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## **'Better' clinical decisions do not necessarily require more time to make**

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The web-based intervention modelling experiment (IME; randomised study in a simulated setting) reported by Treweek and colleagues [1] provided support for using IME methodology in the evaluation of interventions to improve quality of care. As well as the management decision made, Treweek and colleagues' data on general practitioners' (GPs) responses to scenarios describing uncomplicated Upper Respiratory Tract infection (URTI) included a measure of perceived decision difficulty for each decision, and the time taken to make each decision. To further inform the development of interventions to improve quality of care, we analysed this data, aiming to quantify the relationships between decision difficulty, decision appropriateness, and the speed at which decisions were made.

Perceived difficulty was measured using a 1 (not at all difficult) to 10 (extremely difficult) scale. As scenarios presented no clear cases for prescribing an antibiotic, decisions were categorised as appropriate (clear decisions to not prescribe) or inappropriate (clear decisions to prescribe; or delayed prescribing; and uncodable decisions). Decision time (the time spent reading the scenario, making a decision, and typing a response) was recorded by the web-based platform. Time data were analysed only where GPs had completed the scenarios in one session. Times longer than 600 seconds (10 minutes) were excluded as outliers. Missing data was excluded. Correlation and logistic regression were used to explore associations.

Eight baseline scenarios completed by 270 GPs, involving 2150 decisions, 2062 difficulty ratings, and 1024 time scores, were analysed. Overall, 65% (1408) of the decisions were appropriate (no prescribing). The mean (SD) difficulty rating was 3.4 (2.1). Time scores were positively skewed: median (IQR) decision time was 69 (75) seconds. Perceived difficulty and decision time were positively correlated (Spearman's  $\rho(984) = .357$ ,  $p < .001$ ) with more difficult decisions taking longer to make. Quicker decisions were more likely to be appropriate (Spearman's  $\rho(1022) = -.408$ ,  $p < .001$ ), and each unit decrease in perceived difficulty was associated with 12% greater odds of an appropriate decision (OR 0.89 CI 0.84 to 0.94; controlling for scenario).

In summary, it was more likely that an appropriate (no prescribing) decision would be made for uncomplicated URTI when perceived decision difficulty was lower and decision time was shorter. This suggests that appropriate decisions can be made quickly using a less effortful cognitive process, and that simply giving GPs more time to make decisions would not necessarily improve the appropriateness of their decisions. Indeed the provision of more time is unlikely to be feasible, given the time constraints inherent in the GP role. Intervention strategies aimed at reducing cognitive effort may therefore be useful. Strategies could be based on fast-and-frugal heuristics paradigms, which involve rapid processing of relatively little information to make a decision [2]. Indeed, researchers have developed such strategies to assist clinicians in decision-making which compare favourably with more complex decision support tools [3]. Strategies which enable GPs to make the best use of their limited time may therefore be an important contribution to interventions to improve quality of care.

MAX 500 WORDS; CURRENT WORD COUNT 477

References

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Permission to access and analyse the data was obtained from the Tayside Research Ethics Committee at the request of the Principal Investigator of the original study (ST).