Understanding and Assessing Medical Engagement: A New Toolkit and 'Killer' Questions You Might Want to Ask Doctors

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APA Citation: Martin, G., Staines, H., & Bushfield, S. (in press). Understanding and Assessing Medical Engagement: A New Toolkit and 'Killer' Questions You Might Want to Ask of Doctors. Journal of Organizational Effectiveness: People and Performance, https://doi.org/10.1108/JOEPP-07-2024-0326%29

Abstract

Purpose
Using theory on institutional logics and identity work, we examine why many doctors disengage from their organisations. We also develop a research-based, practical tool to improve medical engagement and medical leadership.

Method
Drawing on earlier qualitative research with senior doctors, we developed the medical identity toolkit (MIT) and tested it by analysing responses from 268 senior doctors (55% response rate) in a case organisation. Our analysis employed exploratory factor analysis (EFA), binary logistic regression, AUROC on quantitative data and thematic analysis of free text items.

Findings
We found doctors' identity work in response to shifting logics predicted overall levels of medical engagement. Doctors' overall levels of medical engagement also predicted their advocacy of their employer as a good place to build a medical career. An EFA produced four factors with eigenvalues greater than three, explaining 32.4% of the variance. Significant differences in the mean factor scores for the first three factors were found across the MIT tertiles (each $p < 0.001$). Additionally, using binary logistic regression and stepwise selection we developed a medical engagement index (MEI) containing the sum of scores of four questionnaire items. The AUROC for the MEI model was 0.9687 (95% CI: 0.9478 to 0.9896), with a threshold of 13 (sensitivity and specificity of 88.6% and 90.9% respectively).

Originality
The paper enhances our understanding of medical engagement among senior doctors by examining it through the lenses of medical professional identities, identity work and institutional logics.

Practical Implications
The MIT has strong practical implications for medical professionals in the NHS and other countries. It is grounded in the perspectives of doctors and provides immediate feedback for individual and collective reflection on medical engagement and doctor's suitability for medical leadership.

Key words

Medical engagement, medical identity, identity work, healthcare professionals, institutional logics

Introduction

Improving medical engagement is seen by policy makers, senior managers, and healthcare HR professionals in the UK National Health Service and in other western healthcare systems as a key strategy for dealing with the increasing demands, resourcing and productivity problems facing healthcare systems (Barker *et al*., 2018; Dickinson *et al*., 2016; Perriera *et al*., 2019). Improving engagement also has empirical support from West and Dawson (2012), who found that "the more engaged staff members are, the better the outcomes for patients and the organisation generally" (p. 20). Yet, like the human resource management (HRM) and employee engagement literature from which it derives (Alfes, Veld and Furstenberg, 2020; Akingbola *et al*., 2023; Dromey, 2014; Strobel *et al*., 2017; Truss *et al*., 2014), medical engagement can be criticised for being too focused on psychologistic, unitary, and overly optimistic explanations of how people relate to their work (Goddard, 2014; Kaufman, 2020; Purcell, 2014; Siebert *et al*., 2015). It also fails to distinguish conceptually between work or job engagement, for which there is strong empirical support, and organizational engagement, for which there is less support (Guest, 2014). This is particularly so in a medical context, in which doctors express strong attachments to their jobs, clinical teams and profession but much less attachment to their employing organizations (Martin *et al*., 2021).

We argue medical engagement is better conceived as a professional identity and identification problem, rooted in how doctors respond to changing configurations of field-level institutional logics of the healthcare systems in which they are embedded (Barbour and Lammers, 2015; Noordegraff, 2015). Moreover, we propose that what is currently understood as medical engagement can be enabled by helping senior hospital doctors reflect on their professional role identities (Reay *et al*., 2017), and the nature and strength of their identification with their work, colleagues, and employers. To do so, we have developed a new Medical Identity Toolkit (MIT). The toolkit was created and tested during a study of hospital-based consultants (senior doctors) in a large UK health authority. Many of survey items in the toolkit were grounded in our earlier qualitative research into how senior hospital doctors respond to changing institutional logics through their identity work (Authors, date).

We found the MIT to have two important advantages over existing attempts to theorise and assess medical engagement, which have previously focused on doctors' willingness to contribute to the maintenance and enhancement of an organisational agenda (Spurgeon, *et al*., 2008; 2015). Firstly, our identity-based conception of medical engagement has proved to be useful in explaining a key organisational outcome for healthcare leaders and medical professionals. This outcome is senior doctors' advocacy of their employer as a good place to build a medical career, based on the so-called employee net promoter score or eNPS (Sedlak, 2020). Our findings show that the *identity work* senior doctors undertake, combined with more traditional measures of engagement (organisational identification, work and team identification), provide a good explanation of overall levels of medical engagement and the eNPS. Secondly, our research allowed us to develop a five-fold categorisation of senior hospital doctors' response to changing logics. This categorisation provides a nuanced perspective on their enacted work selves and levels of engagement (Bertolotti *et al*., 2022), so assisting

medical leadership teams and medical staff to benefit from evidence-based individual and organisational development.

Medical Engagement: Is it Worth Engaging With?

Inspired by the employee engagement literature developed in business schools (Alfes, *et al*., 2020; Akingbola *et al*., 2023; Dromey, 2014; Strobel *et al*., 2017; Truss *et al*., 2014), medical engagement has been defined as "the active and positive contribution of doctors within their normal working roles to maintaining and enhancing the performance of the organisation …" (Spurgeon *et al*., 2008, p. 200). Such engagement is mostly focused on encouraging doctors to play a more significant role in the leadership of healthcare organisations and participate in healthcare governance on hospital boards (Baker and Goodall, 2021; Howieson, *et al*., 2024; Veronesi *et al*., 2013) because the available evidence suggests that positive outcomes follow, especially in improving the engagement of doctors in organisational change. For instance, one of the most widely used methods of defining and measuring medical engagement in the UK (Spurgeon *et al*., 2015) sees the concept as hierarchical and the aggregation in an overall score comprising three sub-scales: (1) working in a collaborative culture, (2) having purpose and direction, and (3) feeling valued and empowered.

Yet, much of the recent academic evidence on senior doctors' experience of work in healthcare systems such as the UK NHS shows that a significant majority feel disengaged, disillusioned, and deprofessionalised (Martin *et al.*, 2021; Howieson *et al.*, 2024). Thus, in common with employee engagement, the notion of medical engagement can be criticised for being too focused on psychologistic, unitary, and overly optimistic explanations of what such engagement can actually deliver (Goddard, 2014; Guest, 2014; Kaufman, 2020; Purcell, 2014; Siebert *et al*., 2015). Along with others (e.g., Barbour and Lammers, 2015), we suggest that these shortcomings of the medical engagement literature and, indeed the HRM literature more generally, arise because they do not consider how professional identity and doctor's identification with their profession influence their beliefs about their work and professional life, and how these may have changed as a response to broader institutional shifts in the healthcare systems where they work (Currie, 2024; Fletcher *et al*., 2020; Martin *et al*., 2021).

