

Silverman WA, Chalmers I. Casting and drawing lots: a time-honoured way of dealing with uncertainty and for ensuring fairness

Cite as: Silverman WA, Chalmers I (2002). Casting and drawing lots: a time-honoured way of dealing with uncertainty and for ensuring fairness. The James Lind Library (www.jameslindlibrary.org). Accessed Tuesday 20 June 2006
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Author contact details: Iain Chalmers, James Lind Library, Summertown Pavilion, Middle Way, Oxford OX2 7LG, UK. E-mail: ichalmers@jameslindlibrary.org

"The lot causeth disputes to cease, and it decideth between the mighty".

Proverbs 18:18.

Disagreements and uncertainties about which treatments should be used in health care are very common. These uncertainties can be addressed and reduced by casting lots to decide which patients should receive which treatments. This is not a new idea. In 1662, the Flemish physician Van Helmont proposed this approach to settle a dispute he was having with the followers of Galen, who were bleeding and purging their patients ([Van Helmont 1662](#)):

'Let us take out of the hospitals...200 or 500 poor people, that have fevers, pleurisies. Let us divide them into halves, let us cast lots, that one halfe of them may fall to my share, and the other to yours; I will cure them without bloodletting and sensible evacuation; but you do, as ye know...We shall see how many funerals both of us shall have.'



Casting lots (random allocation) of treatments is used not only to ensure that the hoped-for benefits and the unknown risks of inadequately tested treatments are distributed fairly, but also to distribute democratically a treatment that is in short supply. For example, when Britain had a very limited supply of US dollars in the period immediately after the 2nd World War, the country could only afford to purchase a small amount of a promising new drug for treating tuberculosis. Accordingly, random allocation was used to decide which patients with pulmonary tuberculosis should receive some of the limited supply ([MRC 1948a](#)).

Random allocation of treatments is a modern-day example of one of the oldest practices in human history. For thousands of years, when there have been uncertainties and difficulties about choices, human societies have consulted the 'Goddess of Fortune' for guidance in this way. They have used pebbles, nuts, barley-corn, bones, twigs, yarrow stalks (I Ching), polished sticks, cards, coins, and dice. The list could be extended on and on, but the principle is always the same: 'Chance' is envisioned as the working of some impartial power, which makes dice fall in a specific way, or an odd or even number of pebbles jump out of a buffalo horn, or a specific individual draw a certain lot. Whether it is used as a way of revealing divine will, or for ensuring fairness, lottery has always served as a definitive adjudicating engine: it never fails to provide an unequivocal answer.



Casting lots for divination

The Hebrew bible makes a number of references to lots. For example, Jonah declared "Let us cast lots, that we may know for whose cause this evil is upon us"; and the whole book of Esther is the story of Purim, which means 'lots'. Although the masses were forbidden by Jewish law to cast lots for divination – which was the prerogative of the priests – God's authorities on earth were allowed to use lottery devices to guide judgements. Thus the chief priest carried sacred stones inside his breastplate, through which he sensed divine intentions. The stones gave God's answer, determined when the 'Yes' or the 'No' stone was drawn out. King David consulted this oracular medium before going into battle: when the 'Yes' stone appeared, forecasting his victory over the



Philistines, he set off on the warpath.



Although the early fathers of the Christian church were vigorously opposed to divination by lots, sometimes excommunicating those who practised it, this did not stop the Church itself using this method for decision-making. For example, in 782 CE, when the bishops of Poitiers, Autun, and Arras all claimed the body of St. Leger, lots were cast, with the result that the saintly remains were handed over to the Bishop of Poitiers.

Some devout Christians continued to use lottery when faced with some of life's most difficult decisions. Benjamin Franklin records in his autobiography:

'I enquired concerning Moravian marriages, whether the report was true that they were by lot. I was told that lots were used only in particular cases; ...if, for example, it should happen that two or three young women were found to be equally proper for the young man, the lot was then resorted to. I objected, 'If the matches are not made by the mutual choice of the parties, some of them may chance to be very unhappy'. 'And so they may' answered my informer 'if you let the parties decide for themselves.' Which indeed I could not deny.'



When John Wesley, the founder of Methodism, was faced with the problem of choosing a wife, he consulted his friend Mr Delamotte about the woman under consideration.

