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**Piloting the operationalisation of the construct of medical wisdom to develop a new scale
(MD-WISE)**

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Abstract

Background

In increasingly complex and stressed health environments, medical practice requires more from doctors than just knowledge and skills. Much has been written of wisdom, although there is a striking absence of reflection on its potential occupational application, particularly in medicine. This study aimed to adapt the wisdom construct to the medical professional setting and develop a new scale, the Medical Wisdom Scale (MD-WISE).

Method

We developed a prototype questionnaire based on domains and items from an existing validated tool—the San Diego Wisdom Scale (SD-WISE) (Thomas et al., 2019)—and a Delphi-style consensus process with a diverse range of selected subject matter experts, yielding a 56-item prototype scale. These candidate items mapped to nine putative domains of medical wisdom. The scale was tested on two independent samples of doctors recruited from a large urban health district in Sydney, Australia: Sample 1 completed the 56-item prototype for initial item screening; Sample 2 completed a reduced item set alongside the Authentic Leadership Self-Assessment Questionnaire (ALSAQ) as part of assessing construct validity.

Results

Despite extensive recruitment strategies, Sample 1 data (n=64) precluded explorative factor analysis (EFA) and items were screened using alternative validated qualitative and quantitative approaches to generate a 20-item scale. From the 20-item version tested in Sample 2 (n=174), EFA supported a four-factor structure. Iterative refinement yielded a final 13-item scale (MD-WISE-13) comprising four factors: (i) Clinical Composure, (ii) Insightful and Reflective Practice, (iii) Self and Family Care, (iv) Respect for Patient Autonomy. The 13-item model demonstrated good fit in CFA ($\chi^2 = 66.42$, $p = .003$; CFI = .965; TLI = .950; RMSEA = .066). Furthermore, the final MD-WISE scale demonstrated convergent validity with ALSAQ total scores (Pearson's coefficient $r = 0.53$, $p < 0.001$, 95% Confidence Interval: 0.414-0.630).

Conclusions

We developed a pragmatic Medical Wisdom scale (MD-WISE-13) with a stable four-factor structure and evidence of good construct validity, measuring items that resonate with contemporary medical practice, with potential use for professional development.

I BACKGROUND

We could do with more wisdom in medicine. It is tantalising to consider the potential contribution of wisdom to address “toxic medical cultures” where “unwise”, disrespectful, non-collegial and disruptive behaviours abound (Leape et al., 2012; Moreno-Leal et al., 2022; Peisah, Williams, et al., 2023; Petrovic & Scholl, 2018; Rosenstein, 2002, 2011, 2015; Rosenstein & O'Daniel, 2005; Veltman, 1995). The appeal of the concept of wisdom is further justified by an increasingly holistic view of similar important constructs in medicine, namely leadership, competence and professionalism, beyond knowledge and technical skills (Peisah & Haysom, 2021).

It is recognised that understanding the ancient, higher-order construct of wisdom has important implications for individuals and society alike, because of correlates with a gamut of positive parameters such as well-being, happiness, life satisfaction, personal mastery and resilience (Jeste et al., 2010; Jeste & Vahia, 2008; Thomas et al., 2019). In defining wisdom Thomas et al. (2019) noted its components: (1) general knowledge and social decision making-ability implicit in giving “good advice”; (2) emotional regulation; (3) pro-social behaviours (e.g. empathy, compassion, altruism); (4) self-insight; (5) value relativism (non-judgmental and tolerant of other value systems); and (6) decisiveness.

Clearly, much has been written of wisdom (Baltes et al., 2014; Jeste et al., 2010; Jeste & Vahia, 2008; Staudinger & Glück, 2011; Thomas et al., 2019), although there is a striking absence of reflection on its potential occupational application, particularly in medicine. Yet many of the aforementioned constructs comprising wisdom overlap with many of the aspirational attributes and behaviours associated with strong leadership, ethics, and professionalism in medicine (Thomas et al., 2019). However, it is likely that general wisdom, although overlapping with, is distinct from, occupational wisdom, although this needs testing. In reviewing the measurement of wisdom, Glück (2018) has advocated for the development of wisdom measures with ecological validity and alignment with real-life manifestations of wisdom.