Thus, we seek to re-orient the notion of medical engagement by arguing it should be more strongly grounded in how doctors understand their *professional role identities* in response to changing *institutional logics* in healthcare (Barbour and Lammers, 2015; Obodaru, 2016; Reay *et al*., 2017; Winkler *et al*., 2023) and how they use *identity work* (Bertolli *et al*., 2022; Kreiner *et al*., 2006; Lepisto et a., 2015) to enact their responses. Medical professionalism is largely conceived as a personal and professional identity phenomenon (Cruess *et al*., 2016; Shapiro *et al*., 2015; Stephens and Higgins, 2023). So, we propose that if medical engagement is to be useful as a theory and method of assessing doctors' attitudes and behaviours, it needs to incorporate a sense of how doctors understand, defend, and change their professional identities through their identity work. Thus, our aim is to develop a method that can provide doctors and their leaders with a more theoretically and practically grounded understanding of medical engagement and its outcomes. To this end, we ask: can the identity work which doctors undertake predict their understanding of medical professionalism and engagement with their employers?

Institutional Logics, Medical Professional Identities and Doctors' Identity Work

To build our argument, we briefly discuss the literature on doctors' responses to the challenges and opportunities of changing field-level institutional logics in healthcare through their 'identity work' (Barbour and Lammers, 2015; Reay *et al*., 2017). Identity work is a widely used concept in organisational studies (Brown, 2017). Such a focus, when applied to the analysis of professions, it is sometimes criticised for (a) giving an appearance of identities as stable and coherent phenomenon, (b) existing outside of the power relations that characterise bureaucracies, and (c) having a strong normative flavour. However, professional identity is a complex and dynamic construct that provides a lens for understanding how medical professionals navigate the intricate landscape of their professional roles. Professional identification and the identity work involved in addressing questions like 'who am I', 'who am I not', and 'who do I want to be' are central in understanding doctors' orientations to work (Martin *et al*., 2021). Identification with the profession in particular is central to the development of competent and confident doctors who seek to preserve their traditional autonomous ways of working (Cascon-Pereira, Chillas and Hallier, 2016). Within this scholarly research on medical professional identities, it is widely accepted that doctors' sense of professionalism and claims to expertise are shaped by societal and sector logics (Currie *et al*., 2012; Kirkpatrick *et al*., 2016; Martin *et al*., 2021). These institutional logics have been defined as templates or organising principles guiding actors' interpretations and construction of their material and symbolic realities, emotions, and behaviours (Thornton *et al*., 2012). In the context of relevance to our UK NHS case study, the key features of logics are set out in Table 1 below.

Insert Table 1 about here

Institutional logics, however, are also interpreted and enacted differently by doctors, according to their changing personal and professional identities, and, arguably, to the medical specialties to which they belong (Barbour and Lammers, 2015). This is especially so in healthcare systems such as the NHS, which has seen market, bureaucratic, and, increasingly, state or political logics overlay the traditional medical professional logic, assumed to dominate in healthcare systems before the onset of New Public Management. A traditional medical professional logic is characterised by the expert knowledge of high status, largely autonomous, senior doctors (Fincham and Forbes, 2015; Kirkpatrick *et al*., 2016).

It is widely claimed that doctors have responded to these shifting configurations of logics, either willingly or incidentally, by becoming 'hybrid' professionals, who have reinterpreted, accommodated, and integrated these new logics into their sensemaking and enactment of a new medical professionalism, not only in the UK NHS but also in other European countries such as Spain (Cascon-Pereira *et al*., 2016). This 'reprofessionalisation thesis' is often contrasted with the earlier 'deprofessionalisation' thesis, which holds that doctors have been unwilling to give up their personal and professional identities, and often seek to challenge the system, their employers, and the state on who and how the quality of care is determined (Kyratsis *et al*, 2017; Reay *et al*., 2017).

Research on medical professional identities has been accompanied by studies of how doctors use identity work to claim a role (Bertolotti *et al*., 2022) or respond to and enact opportunities and threats associated with perceived reprofessionalisation or deprofessionalisation. Identity work was originally defined as by Snow and Anderson (1987, p. 14) as 'the range of activities individuals engage in to create, present, and sustain personal identities that are congruent with and supportive of the self-concept'. This definition has been expanded and applied to professional roles by Martin *et al*. (2021) as "the cognitive, affective and social processes and

tactics used by individuals, professional sub-groups and professions to add new identities, retain existing identities, and abandon unwanted identities to form a dynamic and contextually bound professional self-concept" (p. 1482). Thus, doctors when faced with challenges to their autonomy and sense of traditional medical professionalism often draw on *retaining* identity work to maintain continuity with the past. Doctors who see opportunities arising from shifting logics are more likely to use *adding* work by integrating new logics into their sense of medical professionalism or by *letting go* or abandoning previous versions of traditional medical professionalism (Brown, 2015; Lepisto *et al*., 2015).

Underpinning these different forms of identity work are the notions of belonging, attachment, and beliefs associated with what it means to be a medical professional (Barbour and Lammers, 2015). Belonging generally refers to the orientation of their identification, often (over)simplified as the profession or the organisation, as was the case in Goulder's (1957) study on cosmopolitan (professional) and local (organisational) orientations to work. Cosmopolitans drew more on their professions for their values, norms, and beliefs, while locals drew more on their organisation, evidenced by their commitment, intentions to remain, and commitment to organisational-specific roles. Attachment refers to the strength of identification with the category to which they belong, sometimes measured by professionals' commitment to remain in a profession or organisation despite strong inducements to leave. Attachment to remain in medicine was recently tested among doctors is a UK context when pension taxation regulations were seen as penalising doctors' continued employment in the NHS beyond or even well before official retirement age (Authors, date). Premature retirement became the favoured strategy of a majority of senior doctors in response to the pension taxation regime, indicating a declining level of attachment to their employers and, in some cases, their profession.

