

How does your vote count?

PD Welsby

Consultant in Infectious Diseases, Western General Hospital, Edinburgh, Scotland

ABSTRACT It is common knowledge that voting procedures can affect the results of governmental elections. Few realise that voting procedures can affect the outcome of parochial small-scale committee decisions. Various voting procedures are available and the choice of voting procedure may be influenced by the outcome desired.

KEYWORDS Borda, Condorcet, elections, interview committees, voting.

LIST OF ABBREVIATIONS Senior house officer (SHO)

DECLARATION OF INTERESTS No conflict of interests declared.

Correspondence to PD Welsby, Consultant in Infectious Diseases, Western General Hospital, Edinburgh, EH4 2XU

tel. +44 (0)131 537 1000

fax. +44 (0)131 537 2878

e-mail P.Welsby@ed.ac.uk

Most doctors have sat on selection panels and have been surprised when the voting procedure, and not the relative merits of the candidates, seems to be responsible for the outcome. Indeed it is possible for a majority of voters to claim, correctly, that the successful candidate would not have succeeded if compared in isolation against several other candidates. They should not be surprised because voting procedures do influence outcomes.

Most instructions for chairpersons state that there should be a vote but they do not specify the exact voting procedure nor the manner in which the votes should be processed to give a result (notice 'a' and not 'the' result). Seemingly trivial decisions about voting procedures or, perhaps more likely, failure to realise that such decisions have to be made, may be crucial and effect the lives of each candidate. *The stakes are high.*

VOTING SYSTEMS FALL INTO FIVE MAIN VARIETIES

Plurality voting

Voters have one vote to allocate and the candidate getting more 'first place' votes than the rest is the winner. This is the obvious mechanism of selection if there are two candidates: however, in a competitive interview, there may be several 'front-runners' and it is possible that more voters will *not* have voted for the winner than voted *for* the winner. This is more likely the more front-runners there are. Worse, if there are two front-running candidates, each favoured by between a quarter and just less than one third of voters, then the vote may be split, reducing the chances of each of these front-runners and perhaps allowing a candidate not favoured by the divided majority of the voters to be successful. In General Elections for Parliaments the winning party may have obtained less than 50% of the votes which can lead to terrible tragedies. Salvadore Allende was elected in Chile in 1970 with only 36% of

the votes: instability followed which eventually led to a coup and a military dictatorship. Admittedly there were more voters in Chile than on medical appointment panels, but appointing a professor who is the second choice of a majority of voters could have consequences lasting for decades.

Plurality with elimination (Clyde Coombs¹) voting

Successive ranking votes occur and, at each vote, the least strong candidate is eliminated, further discussion can then occur, and the next stage vote taken, and so on until a winner emerges; (candidates who receive no votes are automatically eliminated). The winner is the candidate who first obtains an absolute majority amongst non-eliminated candidates in any of the votes.

A 'run to the end' alternative, which should be decided in advance, is that the elimination process should proceed, even if an absolute majority is achieved, until only one candidate, the winner, remains – this will usually, but not necessarily, be the candidate who had previously achieved an absolute majority. In either case this avoids a middle candidate being appointed when two or more front-runners split the vote, as can occur with plurality alone – under plurality with elimination a split could still occur but only one front-runner could be eliminated by the split.

If there were a large number of candidates (SHO rotation schemes, for example) and relatively few voters then each voter could be given, say, five votes to distribute and, say, the five lowest rankers could be successively eliminated. Importantly, if it is decided that the elimination procedure is run to the end until only one candidate remains, then this will provide bandings of candidates. Plurality with elimination or Borda voting (see below) can also enable banding when groups have to be identified for progressive rewards (for example in discretionary points or merit awards).

Borda² voting

Voters give one point to their first choice, two to the second and so on. Ideally a voter should rank all candidates. The candidate with the lowest total wins.³

Plurality and Borda voting may give different winners. For example with five voters and three candidates:

	Voters	Total	
Candidates A	1 1 1 3 3	9	(who would have won under plurality)
B	2 2 2 1 1	8	(who wins under Borda)
C	3 3 3 2 2	13	

Worse, under Borda, the second or third ranking may affect who is chosen as the winner. For example, in the vote above, candidate B wins. But if the first three voters reversed their second and third placement, thus:

	Voters	Total
Candidates A	1 1 1 3 3	9
B	3 3 3 1 1	11
C	2 2 2 2 2	10

then candidate A wins. Surely the winner should not be selected by the ranking of a candidate who does not win?

Condorcet⁴ voting

Any candidate who wins more head-to-head match-ups with the other candidates is the winner. For example, if there are three candidates, A, B and C, and if voters decide that A beats B, B beats C and A beats C, then A has two victories and wins.

This method avoids tactical voting in which you put your candidate first and falsely downgrade the close competitor(s). Condorcet is useful, firstly, to avoid a middle candidate being the winner as may occur with a plurality vote (on each head-to-head match-up each of 'their' voters can rank their candidates above all others but would have to decide the head-to-head between the front-runners), and secondly if there are candidates with widely varying attributes. A centre candidate should win *if a centre exists*. With Condorcet ideally there should be an odd number of voters to avoid head-to-head ties.