Fostering hope in collective, systemic approaches to medical culture change (McLean, 2013; Peisah & Mclean, 2023), we find intuitive appeal in the potential application of the construct of wisdom, which encompasses social, emotional, cognitive, and behavioural processes, to the contemporary challenges of medical practice. However, adaptation of the concept to the occupational context is required if we wish to use it in the service of professional development. While the plethora of existing wisdom measures might be useful for measuring and enhancing wisdom (Ardelt, 2004; Jeste et al., 2019; Thomas et al., 2019; Webster, 2003), the general focus of many items (e.g. “I have a difficult time keeping friendships”) needs contextualising to the professional context, and a field-specific measure of “medical wisdom” is what is needed.

Finally, given the evidence that generic wisdom can be taught or enhanced (Lee et al., 2020; Treichler et al., 2022), there is reason to hope that professional wisdom, if it can be measured, can be also taught.

This study aimed to: (i) build on current understanding of the construct of wisdom to adapt this to the medical professional setting; and (ii) develop a new scale (MD-WISE) to measure it.

II METHODS

A Setting

The study was conducted online in a large urban public Local Health District (LHD) in Sydney, Australia. A two-phase cross-sectional design was employed using two separate samples of medical professionals. Ethics approval was obtained by the Western Sydney Local Health District Ethics Committee (Project identifier: 2023/PID02163).

B Item Development

We developed a prototype questionnaire based on (i) domains and items from the SD-WISE tool (Thomas et al., 2019); and (ii) a Delphi-style consensus process using multiple consultations with a diverse range of selected subject matter experts (i.e. leadership, psychotherapy, general psychiatry, senior physicians, and other cultures (e.g. Thai Drs) and doctors’ health). In doing so, we identified nine putative domains – some novel, and others based on modified SD-WISE items (Thomas et al., 2019). These putative domains were: (i) Medical decision making-ability implicit in giving “good advice”; (ii) Tolerance of uncertainty/lack of omnipotence; (iii) Value relativism (non-judgmental and tolerant of other value systems); (iv) Humility and openness to feedback; (v) Respect for patient autonomy; (vi) Pro-social behaviours (e.g., empathy, compassion, altruism); (vii) Care of self and family; (viii) Giving back/generativity; and (ix) Emotional regulation and self-insight. This process generated 56 candidate items. The question set was then organised according to psychometric principles of ordering items according to domains while minimising mixing items with positive and negative valences where possible, recognising that respondents don’t easily change their set in responding to an altered response set (Table 1). Questions were rated using a Likert scale from Strongly Agree to Strongly Disagree.

C Participants and Procedure

Participants were recruited via snowball sampling using email invitations sent to all medical staff (junior and senior) within the LHD, offering participation in the study via a link and asking them to forward the email to other doctors (including private practitioners).

Sample 1 was recruited to pilot the 56-item prototype for initial screening and item reduction.

Sample 2 was recruited to complete the reduced item set for psychometric evaluation (EFA/CFA) and validation.

D Measures

Participants rated items on a Likert scale ranging from “Strongly Disagree” to “Strongly Agree”.

Sample 1: Neither demographics nor any other details about the doctor participants were collected to maximise the response to recruitment in Sample 1. Sample 1 completed the prototype-56 item MD-WISE tool. Participant feedback was collected on the questions.

Sample 2 completed a refined 20-item MD-WISE tool. For convergent validity, the Authentic Leadership Self-Assessment Questionnaire (ALSAQ), a 16-item scale representing authentic leadership, comprising three subscales (moral processing, self-awareness and relational transparency) was administered (Panczyk et al., 2019).

