Heartbeat: An ecosystem approach to clinical decision making

doi:10.1136/heartjnl-2019-315173

Catherine M Otto

Improving the efficiency of healthcare is essential for reducing healthcare costs. Adherence to evidence-based practice guidelines has the potential to improve health outcomes at lower costs but there are many barriers to consistent implementation of guidelines in clinical practice. Manja and colleagues[1] performed a descriptive qualitative study of cardiologists to better understand the major factors influencing clinical decision making including interpersonal interactions, financial incentives and system factors. Major influences in clinical practice ranged from time constraints, patient insurance status, fear of litigation or missing a diagnosis, patient demands, and need to increase personal or practice income (figure 1). Guidelines were less important in decision making and 'some cardiologists expressed a high level of scepticism regarding guidelines.'

In an editorial, Dabbouseh and Bergl[2] point out that in addition to the, perhaps unsurprising, explicit factors affecting decision-making, additional cognitive biases, such as misinterpretation of relative risks also affect clinical practice -- "physicians generally overestimate benefits and underestimate harms for both diagnostic tests and treatments." In addition, clinicians frequently find that guidelines are too lengthy, out-of-touch with clinical practice, unhelpful in complex decisions, frequently updated raising questions about validity, and potentially biased by author conflicts of interest. Going forward, they 'propose changes at every level of the ecosystem to advance high value, evidence-based care as outlined in figure 2. Though idealised and almost naively optimistic, these proposals echo the conclusions of this study: veritable culture transformation is needed if we aspire for clinicians to deliver optimal, efficient and evidence-based care in a way that best helps our patients.'

Current guidelines advocate considering patient preferences and values in decision making. Yet as physicians we often make assumptions about patient preferences and values given the often-limited information available to the patient and time constraints in discussing the diagnostic and therapeutic choices. In this issue of **Heart**, Hansen and colleagues[3] conducted a discrete choice experiment in over 1200 male participants to determine preferences for a hypothetical cardiovascular disease (CVD) screening programme. They found than individuals were able to consider the balance of benefit over risk with clear expressed preferences for higher mortality risk reduction, avoidance of overtreatment, and access to high-tech facilities (table 1).

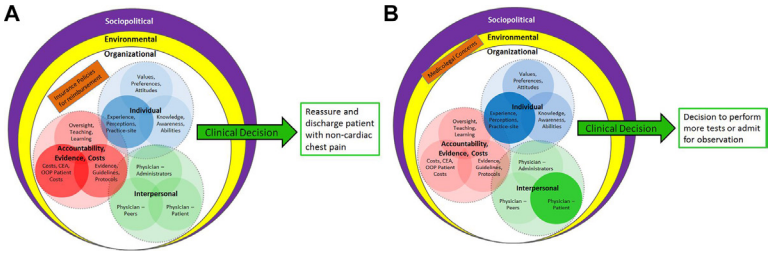

Figure 1 (A) Factors influencing decision to discharge a patient with non-cardiac chest pain. (B) Factors influencing decision to perform further testing or admit for observation in a patient with non-cardiac chest pain.

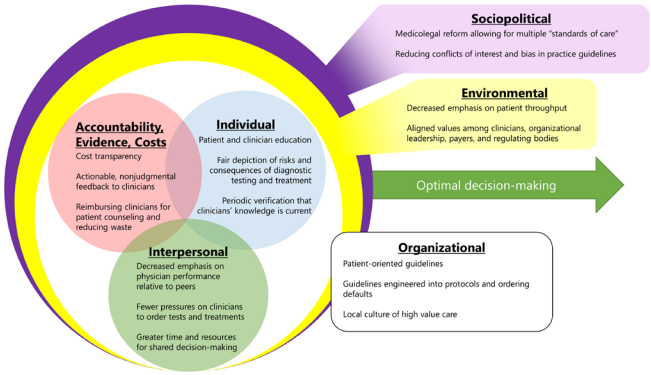

Figure 2 Idealised changes to promote evidence-based clinical decisions within the ecosystem theory framework, as proposed by Manja *et al*

Table 1 Mixed logit model on preferences for screening programme characteristics

Attributes	Coefficient (SE)	SD (SE)
Mortality risk reduction (for each life saved per 1000 screened)	0.53 (0.03)*	NA
Avoid overtreatment (for each additional man per 1000 screened)	0.04 (0.00)*	0.04 (0.00)*
Avoid regret (for each additional man per 1000 screened)	0.00 (0.00)*	0.01 (0.00)
Screening duration (for each additional hour)	0.13 (0.04)*	0.27 (0.11)*
Location (index general practice)		
Hospital	0.64 (0.08)*	0.84 (0.16)*
High-tech hospital with CT	2.74 (0.17) *	2.01 (0.15)*
Log-likelihood =−2253.89 LR $\chi^2(9)$= 324.21 Probability>χ^2= 0.0000		

*Significant at a 5% level.
LR, likelihood ratio; NA, not applicable

Correspondence to Professor Catherine M Otto, Division of Cardiology, University of Washington, Seattle, WA 98195, USA; cmotto@uw.edu

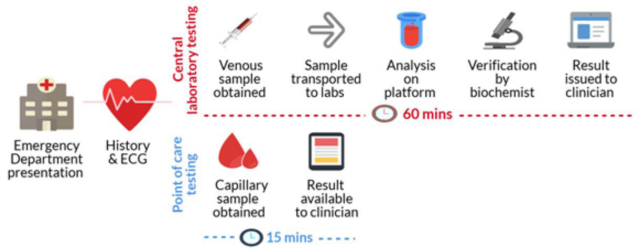

Figure 3 Point of care compared with central laboratory testing for cardiac troponin in patients with suspected acute coronary syndrome.