'... both of us sought God by deep consideration, fasting and prayer...but could not come to any decision. At length we agreed to appeal to the Searcher of Hearts. I accordingly made three lots. In one was writ, "Marry;" in the second "Think not of it this year." After we prayed to God to give us a "perfect lot", Mr. Delamotte drew the third, in which were the words, "Think of it no more." Instead of the agony I had reason to expect, I was enabled to say cheerfully, "Thy will be done." We cast lots again to know whether I ought to converse with her anymore, and the direction I received from God was "Only in the presence of Mr. Delamotte".' (Wesley 4 March 1737, cited in David 1962)

There are many examples of lottery used for divination outside Judeo-Christian monotheism. Not long ago, for example, the Dalai Lama drew lots to choose the name of his successor. Slips of paper bearing the names of candidates were introduced into identical balls of barley meal, and placed in a bowl. The bowl was then rotated until one of the balls 'jumped out', thus identifying the Panchen Lama.



Drawing lots to ensure fairness

1805
GEORGIA LAND
LOTTERY

Whether or not divine intervention is invoked as the mechanism through which the casting of lots leads to decisions, the method has been recognised for millennia as a way of ensuring fairness in deciding difficult matters. Thus, the land of Canaan was distributed among the tribes of Israel by lots ("And ye shall inherit the land by lot according to your families." Numbers 33.54).

Sometimes lots have been used to deal with particularly dire circumstances. When it became apparent in 73 CE that the zealot Jewish soldiers at Masada could not survive, they drew lots to select the ten men who would carry out the mass suicide. The immediate survivors of shipwrecks have also had to take life or death decisions in attempts to ensure that at least some of them would be able to return home alive. These have sometimes been reflected in popular ballads (cited in Simpson 1984).

We ranged through, no food could we get,
Confined there for a long time, nothing for to eat,
Till we cast lots to see who should die,
Which made our ship's crew for sorrow to cry.

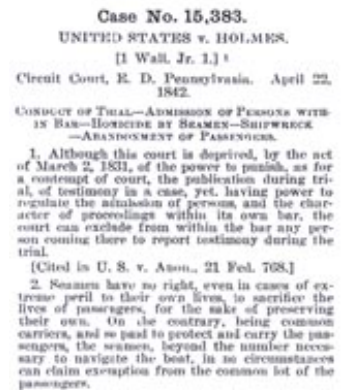


The lots were drawn, one man was to die,
For his wife and poor children most bitterly did cry,
To kill him says the captain, or take away his breath,
But to starve with hunger is a deplorable death.

Then his messmates they killed him and cut off his head,
And all the ship's crew from the body did feed,
And at eight different times lots amongst them were drawn,
For to keep them from starving that's the way they went on.

Popular ballads like this emphasized the legitimacy of drawing lots in circumstances such as these. So also did the opinion of an American judge considering a charge of manslaughter brought against a sailor who had helped to throw fourteen passengers out of an overloaded lifeboat. He argued that:

"there should be consultation, and some mode of selection fixed, by which those in equal relations may have equal chance for their life...When the ship is in no danger of sinking, but all sustenance is exhausted, and a sacrifice of one person is necessary to appease the hunger of others, the selection is by lot. This mode is resorted to as the fairest mode, and, in some sort, as an appeal to God, for selection of the victim... For ourselves, we can conceive of no mode so consonant both to humanity and to justice (*United States v. Holmes 1842*)."



Lots have been used for millennia to ensure fairness in other circumstances concerned with life and death, albeit less dire than those faced by the Jewish zealots at Masada and the starving survivors of shipwrecks. During a prolonged and severe famine in Lydia during the pre-Christian era, for example, the king divided his people into two halves "and cast lots, for the one half that should remain in the homeland and the other that should emigrate." (Herodotus). The Book of Judges (20: 10) records that lots were used to decide which ten men from every hundred in each of the tribes of Israel would be drafted as soldiers.

In more modern times, too, lots have been used to decide who will be drafted into armies. Lots were used to select conscripts when British preparations were being made for an anticipated French invasion of Ireland at the end of the 18th century. They were also used in Austria-Hungary between 1889 and the start of the First World War, in the United States in both World Wars and in the Vietnam War, and in Australia in the Vietnam War.



Lottery versus authority and fallible human judgement

In the past, the results of drawing lots were considered to reflect divine guidance. Today the results are more likely to be regarded as reflecting the play



of chance. Lotteries to decide which citizens shall risk their lives in defence of their countries have been accepted as a fair, democratic solution to a problem of difficult choices. Lots for the 1917 military draft in the United States were drawn in public, in the presence of the President and other dignitaries, by a blindfolded Secretary of State. The words of the US Secretary of the War Department capture its essence:



"This is an occasion of great dignity and some solemnity. It represents the first application of a principle believed by many of us to be thoroughly democratic, equal and fair in selecting soldiers to defend the national honor abroad and at home." (cited in Fienberg 1971)

From solemn to less solemn uses, there are lots of uses of lots to ensure fairness these days. These include issuing limited quotas of immigration visas, distribution of high risk drivers among insurance companies, allocation of student places at medical school, and even assigning dormitory rooms at university.