Research has shown that doctors use different forms of identity work to defend, retain or let go traditional medical identities, or add hybrid identities as new medical professionals (Bertolotti *et al*., 2022; McGivern *et al*., 2015). We propose that doctors' interpretations and answers to the belonging, attachment and belief questions concerning their professional identities, when completing fixed response surveys, can provide a useful indicator of how they self-categorise their sense of what it means to be a medical professional. In turn, we propose doctors' professional self-categorisation predicts key outcomes, such as their advocacy of their organisation as a good place to build a medical career (see Figure 1 below). In short, we argue identity work can be construed as a *variable* to explain doctors' professional identities, and identification with their organisation (Winkler *et al*., 2023).

To answer our research question, we have drawn on the above literature to propose the theoretical framework below.

Insert Figure 1 about here

The above framework was originally conceived as a more complex process framework, grounded in our earlier qualitative research into how senior hospital doctors, mainly but not exclusively consultant-grade, experience their work (Authors, date). This research showed how these doctors' interpretations of shifting institutional logics influenced the nature of their identity work when faced with organisational changes. We found the identity work doctors undertook for, and to, themselves and to, and with, others (Kriener *et al*., 2006) led them to self-categorise as *willing reformers, reluctant reformers*, or *traditionalists*. Such self-categorisation shaped their overall identification with their employers and responses to institutional logic shifts. In the context of our current study of medical engagement and the

development of the MIT, this explanation was particularly relevant in understanding how different categories of doctors would respond to initiatives such as the promotion of medical leadership as a way of inducing and involving doctors into improving organisational performance.

We were also interested in determining whether our version of medical engagement could predict key outcomes, so we used doctors' advocacy of their organisation as a good place to build a medical career as a dependent variable. This so-called 'net promoter score' (eNPS) is a widely accepted measure of employee engagement in the HR literature and often proposed as the 'ultimate single question' in assessing employee engagement in healthcare (Adams *et al*., 2021; Sedlak, 2020). While it does have its critics (Sedlak, 2020), our main justification for using the eNPS is that when people, in this case doctors, recommend their organisation to others, they are putting their own reputation at risk (Akingbola *et al*., 2023).

This simplified variance theory framework poses two different types of identity work used by doctors to reflect their desired selves: one is used by doctors to defend traditional medical professionalism in response to new logics in healthcare; the other is to integrate these new logics in healthcare into a new, hybrid medical professionalism. These different forms of identity work allow us to set out two key propositions regarding the notion and utility of medical engagement, defined here as how consultants self-categorise their professional role identities along a continuum ranging from willing reformers to traditionalists.

> *P1 The nature of doctors' identity work in response to shifting institutional logics will predict overall levels of medical engagement.*
>
> *P2 Doctors' overall levels of medical engagement will predict their advocacy of their employer as a good place to build a medical career.*

Methods

The Medical Identity Toolkit (MIT)

Stage One: The Development and Piloting of the Toolkit. The survey and toolkit have their origins in our earlier in-depth interview research with 68 hospital consultants in 2015 in NHS Scotland, one of the four country-based UK health systems (Authors, date). This research sought to understand their experience of work and what lay beneath these experiences. The findings from this study showed strong feelings of deprofessionalisation among a significant majority of consultants, a lack of voice in decision-making, and antipathy towards their own clinical and non-clinical leaders as a consequence of shifting institutional logics taking place in the NHS. However, a minority of consultants, roughly 30%, were more receptive to these changes in logics and often critical of colleagues who had not 'moved with the times'.

Based on these findings, we designed a new survey tool in 2018 for use with individual healthcare organisations that sought an in-depth understanding of medical engagement and medical leadership in relation to shifting institutional logics. This survey tool was largely based on the types of statements, opinions, and sentiments consultants had shared with us during our previous qualitative research outlined in the previous paragraph, which we turned into 37 Likert scale items. Examples of these items - supplemented by existing scales on relational coordination (as a measure of workgroup engagement), trust in leadership, organisational

identification (as a measure of organisational engagement) and identity motives – can be found in Supplementary Table 1.

Our new survey tool was piloted in an exploratory study in 2018-19 with 88 psychiatric consultants in a large mental health trust in England. The findings were extensively discussed with the Trust's consultants and used to generate an in-depth analysis of medical leadership and engagement. This process provided partial validation of the toolkit as a measure of overall medical engagement. Feedback from participants showed that the survey had greater acceptability than the standard NHS employee survey because the questions were grounded in the language doctors use to express their sense of belonging, attachment, and beliefs, so providing a more acceptable basis for organisational development.

Stage Two: Applying the Toolkit. The opportunity to revise and test what we began to refer to as the MIT arose in the summer of 2020 with a Scottish regional health board (the "Board") employing just less than a thousand consultants and resident doctors. At the beginning of this project, we undertook further development of the MIT with a group of 12 consultants who were part of the Board's medical leadership team. Following this pilot exercise, the new survey of 53 5-point Likert scale items and two free text questions was launched in June 2020 during Covid-19 on the population of 488 consultants employed by the Board. Our response rate of 55% (n=268) was about average for surveys published in leading management journals (Holtom *et al*., 2022) and thus acceptable for theory generation and testing.

However, we also acknowledge the limitations of this sample. First, it is based on senior doctors only, whose attachment to a more traditional notion of medical professionalism may be different from their more junior colleagues who have been socialised into a hybrid healthcare system from the beginning of their training (Authors, date). Second, it is restricted to a UK, NHS-based case, which may make it less generalisable to other healthcare systems that are more market driven. Third, like most surveys, it may suffer from non-response bias, e.g., senior doctors, less affected directly by medical leadership and engagement issues, may have chosen not to participate.

Table 2 below provides the socio-demographic characteristics of the respondent consultant doctors.

Insert Table 2 about here

The practical aim of this study, as defined by the Board's medical leadership team, was to evaluate a new approach to leadership and engagement adopted by the Board in 2018. This involved a move from the traditional hierarchical model to one focused on leadership by clinicians and the greater engagement of doctors in the work of the Board. The initiative was branded internally as a 'clinically led and managerially enabled' model. The findings, however, were not only intended to evaluate this approach, but also to provide an evidence-base for individual and organisational development. Consequently, we sought to develop a way of providing immediate confidential feedback to individual doctors in the form of their medical engagement 'score'. To establish this score, we took out the dichotomised dependent variable (eNPS) and removed the six identity motive measures. The engagement score comprised the complete data for the remaining 46 Likert scale items (with reversed scoring where necessary) using the 'quiz' facility in the data analysis software package. Doctors' overall quiz scores, together with the feedback, were a summative assessment of medical engagement for consultants undertaking the survey from which we developed a basis for professional identity

self-categorisation (see Table 3). Our intention was that this self-categorisation could then be used for individual self-reflection and comparison with consultant colleagues in the Board for appraisal terms and for collective reflection for team and organisational development purposes. To that end, we also wanted to know if a smaller number of items in the survey could be used as an easier, more practical approach to measuring medical engagement.