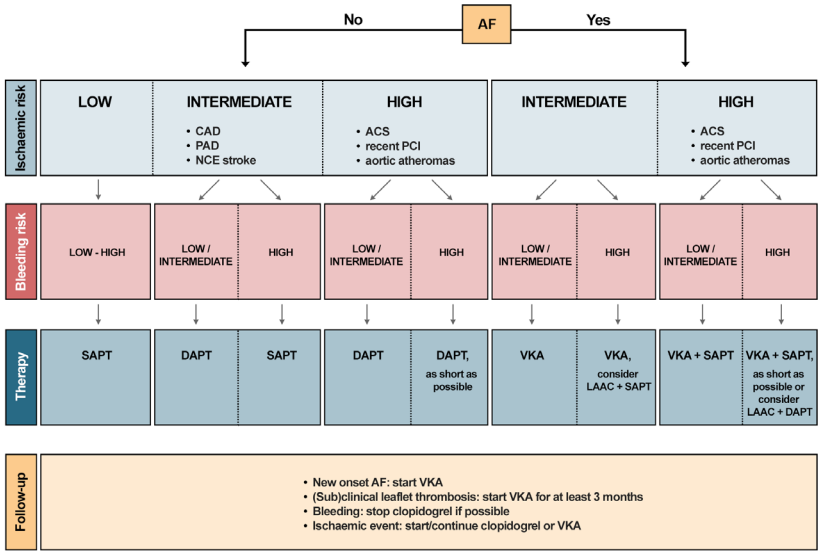

Figure 4 Potential antithrombotic treatment options for prevention of thromboembolism after TAVI. Bleeding risk is estimated using current available risk scores. such as HAS-BLED, and clinical characteristics. AF, atrial fibrillation; ACS, acute coronary syndrome; DAPT, dual antiplatelet therapy; NCE, non-cardioembolic; PCI, percutaneous coronary intervention; SAPT, single antiplatelet therapy; TAVI, transcatheter aortic valve implantation; VKA, vitamin-K antagonist.

Fedson[4] points out that "We most often think of patient autonomy in the context of informed consent or treatment refusal, but it is perhaps even more important in the setting of screening.' CVD screening, in particular, provides patients "with information on their likelihood of developing CVD. Screening programmes for CVD should therefore include the setting of realistic expectations of the results and consider patient preferences. Doing so will help them overcome the inevitable uncertainties that can accompany CVD screening and emphasise the long-term benefits of their participation.'

Other papers in this issue include a study by Body and colleagues[5] showing that the Troponin-only Manchester Acute Coronary Syndromes (T-MACS) decision aid reliably excludes an acute coronary syndrome in about 30% of patients, with no acute coronary syndrome patients missed, and confirms the diagnosis is about 10%. Chapman, Stewart and Mills[6] discuss the strengths and limitations of this study, comparing this approach using a rapid cardiac troponin assay to the conventional approach. (figure 3) They also suggest new avenues of research including prehospital approaches that triage high-risk patients to cardiac centres and low risk patients to general hospitals.

A timely review article in this issue discusses the current approach to anti-thrombotic therapy in patients undergoing transcatheter aortic valve implantation.[7] In addition to summarising their current approach, knowledge gaps and suggestions for future research are highlighted (figure 4).

The ***Education in Heart*** article reviews radiation safety in cardiology, both for the cardiologist with approaches to reduce personal radiation exposure and for the patient with techniques to minimise radiation exposure during cardiac imaging and interventional procedures.(8) The key principles of radiation protection are 'as low as reasonably practicable' for the patient and correct use of personal protective equipment to limit occupational radiation exposure for healthcare providers.

Competing interests None declared.

Patient consent for publication Not required.

Provenance and peer review Commissioned; internally peer reviewed.

To cite Otto CM. *Heart* 2019;**105**:733–734.

Heart 2019;**105**:733–734.
doi:10.1136/heartjnl-2019-315173

REFERENCES

1 Manja V, Guyatt G, You J, *et al*. Qualitative study of cardiologists' perceptions of factors influencing clinical practice decisions. *Heart* 2019;105:749–54.
2 Dabbouseh NM, Bergl PA. Of best intentions and best practices: thinking beyond guidelines. *Heart* 2019;105:735–7.
3 Hansen TB, Lindholt JS, Diederichsen ACP, *et al*. Individual preferences on the balancing of good and harm of cardiovascular disease screening. *Heart* 2019;105:761–7.
4 Fedson S. Discrete choice experiments: an insight into what patients prefer. *Heart* 2019;105:738–9.
5 Body R, Almashali M, Morris N, *et al*. Diagnostic accuracy of the T-MACS decision aid with a contemporary point-of-care troponin assay. *Heart* 2019;105:768–74.
6 Chapman AR, Stewart S, Mills NL. Contemporary point of care cardiac troponin testing in suspected acute coronary syndrome. *Heart* 2019;105:740–1.
7 Nijenhuis VJ, Brouwer J, Søndergaard L, *et al*. Antithrombotic therapy in patients undergoing transcatheter aortic valve implantation. *Heart* 2019;105:742–8.
8 Williams MC, Stewart C, Weir NW, *et al*. Using radiation safely in cardiology: what imagers need to know. *Heart* 2019;105:799–806.