

In Britain and other developed countries, disposing of unwanted things is taken for granted. There is (lots of) legislation in place to ensure waste is collected, transported and treated safely without having an impact on either health or the environment. But waste management is a costly business, increasingly seen by organised criminals and opportunists alike as an easy way to make quick money.

Two recent instances of waste crime, in my local area, show how this can happen. In the first, a deserted factory, used for the illegal storage of 5,000 tons of partially treated waste was deliberately set alight. It contained combustible materials, such as plastics and decomposing food. The police investigation looking for the source of the waste, as well as the reason it was set alight, continues.

Illegal waste dumps such as this are becoming an increasing problem, both in open countryside and hidden in rented buildings due to the potential income available from these crimes. Estimates from waste-industry experts put illegal profits from this one operation somewhere between £400,000 to

It harms the environment and poses risks to health, here and abroad

£500,000 for the cost of just two weeks' rental on the building.

This kind of thing appears to be a victimless crime, but it isn't. The building owner in the case of the illegal storage fire (who appears not to have been involved) faces losses. And we are all victims: burning this illegally stored waste has polluting impacts on both local air quality and local water-courses. The incineration of waste is one of the most highly regulated waste management processes, and rightly so.

Fire services managed to control the fire, so estimate that only 10-15 per cent of the waste present was burnt. This leaves the problem of moving what remains to proper treatment facilities – who pays for this? Or the cost of the 65 fire service personnel it took to control the fire?

In the second incident, a large quantity of asbestos was dumped. Asbestos was widely used for insulation, flooring and roofing until it was discovered that it can cause lung conditions, including cancer, asbestosis and pleural disease. It is banned in the UK, but is still present in buildings built before 2000.

How illegal waste became big business

Illicit dumping of rubbish is a lucrative industry attracting organised crime – and affects us all, says **Christine Cole**



Fly-tipped rubbish in Merthyr Tydfil: nationally £200m is spent on clearing such waste GETTY

The removal, transport and disposal of asbestos is highly dangerous, heavily regulated and consequently expensive. This makes it attractive to criminals. Charging high rates for removal and dumping for free generates an easy profit. Again, wider society is the victim: there are serious health implications for anyone coming into contact with this waste, including the people that dumped it.

The bill for clearing this waste

will be paid by council tax-payers. Nationally, clearing fly-tipping costs taxpayers in excess of £200m a year. Clearance of fly-tipping on private land falls to the landowner, be that a private individual or charity such as the Woodland Trust, who report an annual clearance bill in excess of £350,000.

These waste crimes are taking place in plain sight. There are underlying causes to these crimes, which are allowing waste crime to

flourish. Correct, legal waste disposal is expensive, with landfill and incineration charges now around £100 per ton. This is why the profits of these crimes are high.

It seems that the traditional deterrents for these crimes – fines and prison sentences – are not working, or are not tough enough. It is too easy for criminals to obtain documentation that makes their operations appear compliant. For example, waste carrier's registra-

tion and waste exemptions can be easily and quickly obtained online. These make waste operations – on the surface – appear legal.

It is also too easy for criminals to gain access to waste. On a small scale “scrap men” informally remove white goods and other metal objects. They have the implied consent of the householder who leaves unwanted items out. Parts of these items which don't have a resale value are often fly-tipped meaning the householder also, unknowingly, commits a crime themselves. There are more complaints to the local authority about the noise these collectors make with their loudspeaker appeals for “any old iron” than about the removal of items.

On a larger scale, the offer of cheap waste collections can be quite tempting. Waste is removed, the service paid for and then the waste is fly-tipped or stored at illegal, unregulated, waste sites leading to an immediate profit at a cost to us all. Assets of almost £1m have recently been recovered from one such waste crime through the Proceeds of Crime Act.

The Environment Agency and local councils respond to these crimes when they take place. They also work with other agencies, such as HM Revenue and Customs and the Vehicle and Operator Services Agency to “disrupt” waste crime. Householders should make use of local council waste collections and check their local council's website for information on the disposal of larger items.

Across the UK illegal waste management practices are now a multimillion-pound issue, with some serious underlying problems that need to be addressed. Apart from the associated criminality, fly-tipping damages the environment, poses risks to human health here and abroad, undermines legitimate businesses, reduces tax income so others have to pay more, and just looks really ugly. With the potential for easy, high profits, waste crime is joining the ranks of organised crime alongside drugs and human trafficking, cyber crime and child exploitation and this has wider implications for society.

We must remember that many environmental regulations have been put in place as a response to serious incidents and resist the prospect of further deregulation. This may stand to cost us in terms of damage not only to the economy and environment – but also to human and public health.