Insert Table 3 about here

Statistical methods

The 46 Likert type scales used in the quiz were reversed as necessary from the original coded values of 1 (strongly agree) to 5 (strongly disagree). These were summed to derive the quiz score provided there were no missing items. The Anderson-Darling test was used to determine if data (e.g., quiz scores) were consistent with a normal distribution. The mean and standard deviation were found for approximately normally distributed continuous variables. Frequencies and percentages were calculated for categorical variables. Clopper-Pearson exact confidence intervals were calculated for binary endpoints.

Exploratory factor analysis was conducted using principal components on the correlation matrix of all the Likert scale items using their original coded values. Varimax rotation and displaying only those items with factor loadings of magnitude > 0.5 was used to aid interpretability. Fourteen factors satisfied Kaiser's rule (eigenvalue >1) but factor 5 had three and factors 6 to14 two items with factor loadings of magnitude > 0.5. This together with a visual inspection of the scree plot suggested the retention of the first four factors. Each of the retained factors have eigenvalue > 3 and at least 5 items with loadings of magnitude > 0.5 (see Table 4). Factor scores were derived for later analyses.

One way analysis of variance (ANOVA) with type III sums of squares was used to test for significant differences in the mean of a continuous endpoint (e.g., a factor score) across the levels of a single categorical variable (e.g., quiz score tertile).

Binary logistic regression was used to determine endpoints that predict the levels of a single binary categorical variable. The best subsets of potential independent variables in the model were selected using a stepwise algorithm with p-values for entering and remaining in the model set to 0.05 and 0.10 respectively. The goodness of fit of a model was assessed using the area under the received operating curve (AUROC), which is widely used in clinical trials to illustrate the diagnostic ability of tests. AUROCs for different models are compared using De Long's test. The Youden threshold, which maximises the sum of sensitivity and specificity, was used to determine the threshold of indices of the MEI.

No adjustment was made for multiplicity. Statistical analyses were done with SAS version 9.4.

Results

The exploratory factor analysis produced four factors with eigenvalues greater than three, cumulatively explaining 32.4% of the variance (Table 4).

These factors were interpreted as: (1) how consultants used identity work to delegitimise new hybrid logics and (2) how consultants used identity work to legitimise; (3) relational coordination within clinical teams; and (4) consultants' identity motives hybrid logics. These four dimensions comprised 27 survey items.

Insert Table 4 here

The Usefulness of the Quiz Element in Identifying Distinct Categories for Feedback

Quiz score tertiles of approximately 85 respondents each were derived. Significant differences amongst these categories were found for the first three factors that arose from the EFA (each $p < 0.01$). These analyses tentatively suggested three categories of consultants. However, we use the term category advisedly as it implies a class of identity responses over which a high degree of consensus exists among a particular audience. Although we believe our categorisation reflects such commonalities and difference, they are no more than statistical artefacts, intended to be rough guides to numbers in each group and where significant breaks between categories occur. We labelled these three core categories 'willing reformers', 'reluctant reformers' and 'traditionalists'.

These findings allowed us to provide a better estimate of how consultants might self-assess their scores. As predicted, scores were consistent with a normal distribution ($A^2 = 0.547$; $p = 0.164$). The 254 valid quiz scores ranged from 75 points (32.6% of the theoretical maximum) to 198 points (86.1% of the theoretical maximum), with a mean of 136.6 points and a standard deviation of 20.6. Our further consideration of the data, however, suggested refining and splitting the first and third tertiles. Within the traditionalist category respondents those respondents with a quiz score of less than the mean minus one standard deviation were defined as '*disengaged*'. Within the willing reformer category respondents those with a quiz score of at least the mean plus one standard deviation were defined as '*willing transformers'*.

To explain further, the 33 (13.0%) consultants scoring less than 116 (mean minus one standard deviation) at the 'traditionalist' end of the spectrum were characterised by identity work suggesting strong 'deprofessionalisation' and disengagement from the Board and their clinical leaders. The following free-text quote from one of these consultants expressed disengagement in nearly all its forms:

"I *have never felt so disempowered or undervalued by an organisation. The impression that I am given by clinical managers is that I am simply a resource available to do the work that the organisation wants me to deliver, regardless of my interests or specialist skills. My opinion is not sought about organisational challenges: rather, rules, processes* and *procedures are imposed 'from on high'. Every day, in some way, I am reminded how little I mean to the organisation: this despite the enormous efforts made by many over the previous three months (of COVID)".*

Conversely, the 35 (13.8%) respondents scoring at least 158 (mean plus one standard deviation) are defined as willing 'transformers' who saw their calling as linked to their ability to impact on system-wide transformation (see Table 2 below). They were also highly positive about the relationship between clinical and non-clinical leaders, as the quote from free text comments below illustrates:

"*The environment* and *relationship between medical staff* and *non-medical managers is the best it has been in 20 years with respect given* and *taken by both groups of professionals".*

Transformers' views on the issues discussed above suggest an identity as knowledge brokers who see the opportunity for health and social care improvement as closely bound up with

leadership and management identities and ideologies.

Table 3 sets out the final five categories, their characteristics and quiz score ranges. These were used as the basis for built-in feedback to individual consultants from the survey questionnaire, depending on their scores.

Proposition 1 Predicting the Overall Medical Engagement Quiz Score from Doctors' Identity Work in Response for Shifting Institutional Logics

To help validate our toolkit, we sought to ascertain which items and factors from an initial exploratory factor analysis of the survey data were good predictors of the overall quiz scores, which we treat as a measure of *overall medical engagement*. We reasoned this process would not only allow us to reduce the numbers of questions to be used in a revised toolkit but also to focus our analysis on those key factors that explained overall medical engagement and our categorisation of consultants. Thus, respondents were dichotomised using a threshold of 158 (willing transformers, yes or no). Our reasoning here was that consultants scoring above the threshold were more likely to be able to value or at least cope with bureaucratic, market, and statist/political logics, while those scoring below it would be more likely to see these new logics as a threat to their traditional medical professional identities. A set of univariate binary logistic regression models showed that first two factors, derived from our exploratory factor analysis, provided high AUROCs (0.905 and 0.691 for factors 1 and 2 respectively; each $p < 0.01$).