In the knowledge that human judgements are fallible, lottery is also used to test the validity of opinions. For example, the newspaper of the National Union of Teachers reported that Terry Purser, who runs the Spice Girls sweet shop in Margate, England, and is dyslexic, had passed on his advice to children at exam time:

"I tell them, 'Read the questions carefully, not once, not twice, but four times, and the answers start popping out'. It has worked for my sons... When I was in hospital I told a student nurse about the method and she said that she was delighted that she passed her exams by using it. What I really want is for teachers to test my method by splitting their class randomly and setting half the class questions using my method while the other half answers questions as they would normally".

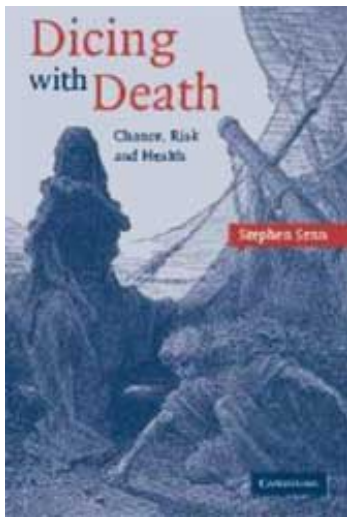


Mr Purser didn't expect others to accept his opinion without good evidence, and had the humility to suggest that the validity of his ideas should be tested formally. He sets an example which many 'authorities' would do well to emulate, for there remains considerable ambivalence about casting lots as a risk-limiting and democratic device for dealing with uncertainty. Some clues to the reasons for this can be discerned in the condemnation of lottery by religious authorities as 'unlawful,' 'sinister,' 'invoking demons and evil spirits,' 'usurpation of God's prerogative'. In fact, the history of lottery for divination is the history of the surrender of decision-making to the control of authorities.

In health care, we suggest that ambivalence about random allocation of treatments in the face of uncertainties about their effects is often because authority rather than evidence is the usual basis for action. As Maimonides, the 12th century Jewish philosopher, said: "Teach thy tongue to say 'I do not know' and thou shalt progress." The dilemma has come to the forefront as medicine struggles to become scientific: a move from belief in authoritative declarations to a critical approach, questioning authority. The impersonal rules of evidence are slowly replacing the voice of respected sages. It is in this transitional period that the outcry is heard against formal 'contests' to choose between proposed treatments. For ages the ailing have turned to 'healers' who professed to know how to bring relief and cures, but patients gave little thought to the gnawing question, 'How do they know?' It is often painful for physicians and others to whom people turn for help to bring up the matter of uncertainty about the effects of their treatments, but this is essential if there is to be efficient progress in sorting out which treatments do more harm than good.



Just as drawing lots challenged the authority of priests in the past, so also random



allocation to decide which patients should receive which among alternative treatments in modern temples of healing often challenges the authority of individual physicians. But when there is uncertainty about the relative merits of the double-edged swords wielded in medicine today, we are wise to employ this ancient technique of decision-making as a fair way of distributing the hoped-for benefits and the unknown risks of inadequately evaluated treatments. And if there is to be progress in this respect, lay people must become more centrally involved with practitioners and researchers in confronting uncertainties about treatment effects, challenging authority and promoting fair ways of comparing alternatives in health care. As Hazel Thornton, founding chair of the Consumers' Advisory Group for Clinical Trials, has noted:

"To make a useful contribution, patients will need to face unpleasant realities; learn to appreciate uncertainty; be educated to understand the dilemmas and problems of clinical research and the dilemmas of obtaining consent; understand the need for trials to evaluate new treatments and assess the value of established ones; demand quality; be aware of the diversity of opinion within the profession and be prepared to work hard to acquire understanding of all aspects of research activity, preferably when they are well, so that they may effectively participate in the shared responsibility and debate (Thornton 1995)".

Acknowledgements

We are grateful to Gene Adcock, Steven Fienberg, Tony Hope, Ted Kaptchuk, James King, Nina Paul, Mark Petticrew and Anthony Petrosino for providing relevant material and for commenting on earlier drafts.

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