Christine Cole is a research fellow in architecture, design and the built environment at Nottingham Trent University

Taking the right type of vitamin D

It's vital for bone and muscle health, but vitamin D₃ is twice as effective as D₂ in raising levels of vitamin D in our body. By **Susan Lanham-New**

Most people know that it's important to get enough vitamin D. Among other things, it's vital for bone and muscle health. What people may not know is that there are two types of vitamin D: vitamin D₂ (found in plant-based foods) and vitamin D₃ (found in meat and fish).

The public haven't had to worry about this distinction because nutritional scientists have been telling us for years that both forms of the vitamin are “biologically equivalent”. In other words, a given dose of vitamin D₂ or D₃ will raise blood levels of vitamin D by the same amount. However, our latest study shows that this is not the case.

We have discovered that, compared with vitamin D₂, vitamin D₃ is twice as effective at raising levels of the vitamin in the body, when given at recommended daily doses. This finding means that a lot of health guidelines will need to be rewritten as many claim that the two forms of vitamin D are equivalent.

For our study – which is the largest of its kind so far – we compared vitamin D₂ and vitamin D₃ levels in 335 women over two consecutive winters. We ran the study during the winter months to exclude any effects of sunlight exposure on vitamin D levels. (Sunlight increases the production of vitamin D.)

Participants were randomly allocated to one of five groups. The groups were administered vitamin D₂ or D₃ in juice or a biscuit, or they were given juice and a biscuit that didn't contain vitamin D (the control group). None of the participants knew whether they were receiving vitamin D₂, or D₃ or neither (a placebo). The researchers also didn't know what the participants were receiving – until the end of the study, that is. This is what's known as a “double-blind” study.

Each participant drank a small juice and ate one biscuit every day for 12 weeks. To measure the levels of vitamin D in the participants' bodies, we took blood sample at the beginning of the study, midway through (at six weeks) and at the end of the study (12 weeks). We carefully measured dietary intake of vitamin D and found no differences in any of the five groups. None of the participants were taking vitamin D supplements.

We found that vitamin D levels in women who received vitamin D₃ from juice or a biscuit increased their vitamin



Good day sunshine: People should aim for 15-20 minutes daily exposure to the sun AFF/GETTY

D levels from their baseline measurements by around 75 per cent, whereas those given vitamin D₂ had an average increase in vitamin D levels of around 33 per cent over the course of the 12-week intervention.

The method of giving the supplemental vitamin D – juice or biscuit – didn't make any difference to the outcome, they were both equally effective. This is the first study to directly compare one method of delivering vitamin D with another in the same study design, and it could have relevance for public health and for the food industry.

Participants who were in the placebo group saw their vitamin D levels fall by a quarter. This is as we expected as there is insufficient sunlight in the winter months, and most people don't get enough vitamin D from their diets.

We also found that participants who were given vitamin D₂ had a substantial drop in the levels of vitamin D that your body makes naturally (that is, our vitamin D₃ levels), which suggests that taking vitamin D₂ may actually be harmful to the body in the long run. A large review of studies has shown that vitamin D₂ and vitamin D₃ have different effects on our health.

Vitamin D is an important nutrient for your health. You should aim to get 15 to 20 minutes of sunlight exposure on your skin each day during spring and summer. That doesn't mean you have to strip off. Having 10 per cent of your body exposed (roughly your face, neck, hands and some of your arms), and not wearing sunscreen during this 15 to 20 minutes, is enough. Be careful not to allow your skin to burn during this time.

If you are not able to get outside, or you cover up, then take a vitamin D supplement all year round. And if you are able to go outside in the summer, consider just taking a supplement in the winter, but don't reach for any vitamin D pill at your local pharmacy – look for vitamin D₃. And don't forget to eat plenty of oily fish.

Susan Lanham-New is head of the department of nutritional sciences at the University of Surrey

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Pedants Corner

Jeff Robson



Readers' principal concerns

DRAGON'S WRATH

In a report on the reaction from Scotland and Wales to Theresa May's negotiations with the DUP (“First ministers unite to attack ‘grubby’ deal”, 27 June), we referred to Wales as “the principality”. As Gaynor Jones pointed out, Wales is recognised as a country within the UK and should be described as such.

EARLY BUSES

In a story marking the 50th anniversary of the use of cashpoint machines in Britain we used a picture of Reg Varney making the first withdrawal on 27 June 1967 and said that at the time he was a

huge star in *On the Buses*”. As Derek Smith pointed out, although Varney was indeed a sitcom star, the first episode of *On the Buses* was not broadcast until 1969.

HARRY THE YOUNGER

Several readers have written in response to articles describing Prince Harry as “the youngest son” of Diana, Princess of Wales. As she only had two sons, he should more correctly be referred to as her “younger” son.

BORED DECISION

One of our readers' perennial bugbears has been making a return recently: “bored of”. The OED acknowledges it is becoming “extremely common” but goes on to say it is “not fully accepted in standard English”. We follow the OED in such matters – but would, of course make an exception for *Bored of the Rings*, in my humble opinion one of the funniest books ever written.

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