The key survey items were found by fitting a binary logistic regression model containing questionnaire items from the first factor to predict respondents with a quiz score of at least 158. Four items from the first factor were found using stepwise selection. The same approach was taken using the items (excluding the eNPS item) from the first two factors. This resulted in an additional item being selected. The AUROC from the model using the sum of the four items was 0.9687 (95% confidence interval (0.9478 to 0.9896). Using the sum of the five items did not change the AUROC significantly (De Long's test; $p = 0.5416$). Hence, the model containing the four key survey items (which we label as the medical engagement predictors) was selected for further analyses. The sensitivity and specificity using the Youden threshold of 13 for the sum of the four items were 88.6% and 90.9% respectively to predict a total quiz score of at least 158. These values would normally be regarded as prediction with high sensitivity and specificity (Bateson *et al*., 2023). We denote the sum of the scores of these four items as the 'Medical Engagement Index' (MEI). Figure 2 shows that all respondents with a MEI of 10 or less for these four questions have a total quiz score of less than 158. This proportion reduces as the MEI increases and there are no respondents with a total quiz score of less than 158 if the MEI is at least 16.

Insert Figure 3 about here

These medical engagement predictors and the direction of agreement, listed in the stepwise order they were entered, were:

> Q10. Medical professionals have been devalued in terms of their status within hospitals and the healthcare system generally (Strongly agree = quiz score of 1, … strongly disagree = quiz score of 5).
> Q30. In general, senior managers in (the health authority) are good at seeking consultants' views on decisions that affect patient care (Strongly agree = quiz score of 5, … strongly disagree = quiz score of 1)

Q9. Most of the changes introduced into (the Board) have made it difficult for doctors to retain their traditional sense of medical professionalism (Strongly agree = quiz score of 1, … strongly disagree = quiz score of 5).
Q24. I think we've lost our traditional autonomy since I became a doctor, which has had a negative impact on my ability to care for patients (Strongly agree = quiz score of 1, … strongly disagree = quiz score of 5).

What is notable is the common theme underlying these four predictors, which is identity work consistent with doctors' feelings and beliefs about deprofessionalisation in medicine (Currie *et al*., 2012; Filc, 2006; Numerato *et al*., 2012). One strand of this thesis proposes that doctors are subject to a deliberate strategy by managers and the UK state to reduce their professional power and autonomy so that health services reform involving cost savings is more easily implemented (Siebert *et al*., 2018).

Proposition 2: Predicting the eNPS

To get a better estimate of how good the overall medical engagement quiz score was at predicting behaviours consistent with engaged doctors we sought to assess how well it predicted the net promoter score. The so-called employee 'net promoter score' (eNPS) (Reichheld, 2003) has been widely used by HR practitioners to evaluate leadership effectiveness and levels of staff engagement, including healthcare (Adams, Walpola, Schembri et al., , A.M, et al., 2022; Stanberry, Lindley & Huffman, 2023). In the context of medical professionals, we sought to operationalise consultant eNPS by asking whether they recommend to others that their employing organisation is a good place to build a medical career.

Respondents with a valid quiz score were dichotomised according to their response to the survey item "Q47 Do you tend to recommend (the organisation) to potential and existing colleagues as a good place to build a medical career?" The categories - 'usually' and 'always' (n = 134) were put into a positive group and the remaining three categories – 'sometimes'; 'rarely' and 'never' were put into a second negative group (n = 120).

The AUROC and 95% confidence intervals using the overall quiz score to predict the eNPS were 0.808 and (0.754, 0.861); $p < 0.001$. The sensitivity and specificity using the Youden threshold of 129 for the quiz score were 89.6% and 59.2% respectively. Thus, the total quiz score is a good predictor for the eNPS. Since the MEI predicts high quiz score, it was used to predict eNPS directly. The AUROC curve using the MEI to predict membership of the eNPS was 0.788 (95% confidence interval (0.733, 0.843); $p < 0.001$). De Long's test ($p = 0.313$) showed that there is no significant difference in the AUROCs (Figure 3). Using only four questions is clearly quicker, simpler and has practical advantages including a reduced risk of missing values.

Discussion

We set out to contribute to the existing literature on medical engagement, which Prenestini, Palumbo, Grilli *et al.*, (2023) have concluded to be an ill-defined concept, in need of better theorisation. We argue it should be more strongly grounded in how doctors understand their *professional role identities* in response to changing contexts in the form of *institutional logics* in healthcare (Barbour and Lammers, 2015; Obodaru, 2016; Reay *et al*., 2017; Fletcher *et al*., 2020; Winkler *et al*., 2023), and how they use *identity work* (Bertolotti *et al*., 2022; Kreiner *et al*., 2006; Lepisto et a., 2015; Martin *et al.*, 2021) to convince themselves and their colleagues

of their version of medical professional role identities. This challenge led us to develop two propositions regarding the links between identity work, medical engagement or identification, and doctors' advocacy of their employer as a good place to build a medical career.

Our findings support our initial argument that medical engagement needs to be understood as a medical professional role identity issue, which can be predicted by the how doctors use different forms of identity work to respond to changing institutional logics (Kreiener *et al*., 2006; Martin *et al*., 2021; Obodaru, 2016; Reay *et al*., 2017). Our first proposition –the nature of the identity work senior doctors undertake in response to changing institutional logics predicts overall levels of medical engagement or, our preferred term, identification– was confirmed. We had sought to theorise medical engagement in terms of doctors' experience of work and their self-categorisation of their medical professional role identities rather than on their willingness to contribute to the maintenance and enhancement of a managerialist agenda (Purcell, 2014). This measure of engagement comprised scales on medical professional identification rooted in our earlier qualitative research, as well as pre-tested scales of work engagement, organisational identification, and relational coordination.

Of particular interest and significance was the finding that consultants' combined responses to four 'killer' questions, which we labelled the MEI, could predict our overall measure of medical engagement with high sensitivity and specificity. Moreover, these four questions related to a common underlying factor of how consultants used identity work to express their sense of deprofessionalisation.

The findings also support our second proposition - senior doctors overall medical engagement would predict key outcomes, in this case, their advocacy of the employing organisation as a good place to build a medical career (eNPS). AUROC analysis showed that our overall medical engagement score was a good test of the propensity of senior doctors in our study to recommend the organisation as a good place to build a medical career. Furthermore, we could, so to speak, cut out the 'middleman' because the simplified four-item MEI could be used to predict eNPS directly. De Long's test showed that there was no significant difference in the AUROC between using only the 4 questions in the MEI rather than all 46 questions ($p = 0.32$).

