition common among the bulletins, Prescrire’s editorial processes combine extensive mining and scrutiny of data with wide external review and multiple drafting and checking stages. You might not like or agree with what’s said about your favourite drug. You can be sure, though, that it’s something the publication can defend, if necessary.

Such readiness is important, of course, if a drug company chooses to cry foul by taking legal action in response to an unfavourable review. Currently Prescrire is being sued in Paris by the company Astellas in relation to its topical immunosuppressant tacrolimus (Protopic), a treatment licensed for atopic eczema. The publication deemed this drug “not acceptable” as long ago as 2003. It has followed up since with various articles highlighting risks of skin irritation and infection related to treatment and reports of skin cancer in patients taking the drug.

Astellas has taken particular exception to a 2009 article that slammed a regulatory decision to extend the drug’s licence to use in maintenance treatment for eczema. However, Prescrire’s editorial staff are confident about their stance and optimistic about the court’s verdict, which is due later this month.

There’s another reason they deserve to win. Central to the company’s argument is the suggestion that tacrolimus’s licensed status automatically invalidates Prescrire’s views. This lame assault on free speech would be funny if it weren’t so scary, given its implication that we should all either praise or stay stolidly silent about any lousy product that regulators allow to reach or stay on the market. Truly “not acceptable.”

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