E Analytical Methods

Data analysis was conducted using R version 4.5.1. Determining precise sample sizes a priori was not feasible due to workforce constraints, thus recruitment was maximised to achieve robust samples for analysis. Sample 1 data, initially planned for EFA, was instead used to prune items using validated alternative methods: quantitatively (excluding items with high homogeneity/low discrimination) and qualitatively (removing ambiguous or redundant items based on participant feedback) (Kline, 2014). Sample 2 was then used for EFA, and cross-validation for CFA using a 50:50 split sample process reiterated over multiple seeds to confirm model stability. Construct validity was assessed through both convergent and discriminant analyses. To assess convergent validity, Pearson’s correlation coefficient was calculated between the MD-WISE-20 total score and the ALSAQ total score. To assess discriminant validity, we examined the association between MD-WISE-20 total scores and two indicators of professional seniority. Pearson’s correlation coefficient was calculated between MD-WISE-20 total scores and postgraduate years of experience. Spearman’s rank correlation coefficient was calculated between MD-WISE-20 total scores and professional role, the latter assigned a numerical hierarchy from Junior Medical Officer (1) to District Executive (8).

F Missing data handling

All incomplete survey entries were empty logs; there were no partially complete entries, thus they were simply excluded from analysis prior to any statistical procedures. For Sample 1, 80 survey logs were recorded, of which 16 were empty, leaving 64 complete questionnaires. For Sample 2, 235 survey logs were recorded, of which 61 were empty, leaving 174 complete questionnaires.

G Test-retest reliability

Test-retest reliability was deliberately omitted. We expect medical wisdom to be a dynamic, “plastic” construct, given the great situational variability of the broader construct of wisdom (Glück, 2018) and its amenability to change, with an increase both with ageing and teaching using “wisdom interventions” (Daniels et al., 2015; Jeste & LaFee, 2020; Jeste et al., 2019; Lee et al., 2020). Thus, short-term test-retest reliability has limited reference value for this scale. We

purposefully developed the tool assuming its measurement will change over time; albeit this needs empirical testing.

III RESULTS

A Item Reduction (Sample 1)

Despite multiple recruitment rounds and the recruitment strategies, completed questionnaires were returned by a net of 64 respondents (i.e. gross of 80 respondents including 16 empty entries). Due to the small sample size, this sample was deemed not suitable for factor analysis (Mundfrom et al., 2005).

The questions were thus pruned in the following manner:

Quantitatively: 21 items excluded due to failure to differentiate (Supplementary Table 1), eliciting homogeneous responses from participants (Kline, 2014; Zwick & Velicer, 1982) (i.e. all participants, or all except 1 agreed/strongly agreed or disagreed/strongly disagreed)

Qualitatively: 15 items were deleted based on participant feedback (Supplementary Table 2), rated as duplicates of other questions, ambiguous or overly confusing.

This left 20 items to form the 20-item prototype administered to Sample 2 (Table 2), comprising seven reconfigured theoretical domains, aligned to best approximate as many of the original nine domains that had emerged from the Delphi while staying true to the wording of the original item set, namely: (i) Medical decision-making ability; (ii) Emotional regulation and self-insight at work; (iii) Pro-social behaviours (compassion) at work; (iv) Self and family care; (v) Insight and emotional regulation; (vi) Ability to accept feedback, tolerance of uncertainty and lack of omnipotence; (vii) Respect for patient autonomy.

B Factor structure (Sample 2)

Sample 2 comprised 174 participants who completed the 20-item prototype MD-WISE scale paired with the 16-item ALSAQ scale. Demographic details are reported in Table 3. Parallel analysis suggested a four-factor solution, as opposed to the previously proposed nine-domain and seven-domain structures. EFA was conducted for both 4-factor and 5 factor models using oblique ("oblimin") rotation, and items were iteratively removed due to either low communalities (<0.30) or cross-loading.

This process yielded 13 loadable items across four distinct, interpretable factors (Table 4): (i) Clinical Composure, (ii) Insightful and Reflective Practice, (iii) Self and Family Care, (iv) Respect for Patient Autonomy. Model fit was validated with CFA using multiple cross-validation, with a mean RMSEA of 0.067 and TLI of 0.96.