We argue that these findings make several contributions to the literature on medical engagement (Dickinson *et al*., 2016; Perriera *et al*., 2019; Prenestini, et al., 2023; Spurgeon *et al*., 2015; 2017), which have significant implications for how the concept can be understood and applied. The first contribution is to our understanding of medical engagement as a useful theoretical and practical concept. Our operationalisation of medical engagement was derived from our earlier, qualitative research with senior doctors (Authors, date). It focused on doctors' lived experience of work, how they saw their medical professional role identities, and how they responded to changing logics in healthcare. This approach contrasts with the existing medical engagement literature that focuses on doctors' willingness to contribute to the maintenance and enhancement of a managerialist agenda (e.g., Spurgeon *et al*., 2015). Thus, our approach to medical engagement 'engages' with Purcell's (2014) criticism of the managerially oriented, employee engagement literature and its somewhat optimistic, unitary, acontextual, and psychologistic nature (Goddard, 2014, Fletcher *et al*., 2020; Truss, 2014).

Doctors' sense of medical professionalism not only lies at the heart of their engagement with their employing organisations, their work colleagues, and their work, but also with the institutional logics of the healthcare system in which these relationships occur. Thus, any definition and measure of medical engagement must consider how doctors' professional role

identities have been shaped by changing logics in healthcare and how they continue to shape them (Kirkpatrick *et al*., 2016; McGivern *et al*., 2015; Reay *et al*., 2017). This lifts the analysis of engagement beyond the organisational level to consider broader societal, field, and system changes. Consequently, identity work as a response to the opportunities and challenges associated with changing configurations of institutional logics in healthcare is a key process and component in understanding doctors' experience of work (Barbour and Lammers, 2015; Cascon-Pereira *et al*., 2016; Gordon *et al*., 2020). This point is starkly illustrated by our findings, admittedly from a single case, that four questions relating to senior doctors' legitimising of their sense of deprofessionalisation could explain their likelihood to see themselves as, and lay claim to being, willing transformers or reformers and, thus, potential medical leaders. This is theoretically and practically important because, as Howieson *et al.* (2024) have argued, doctors have to see themselves as credible medical leaders before being able to successfully claim such credibility with medical 'followers'.

Our second contribution lies in exploring whether our identity-based conception of medical engagement is useful in explaining key outcomes. Here, our findings are positive. They show that the overall scores of our medical engagement measure can predict senior doctors' propensities to advocate their employer to others as a good place to build a medical career – the so-called net promoter score (eNPS). Moreover, the simplified four-item MEI could be used to predict eNPS directly without any significant loss of power. The eNPS is widely proposed as the single most important measure of both customer (or service user) satisfaction and employee engagement in a range of industries, including healthcare (Brown, 2020; Stanberry, 2023). We acknowledge studies showing the eNPS may not be sufficient as a stand-alone measure of employee engagement (Adams *et al*., 2022; Brown, 2020; Sedlak, 2020) because of its one-dimensional nature, susceptibility to external influences unrelated to engagement, and potential for misinterpretation due to scoring asymmetries. However, the justification for using it as one of a number of key outcomes is a strong one - when people, in this case doctors, advocate their organisations to others, they are putting their personal identities and reputations at risk when doing so in practice (Akingbola *et al*., 2023).

Thus, in this case study at least, we can conclude our operationisation of medical engagement and the MEI were validated by being a good test of what has been described as the 'ultimate question' or metric in HR research in healthcare. Our data also help clear up one of the major criticisms of eNPS, which is that although the eNPS may be an indicator of 'brand' loyalty it does not explain the root cause of such (employer) brand loyalty (Zaki *et al*., 2016). Our study suggests the roots of eNPS, in this case, lie in the personal and professional identities of senior doctors and the identity work senior doctors undertake to legitimise their versions of medical professionalism in the face of changing institutional logics of healthcare. In this sense, it provides a rejoinder to Purcell's (2014) criticism that a concept such as employee engagement cannot be usefully 'boiled down' to an aggregate score explained by variance theory approaches. Although we understand his criticism and have strong affiliations with the qualitative process approaches to understanding phenomenon such as medical engagement, we believe our quantitative approach in turning process phenomenon such as identity work into variables can help shed light on the concept of medical engagement.

Our final theoretical and empirical contribution is to question the claims made that: (a) many doctors have followed a re-professionalisation strategy by becoming hybrid professionals who have integrated multiple logics into their personal and professional identities (Currie *et al*., 2012; McGivern *et al*., 2015; Waring *et al*., 2013), and (b) that these new medical professionals are the future of the medical workforce because of their hybrid identities and ability to

incorporate a managerialist agenda (Spurgeon *et al*., 2015; 2017). This study, which reflects the findings of earlier research into senior doctors' experience of work (Authors, date), provides little support for the belief that new, hybrid doctors are either the norm or are likely to become so in the near future (Kyratsis *et al*, 2017). Our five-fold categorisation of senior hospital doctors suggests the willing reformers and transformers who make up hybrids are currently in the minority, and potentially detached from their senior medical colleagues in their understanding of medical professionalism. If anything, our findings point to a relatively widespread and, often, strong sense of deprofessionalisation, distrust, and de-identification from the organisations and system that employs them (Authors, date). We should also acknowledge that those who self-categorise as willing transformers are at risk of being seen by their colleagues as in danger of over-identification or being over-engaged and thus negatively distanced or disconnected from them (Howieson *et al*., 2024).

Limitations and Future Research

In making these contributions, we must acknowledge the limitations of this study. This was a single case study of senior doctors in one regional health authority in the UK NHS. Since the context and timing of research are always likely to make generalising from a single case problematic (Fletcher *et al*., 2020), the composition of the MEI is likely to differ on a case-by-case basis. Furthermore, attempting to generalise to health systems outside of the UK, which may be governed by more decentralised structures and by different combinations of institutional logics, might be problematic. Generalisation is less applicable to 'mixed economy' healthcare systems, e.g. certain European countries, North America and Australia. In these systems, doctors' expectations of autonomy and prestige may differ significantly or be less pronounced. However, we argue this does not invalidate the approach and methods used to develop the MIT/MEI to fit the context of a specific national setting. Moreover, as with all survey studies, the results are subject to self-report bias and social desirability. Thus, for example, a potential problem in using survey items to proxy identity work is a tendency for individuals to overemphasise their 'love of work' because that is what they have been encouraged or socialised into believing through the so-called 'moralisation of intrinsic motivation' or 'calling' (Kwon and Sonday, 2024). However, these to some extent were mitigated by anonymity assurances and the analysis of free text questions and answers, which we have found to provide more nuanced and often conflicted data on doctors' identities. While recognising these issues, our empirical findings on the nature and extent of engagement and disengagement of senior hospital doctors closely match other larger-scale work in the UK NHS (Martin *et al*., 2021).