Importantly a Condorcet vote may not give the same winner as would a plurality vote – hence some 'surprise' decisions.

For example a plurality vote, with five voters and three candidates, may result in either A or C winning:

A gets 2 first choice votes
B gets 1 first choice vote
C gets 2 first choice votes

This tie could be solved by either using a chairman's casting vote or by altering the voting system using plurality with elimination, in which B would be excluded and the voter who voted for B would then give his first choice vote to either A or C. In any event, A or C would win.

If a Condorcet head-to-head match-up were used, and if candidate B above were second choice for the four voters (who gave A and C each two first choice votes) then the following would occur:

B against A could win 3:2 (B's original voters remain true and if those who previously voted for C now vote for B).
B against C could win 3:2 (B's original voters remain true and if those who previously voted for A now vote for B).
B has two victories and wins.

However with A against C, A or C could get 3 votes and the other would get 2 votes (depending on whether B's vote went to A or C). In either case A or C would have one victory and one loss and in any event both would have not been successful.

So A or C wins under plurality but B wins under Condorcet! The explanation for the conflicting outcomes is that the voting procedures use different groupings of the total number of voters, and groupings are often wrongly assumed to remain the same under all voting systems.

Either it is acceptable that a non-front-runner candidate succeeds despite and because there is more than one other front-runner (as can occur using plurality), or it is unacceptable and should be avoided by using plurality with elimination or Condorcet procedures.

Opinions may differ as to whether B, or A, or C should have won, but it is obviously vital that appointment committees decide whether they will use one of the forms of plurality or Condorcet at the outset.

However, there are two problems with Condorcet voting. There may not be a Condorcet winner. For example, again with five voters and three candidates:

A against B wins 3-2
B against C wins 3-2
C against A wins 3-2

Each candidate has one victory and one defeat – a draw.

Condorcet voting could be complex to administrate especially if there were many voters or candidates.

Approval voting

This is a modification of plurality voting. Each voter has, say, a total of 100 votes to allocate and gives each candidate a 'usefulness' vote between 100 and 0. One disadvantage is that a voter might allocate all his votes to one candidate, in effect attempting to merge approval with plurality voting.

Surely there must be a system that provides a result with which everyone can consent? Sadly not. Kenneth Arrow's⁵ Impossibility Theorem (1952) reveals that, when there are three or more viable candidates, application of the most commonly used voting procedures will not necessarily produce a consistent result.

In the absence of national guidance, at the commencement of an interview panel the following should be defined.

- 1 Which voting procedures should be applied. This may differ depending *inter alia* on what the vote is for. A leader who will need to have popular support, or a leader who is expected to push through initiatives which will not be popular, or trainees, or someone whose duty is to perform a service?
- 2 The way in which the votes are obtained. (Ideally, simultaneously without discussion or consultation at the time of the vote – with sequential voting the order of voting may influence how those later in the voting order vote.)
- 3 That voters cannot split their vote (voters should not decline to vote for, or rank, one or more candidates, and certainly should not be able to transfer that vote, wholly or partially, to another candidate.)

The chairperson should only vote as a tiebreak if the voting procedure forces this – (the use of an odd number of voters would minimise the need for a chairperson's vote).

IN MY OPINION

Condorcet is the least worst procedure for appointing someone whose duty is to perform a service, a 'centre' candidate.

REFERENCES

- 1 Clyde Coombs. 1912–88. American psychologist.
- 2 Jean-Charles de Borda. 1733–99. French mathematician.
- 3 Alternatively each voter can give the highest number to their

A 'run to the end' plurality vote with elimination, with discussion before each vote until the winner emerges, would be least worst for appointing leaders who needed to have popular support and trainees because;

- 1 it avoids 'lesser' middle candidates succeeding because of split votes for front-runners;
- 2 it avoids non-winning choices affecting who is the winner;
- 3 it is simple;
- 4 it will focus the discussion and decision between the supporters of front-runners;
- 5 the winner evolves;
- 6 the winner will have received a majority of the final vote and the voters could not complain that a non-majority candidate had succeeded and;
- 7 candidates who are wrongly believed to stand no chance of winning, and who therefore would get few, if any, votes, might be revealed to be in with a chance.

Plurality with elimination, with the winning candidate being the one who received a majority vote in *any* of the votes, is the least worst procedure for appointing a leader who would have to push through unpopular initiatives. He could be appointed even though some will have reservations.

Borda voting, possibly with approval, would be the least worst procedure for appointing several candidates from a large field (for example SHO posts on a rotation) or for ranking applicants for progressive rewards.

The aim of a selection panel is to ensure that 'the best person will win'. I believe the present haphazard administration of voting procedures does not encourage this and deserves clarification. Appointment committees which are unfamiliar with the concepts of plurality, plurality with elimination, Condorcet or Borda do not deserve to be voting.

Not everyone will agree with my assessments. Perhaps the issues could be decided with a vote?

favoured candidate and successively decrease the number by one, with the candidate with the highest score winning.

- 4 Marie-Jean-Antoine-Nicolas de Cariat, 1743–94, Marquis de Condorcet.
- 5 Kenneth J Arrow. b 1921 Nobel prize winning Stanford economist.