Following Reviewer feedback, Item 7 was reworded from its original form ("When something goes wrong at work I avoid dwelling on it") to "After negative experiences at work I try to avoid excessive rumination while still engaging in learning-oriented reflection," as the original phrasing could be interpreted as discouraging reflective practice. It should be noted that the psychometric analyses reported here, including EFA and CFA, were conducted using the original item wording as administered to Sample 2. The revised wording is presented in the final scale (Table 5).

Notably, two of the four final factors directly corresponded to the original putative domains: Respect for Patient Autonomy, and Self and Family Care. The remaining two factors emerged through merging of related domains: 'Self-Insight' and 'Accepting Feedback' proved to be statistically intertwined rather than separate constructs, merging to form 'Insightful and Reflective Practice', suggesting that internal insight and external feedback-seeking are two sides of the same coin for the "wise" clinician. Similarly, 'Clinical Composure' emerged as a hybrid of Medical Decision-Making and Emotional Regulation.

The conceptual connotation of each factor is as follows. *Clinical Composure* captures the clinician's capacity to maintain emotional equilibrium and clear-headed decision-making under the pressures of clinical practice, encompassing steady decision-making, calmness under pressure, and the ability to avoid excessive rumination after adverse events while still engaging in reflective learning. *Insightful and Reflective Practice* represents the integration of internal self-awareness with external feedback-seeking: attending to one's intuitions when something feels wrong, recognising how personal history shapes clinical judgement, valuing group discussion of patient care, learning from mentors, and the willingness to approach colleagues about potential errors. *Self and Family Care* reflects the clinician's ability to maintain healthy boundaries between professional demands and personal and family wellbeing, recognising that habitually prioritising work over self and family represents a deficit in medical wisdom. *Respect for Patient Autonomy* captures the clinician's commitment to patient self-determination, acknowledging that patients' lives belong to them and that they have the right to make their own healthcare choices, even when these diverge from medical advice.

C Convergent Validity

There was a significant positive correlation between the final MD-WISE total score and the ALSAQ total score (Pearson's coefficient $r = 0.53$, $p < 0.001$, 95% CI: [0.41, 0.63]). This indicates that the scales share approximately 28% of their variance ($r^2 = 0.28$).

D Discriminant Validity

There was no significant correlation between either indicator of professional seniority and MD-WISE-20 total score: postgraduate years (Pearson's $r = 0.125$, 95% CI [-0.024, 0.269], $p = 0.099$), and professional role (Spearman's $\rho = 0.037$, 95% CI [-0.114, 0.195], $p = 0.632$) (Table 4). This supports the discriminant validity of the scale, indicating that medical wisdom as measured by the MD-WISE is not simply a proxy for clinical experience or hierarchical position.

IV DISCUSSION

This study aimed to adapt understanding of the construct of wisdom to the medical professional setting by piloting the operationalisation of the concept of medical wisdom to develop a new 13-item scale (MD-WISE) comprising four factors: (i) Clinical Composure, (ii) Insightful and Reflective Practice, (iii) Self and Family Care, (iv) Respect for Patient Autonomy. As far as we are aware, this study is the first to develop a dedicated Medical Wisdom Scale for clinical settings.

Importantly, the MD-WISE was demonstrated to have strong convergent validity compared with the Authentic Leadership Self-Assessment Questionnaire (ALSAQ). This correlation is not surprising. The defining attributes of authentic leadership include shared decision making, caring, moral/ethical courage, and an internalised moral perspective (Almutairi et al., 2025). The fact that the correlation was not perfectly high (i.e. not >0.70) and the 28% shared variance with 72% unique variance remain positive findings suggestive of distinct construct validity. This indicates that the construct of medical wisdom as measured by the MD-WISE, has elements of authentic leadership, while being a distinct construct. This makes intuitive sense, given that as described earlier, despite their many overlaps, leadership is team- and organisationally driven, while wisdom is an attribute or resource. These findings both validate the construct of medical wisdom while also justifying its utility as a separate and useful construct. At the same time, these findings mandate further validation studies with other constructs beyond leadership, given the likely heterogeneous nature of medical wisdom.