One further potential limitation is our approach to the categorisation of doctors, which might be taken to suggest that medical identities are stable and fixed over time. We recognise, however, people often have multiple identities that are both fluid over time and context-dependent (Ashforth & Schinoff, 2016). Indeed, part of our aim in developing the MIT is to help doctors reflect on their identities as a basis for changing them. Finally, we also acknowledge the legitimate approach taken by other researchers (e.g. Spurgeon and Clark, 2015) to define medical engagement from more managerialist agenda, using hard measure of outcomes, such as turnover and absence rates. These perspectives can have significant practical value, but only when their limitations and boundary conditions are recognised. Such limitations rest in the unitary assumptions underpinning much of HRM theory (Fox, 1974; Siebert *et al*., 2015), and the consequent failure to acknowledge healthcare systems as better characterised as pluralist sub-cultures in which ambivalence, and even moderately low trust relations are not only normal but arguably necessary in keeping healthcare systems (and

managers) honest and, thus, motivated to change. Many of these limitations, however, might be addressed by supplementing future quantitative research with qualitative research that provides greater insight into how local contexts influence individuals profession identity construction and whether and how identity construction has changed over time.

Conclusions

With these limitations in mind, we believe our research and our overall MIT approach have significant practical value in understanding medical engagement and in helping doctors self-assess and reflect on their personal and professional identities with the feedback they receive, and the discussions generated by such feedback. Two such reflections concern medical leadership and medical 'followership'. Effective medical leadership is as much as identity phenomenon as a competence one. Leadership identity co-construction theory points to the need for doctors to see themselves and be able to convince others of their legitimate claims to leadership (Howieson *et al*., 2024). Moreover, followers must accept such claims and see themselves as 'responsible followers' for an effective leadership process to be credible and sustainable. At the heart of this process is identity work and how they respond to change, which is the fundamental premise and benefit of our theorisation of engagement and the feedback doctors get from participation in the overall process. Our approach also holds out the possibility of killer questions in the form of an MEI to provide a quick and practical measure of overall medical engagement, although we acknowledge the possibility that a MEI might be specific to particular organizations or systems. Finally, it shows how far healthcare organisations must travel and the types of professional identity and organisational development work they need to do to address the issues of the transformers, reformers (willing and reluctant), traditionalist and disengaged to cope with the demands of increasingly hybrid and resource-poor, healthcare systems such as the NHS.

With respect to healthcare leadership development, at the time of writing we have begun to use the MIT in a practical context in two regional health authorities of similar size and focus, but geographically distant from this case study and characterised by distinct performance outcomes. One authority has been recently awarded a 'good' report by the NHS Quality Care Commission, the other a 'room for significant improvement' report. By engaging in such a comparative exercise, the MIT is providing an evidence base for identifying the engagement and leadership features that distinguish between them, which is widely accepted by senior doctors in these organisations. In turn, the initial findings provided by the MIT and MEI are being explored in follow-up discussions and in-depth interviews with consultant doctors and medical leaders in both authorities to provide more nuanced and grounded explanations and recommendations for developing medical engagement. We hope to report on this 'natural experiment' in detail in future papers.

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Table 1. Logics operating in healthcare and their key features (based on Reay *et al*., 2017; Authors, date)

Logic	Key Features	Relevance to UK NHS
Clinical Professional	• **Expertise and autonomy.** • **Quality of care set by professional expertise.**	• **High relevance to medical professionals but challenged by other logics**
Market	• **Laws of demand and supply determine the nature of healthcare delivery.** • **Quality determined by the consumer/service user.**	• **Market important but giving way to corporate and direct political control**
Bureaucratic	• **Bureaucratic rulemaking by senior managers determines the nature of the service.** • **Quality set by organisational targets and processes, enforced by managerial control.**	• **Forms a strong element in New Public Management and 'new' medical professionalism/transforming healthcare**
State (Political-democratic)	• **Politicians determine the nature and price of the service in line with political priorities and electorate signals.** • **Quality set by legislation, government targets and accountable senior civil servants**	• **High relevance and a distinguishing feature of recent changes in NHS, especially in the devolved NHS in Scotland, where our case study is situated**

Table 2: Socio-demographic characteristics of respondent senior (consultant) doctors

Characteristics of respondents	n	%
Gender		
Male	**142**	**53**
Female	**105**	**39**
No response	**21**	**8**
Length of time as consultant		
Less than 5 years	**52**	**19**
5-10 years	**64**	**24**
More than 10 years	**144**	**54**
No response	**8**	**3**
Specialty		
Investigative	**16**	**6**
Surgery	**53**	**20**
Psychiatry	**27**	**10**
Medicine	**73**	**27**
Women and Children's Heath	**25**	**9**
Anaesthesia	**37**	**14**
Other	**28**	**10**
No response	**9**	**2**
Currently or previously held a medical/clinical leadership role		
Yes	**151**	**56**
No	**107**	**40**
No response	**10**	**4**

Note 268 total completed responses to survey but not all completed socio-demographics

Table 3 Categories of Identity Responses to Changing Logics and Quiz Scores

Category	Characteristics	Quiz score range
Willing Transformers	**Embrace all characteristics of willing reformers but see their vocation linked to system-wide transformation and a willingness to lead such a transformation.**	**≥ mean + 1 standard deviation** **Quiz score ≥ 158**
Willing Reformers	**Tend to see changing logics as an opportunity to develop a new version of medical professionalism, better able to deliver health and social care outcomes. Identities aligned with clinical leadership and non-clinical management enablement; identify with organisational values and employment practices, closely aligned with their clinical teams; see collaboration with and enablement by, non-clinical managers positively; express appropriate levels of voice and involvement in decision-making. Typically, express high levels of engagement and trust in senior management**	**In upper tertile and < mean + 1 standard deviation** **145 ≤ Quiz score < 158**
Reluctant Reformers	**Remain broadly aligned with traditional medical professionalism but acknowledge legitimacy of other logics and changes in specific areas of decision-making, usually on a case-by-case or pragmatic basis. Often ambivalent views expressed about clinical leaders and non-clinical managers, involvement, and voice in decision-making. Express moderate levels of engagement and trust in senior management**	**In middle tertile** **129 ≤ Quiz score < 145**
Traditionalists	**Tend to see changing logics as a threat to medical identities and see the delivery of care and clinical outcomes as best guaranteed by traditional medical autonomy and expertise. Often express a lack of necessary autonomy and control over their working lives, a lack of voice in decision-making, and antipathy towards their own clinical leaders and non-clinical leaders. While engaged with clinical teams, express a lack of engagement with the organisation and distrust/lack of trust in senior managers**	**In lower tertile and ≥ mean - 1 standard deviation** **116 ≤ Quiz score < 129**
Disengaged	**Display marked feelings of powerlessness and disengagement/alienation from organisation and from their own clinical leaders**	**< mean - 1 standard deviation** **Quiz score < 116**