Clearly, the goal of inclusively defining medical wisdom is as elusive as defining what makes a good doctor. Notably, beyond our statistical analysis, combined, the four factors identified here are conceptually coherent and map well with the behaviours and internal resources expected of medical professionals. This lends conceptual, construct validity to the scale. Medical wisdom probably comprises elements of leadership, as well as medical professionalism, medical ethics

and codes of conduct. The four factors that emerged in our final scale (Clinical Composure, Insightful and Reflective Practice, Self and Family Care, Respect for Patient Autonomy) align closely with these core competencies (Almutairi et al., 2025; Epstein & Hundert, 2002; Green et al., 2009; Kirk, 2007; McLachlan et al., 2009; Sawdon et al., 2017; Singh et al., 2024; Van De Camp et al., 2004).

In a recent review, Singh et al (2024) outlined some of the key qualities required to face the unique challenges and high stakes involved in contemporary healthcare environments, the pain points of modern medicine. These included, but were not limited to adaptability, the ability to handle stress, emotional intelligence, adopting an ethical stance and decisiveness. Furthermore, some of the key attributes defining professionalism that have overlap with medical wisdom as defined here, include respect, compassion, integrity, accountability, and commitment to ethical principles (Kirk, 2007).

Including intrapersonal wisdom (Self and Family Care) in a medical wisdom scale is a given in contemporary medical practice where self-care is now acculturated. What is new perhaps, is a focus specifically on clinical composure, insightfulness and reflective practice at work, particularly due to the amenability of these attributes to learning and change, most hearteningly evidenced by studies demonstrating that self-regulation and self-management skills were predictive of health and well-being, and performance enhancement (Bandura, 2005; Jackson-Koku & Grime, 2019). What is novel here is that family care and work-lifestyle balance remained a candidate item for a wisdom scale, yet not surprising given its increasing recognition as important in medical systems (Peisah, Sheppard, et al., 2023).

A Limitations

Firstly, extrapolating from the construct of general wisdom as defined by the SD-WISE (Thomas et al., 2019) and the subjective views of medical professionals regarding “what is a wise doctor?” captured by a Delphi process, regardless of their expertise or the consensus achieved, does not necessarily capture the vast potential descriptors of medical wisdom. For example, a similar concept, professionalism, has 90 different elements, according to a systematic review and qualitative analysis validated by an expert panel (Green et al., 2009). Notwithstanding this, validation of the MD-WISE with a validated authentic leadership scale provides some support for its validity, as does the resonance of many of its factors and items with other important constructs of medical ethics, self and family care, and professionalism.

Secondly, the use of snowball sampling in a single local health district may have conferred selection bias. This potential bias was partly mitigated by the breadth of seniority, professional title, and years of experience represented within Sample 2, although a range of clinical departments was neither purposefully sampled nor collected. Further to the issue of representativeness of the research results, we cannot extrapolate from this Australian public-health sample to the wider medical community. However, nor should we. General wisdom is contextual (Glück, 2018, 2024), rendering medical wisdom to be equally likely to be contextual, such that medical wisdom in one medical setting may not constitute wisdom in another setting.

Thirdly, it is possible that there was response bias due to recruitment, those who agreed to participate being either “wise,” or insightful, “unwise” doctors.

Fourthly, response bias associated with learnt responses and social desirability meant that items measuring important constructs such as generativity (e.g. *Mentoring junior colleagues is important*) were excluded.

Finally, due to sample size constraints in Sample 1, CFA was conducted via cross-validation rather than an independently collected sample, an approach that is acceptable for initial scale development, but future studies should seek a minimum of 10:1 or more participants per item for robust CFA.

The minimum sample size required for factor analysis depends on the number of variables, anticipated number of latent variables, anticipated communality, and—as is often ignored—the

expected response behaviour of the sampling population (Mundfrom et al., 2005). From the outset, we were concerned that the response behaviour of the sampling population would be fiercely difficult to estimate before the fact because: doctors are time poor and the feasibility of recruiting participants to complete a 56-item scale was uncertain; doctors have high levels of social desirability influencing their responses to such value-laden premises; wisdom, and medical wisdom, are abstract and culturally subjective concepts; culture and attitudes to medical wisdom likely differ throughout departments of the hospital, and we could not guarantee which departments would contribute more or less data.

As such, we did not define a minimum sample size before data collection. We instead sought to collect as many samples as possible and assess the appropriateness of factor analysis after the fact. Sample 2 addressed some of these issues.

B Practical implications and future directions

Glück (2018, 2024) talks about wisdom both as a competence and a resource. This is what we wish to harness with this and future research. While neither feasibility nor user-friendliness have been tested, a 13-item tool has theoretical advantages for use with a medical population, but this needs testing. Firstly, future research should seek to replicate this four-factor structure in a sufficiently large, independent cohort. Secondly, regardless of its cross-sectional psychometric properties, it is important to test use of the MD-WISE as a dynamic, action-orientated, practical tool for professional development in doctors. Application scenarios and implementation paths might include using the scale to identify physicians' competency deficiencies and enhancing insight in performance reviews, using the various factors to identify strengths and weaknesses (e.g., identifying relative strengths in Clinical Composure and weaknesses in Self and Family Care). Such insights can be used to guide targeted training programs. As such, medical wisdom might be tested before and after targeted education. Further to this application, this scale might also be used for the admission assessment and graduation evaluation of standardised residency training, to identify deficiencies in dimensions such as reflective practice and self-care and formulate personalised training plans.

Thirdly, future research should also include a longitudinal follow-up study - ideally over different phases of a clinician's career – to examine the dynamic nature of medical wisdom. Finally, the absence of any data regarding departmental distribution in this sample precluded any reflection on the application of the scale in different medical scenarios, which should be addressed in future research.

V CONCLUSION

Notwithstanding this study's limitations, we developed a pragmatic Medical Wisdom scale, measuring items that differentiated responses between doctors about matters that resonate with contemporary medical practice. Most importantly, there is potential to use MD-WISE for professional development, the next phase of our work.

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Tables

Table 1. Original pool of 56 items and their status

Original Domain	Item #	Item	Status*
Medical decision making-ability, collaborative decision-making, giving "good advice"	1	My colleagues at work say I give good advice	H
	2	I enjoy learning things about all branches of medicine	F
	3	I know when to ask for help from others	H
	4	I seek out diverse opinions for tricky patients	H
	5	I approach medical assessment and decisions collaboratively	H
	6	Discussing patient care in a group is helpful	KEP T
	7	I would approach a colleague if I thought an error might be about to be made	KEP T
	8	I would approach a colleague if I thought an error was made	H
	9	I remain calm under work pressure	KEP T
Tolerance of uncertainty/lack of omnipotence	10	I avoid acknowledging mistakes at work	EFA
	11	I have trouble making decisions at work	KEP T
	12	I don't know who to approach if I need help with a clinical problem	EFA
	13	When people come to me for advice at work I don't know what to say	F
	14	I avoid evaluation at work	EFA
	15	I think a doctor should never be weak or vulnerable	H
	16	I fear making mistakes in clinical practice	F
Value relativism (non-judgmental and tolerant of other value systems)	17	There is little I can learn from allied health colleagues	H
	18	Non-medical colleagues do not understand complexities of patient care as well as doctors	EFA
	19	I learn things from my junior colleagues at work	H
Humility and openness to feedback	20	The uncertainty of treatment outcomes is certain	F
	21	All doctors make mistakes	H
	22	When something goes wrong at work I reflect on why	H
	23	When something goes wrong at work I avoid dwelling on it	KEP T
	24	Sharing my clinical dilemmas with colleagues is exposing or embarrassing	EFA
	25	I have learned something from my patients and their families	H
	26	My clinical practice has improved through engagement with medical mentors	KEP T
Respect for patient autonomy	27	The patient's life belongs to the patient	KEP T
	28	I am best placed to determine care plans for my patients	F
	29	Patients have the autonomy to choose what they believe is best for themselves, even if doctors may have a different opinion	KEP T
	30	I approach complex decision making collaboratively with patients	H
Pro-social behaviours (eg, empathy, compassion, altruism)	31	Every patient desires compassion from the healthcare team	F
	32	The healthcare team, including doctors, must provide wholehearted treatment	H
	33	I treat my patients the way I would like to be treated	H
	34	Compassion is less important than knowledge in clinical practice	EFA
	35	I am proud of what I do at work	H
Care of self and family	36	I feel that there should be strong boundaries between work and home	F

	37	I feel that I allow work to intrude on my family life too often	KEP T
	38	I tend to prioritise myself over my work	F
	39	I tend to prioritise my family over my work	F
	40	I tend to prioritise my work over myself	KEP T
	41	I tend to prioritise my work over my family	KEP T
Generativity	42	Mentoring junior colleagues is important	H
	43	Mentoring junior colleagues is a good use of my time	H
Emotional regulation and self-insight	44	I act on my emotions before I am aware of them	F
	45	I remain calm under work pressure	F
	46	I have trouble thinking clearly when I am upset	F
	47	I understand we can all become stressed at work	H
	48	I take time to reflect on my practice	H
	49	I am able to recover well from work stress	EFA
	50	I listen to my feelings if I feel something is wrong at work	KEP T
	51	I take my emotions out on patients and colleagues	H
	52	I suppress my feelings	F
	53	I have to pretend a lot at work	F
	54	Talking to patients makes me feel drained	F
	55	I am aware of my own strengths and weaknesses	H
	56	I am conscious of how my past experiences affect my judgment of particular patients	KEP T

* Status refers to whether an item was kept or why it was removed (H = homogeneous answers in Sample 1, F = feedback from Sample 1, or EFA from Sample 2)

Table 2. MD-WISE 20-Item Scale

Domain (MDW-20)	Item #	Item
Medical decision-making ability	1	I would approach a colleague if I thought an error might be about to be made
	2	I have trouble making decisions at work
Emotional regulation and self-insight at work	3	I remain calm under work pressure
	4	I am able to recover well from work stress
	5	I listen to my feelings if I feel something is wrong at work
	6	I am conscious of how my past experiences affect my judgment of particular patients
	7	When something goes wrong at work I avoid dwelling on it
Pro-social behaviours (compassion) at work	8	Compassion is less important than knowledge in clinical practice
Respect for non-medical colleagues	9	Non-medical colleagues do not understand the complexities of patient care as well as doctors
Ability to accept feedback and tolerance of uncertainty/lack of omnipotence	10	I avoid acknowledging mistakes at work
	11	I avoid evaluation at work
	12	Discussing patient care in a group is helpful
	13	Sharing my clinical dilemmas with colleagues is exposing or embarrassing
	14	I don't know who to approach if I need help with a clinical problem
	15	My clinical practice has improved through engagement with medical mentors
Self and family care	16	I tend to prioritise my work over myself
	17	I tend to prioritise my work over my family
	18	I feel that I allow work to intrude on my family life too often
Respect for patient autonomy	19	The patient's life belongs to the patient
	20	Patients have the autonomy to choose what they believe is best for themselves, even if doctors may have a different opinion

Table 3. Sample 2 Demographics

Role	n	Mean post-graduate years
All Roles	174	Mean = 25.2; SD = 13.3 Range = 1-54
Junior Medical Officer	32	8.9
Fellow	6	16.2
Consultant	93	28.2
Head of Department	17	28.3
Clinical Director	6	31.3
Facility Executive	10	32.0
Network Director	4	34.2
District Executive	1	41.0

Table 4. Discriminant validity: Correlations with professional seniority indicators (post-graduate years and professional role) with MD-WISE 20-Item Scale

Relationship	Coefficient	95% CI	p-value	Interpretation
MD-WISE 20 & PGY (Post-graduate years of experience)	$r = 0.125$	[-0.024, 0.269]	$p = 0.099$	Not significant
MD-WISE 20 & Professional Role	$\rho = 0.037$	[-0.114, 0.195]	$p = 0.632$	Not significant

Table 5. MD-WISE 13-Item Scale

Domain (MDW-13)	Item # (MDW-20)	Item	Scoring (Total = 13)
Clinical composure	2	I have trouble making decisions at work	Yes = 0; No = 1
	3	I remain calm under work pressure	Yes = 1; No = 0
	7	After negative experiences at work I try to avoid excessive rumination while still engaging in learning-oriented reflection*	Yes = 1; No = 0
Insightful and reflective practice	1	I would approach a colleague if I thought an error might be about to be made	Yes = 1; No = 0
	5	I listen to my feelings if I feel something is wrong at work	Yes = 1; No = 0
	6	I am conscious of how my past experiences affect my judgment of particular patients	Yes = 1; No = 0
	12	Discussing patient care in a group is helpful	Yes = 1; No = 0
	15	My clinical practice has improved through engagement with medical mentors	Yes = 1; No = 0
Self and family care	16	I tend to prioritise my work over myself	Yes = 0; No = 1
	17	I tend to prioritise my work over my family	Yes = 0; No = 1
	18	I feel that I allow work to intrude on my family life too often	Yes = 0; No = 1
Respect for patient autonomy	19	The patient's life belongs to the patient	Yes = 1; No = 0
	20	Patients have the autonomy to choose what they believe is best for themselves, even if doctors may have a different opinion	Yes = 1; No = 0

* Revised from original wording ("When something goes wrong at work I avoid dwelling on it")

Supplementary Table 1. Items excluded due to failure to differentiate responses

Item	Nature of homogeneous response
1. My colleagues at work say I give good advice.	Everyone agreed
3. I know when to ask for help from others.	One person disagreed
4. I seek out diverse opinions for tricky patients.	One person disagreed
5. I approach medical assessment and decisions collaboratively.	One person disagreed
8. I would approach a colleague if I thought an error was made.	One person disagreed
15. I think a doctor should never be weak or vulnerable.	Everyone disagreed
17. There is little I can learn from allied health colleagues.	Everyone disagreed
19. I learn things from my junior colleagues at work.	One person disagreed
21. All doctors make mistakes.	One person disagreed
22. When something goes wrong at work I reflect on why.	Everyone agreed
25. I have learned something from my patients and their families.	One person disagreed
30. I approach complex decision making collaboratively with patients.	Everyone agreed
32. The healthcare team, including doctors, must provide wholehearted treatment.	Everyone agreed
33. I treat my patients the way I would like to be treated.	Everyone agreed
35. I am proud of what I do at work.	One person disagreed
42. Mentoring junior colleagues is important.	Everyone agreed
43. Mentoring junior colleagues is a good use of my time.	Everyone agreed
47. I understand we can all become stressed at work.	One person disagreed
48. I take time to reflect on my practice.	One person disagreed
51. I take my emotions out on patients and colleagues.	Everyone disagreed
55. I am aware of my own strengths and weaknesses.	Everyone agreed

Supplementary Table 2. Deletion of items based on participant feedback

Original item	Reason for deletion
2. I enjoy learning things about all branches of medicine	Feedback not useful
13. When people come to me for advice at work I don't know what to say	Ambiguous
16. I fear making mistakes in the workplace	Feedback not useful
20. The uncertainty of treatment outcomes is certain.	Poorly written, the repetition of certain and uncertain is confusing
28. I am best placed to determine care plans for my patients.	Best placed compared with whom ? ambiguous
31. Every patient desires compassion from the healthcare team.	Overly "motherhood"
36. I feel that there should be strong boundaries between work and home.	Theoretical only
38. I tend to prioritise myself over my work.	Duplicate of 40-41
39. I tend to prioritise my family over my work.	Duplicate " "
44. I act on my emotions before I am aware of them.	Not specific to work
45. I remain calm under work pressure	Duplicate of 9
46. I have trouble thinking clearly when I am upset.	Not specific to work
52. I suppress my feelings.	Not specific to work. When do I suppress ?
53. I have to pretend a lot at work.	Pretend about what?
54. Talking to patients makes me feel drained.	Feedback not useful

Figures

Figure 1. PRISMA-Style Item Reduction Flow Diagram for MD-WISE Scale Development