Table 4: Results From an Exploratory Factor Analysis of the MIT

Questionnaire item	Factor Loading			
	1	2	3	4
Factor 1: how consultants used identity work to delegitimise new hybrid logics and (2)				
Q29 Generally speaking, non-clinical managers have a sufficiently good understanding of my work to exercise their responsibilities effectively (R).	0.78			
Q19 Generally speaking, non-clinical managers in (name of Board) have too much influence over service delivery in my hospital.	0.77			
Q20 Since first becoming a consultant, non-clinical managers seem to have taken a greater role in decisions that affect my working life.	0.73			
Q30 In general, senior managers in (name of Board) are good at seeking consultants' views on decisions that affect patient care (R).	0.72			
Q46 I have developed a good working relationship with non-clinical managers and we generally work together to find solutions to the challenges we face (R).	0.69			
Q31 In general, senior managers in this Board are good at responding to the views and suggestions from consultants (R).	0.68			
Q32 I would characterise most of the managers in this Board as trustworthy in their dealings with consultants (R).	0.66			
Q9 I think we've lost most of our traditional autonomy since I became a doctor, which has a negative impact on my ability to care for patients.	0.62			
Q10 Medical professionals have been devalued in terms of their status within hospitals and the healthcare system generally.	0.55			
Q24 Most of the changes introduced into (name of Board) in recent years have made it more difficult for doctors to retain their traditional sense of medical professionalism.	0.54			
Q3 Generally speaking, business and finance judgments have too much influence on most decisions in this Board.	0.53			
Factor 2: how consultants used identity work to legitimise hybrid logics				
Q35 I have respect for most medical leaders in this Board (R).		0.79		
Q34 Medical leaders in this Board tend to do an effective job of managing service delivery (R).		0.72		
Q37 I feel strongly connected to (name of Board) as an employer (R).		0.61		
Q47 Do you tend to recommend (name of Board) to potential and existing colleagues as a good place to build a medical career?.		0.57		
Q22 The doctors who go into medical leadership are usually the wrong ones.		0.53		
Q21 Whenever clinicians take up a medical management position they seem to become different people.		0.51		
Factor 3: Relational Coordination				
Q44 People in my clinical team(s) understand the work I do (R).			0.81	
Q42 People in my clinical team(s) communicate accurately about important work-related issues (R).			0.79	
Q43 People in my clinical team(s) share the same work-related goals as me (R).			0.78	
Q45 People in my clinical team(s) respect the work I do (R).			0.76	
Q41 People in my clinical team(s) communicate frequently about important work-related issues (R).			0.75	
Factor 4: Identity Motives				
Q48e to be seen as a member of a valued profession in society.				0.73

Q48b to be known and liked by others at work.	**0.72**
Q48f to be seen by others as one sees oneself.	**0.72**
Q48d to feel accepted by all of my work colleagues, regardless of profession.	**0.62**
Q48c to do a job that gives me a sense of meaning in my life.	**0.57**

Note. N = 245. The extraction method was principal components with varimax rotation. Factor loadings with magnitude below 0.50 are not displayed. Reverse-scored items are denoted with an (R)

Figure 1: Theoretical Framing Linking Institutional Logics, Identity Work, Engagement and Key Outcomes

Figure 2: Bar chart of Medical Engagement Index by Total Quiz Score ≥158

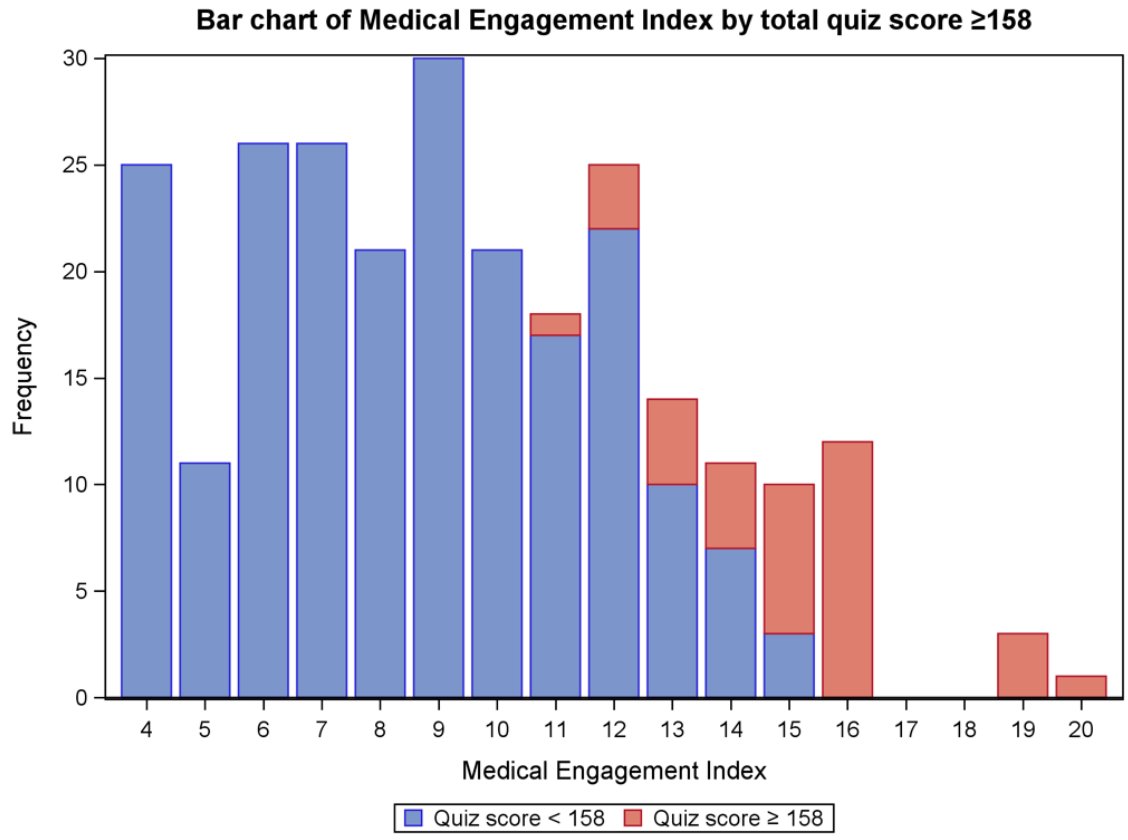
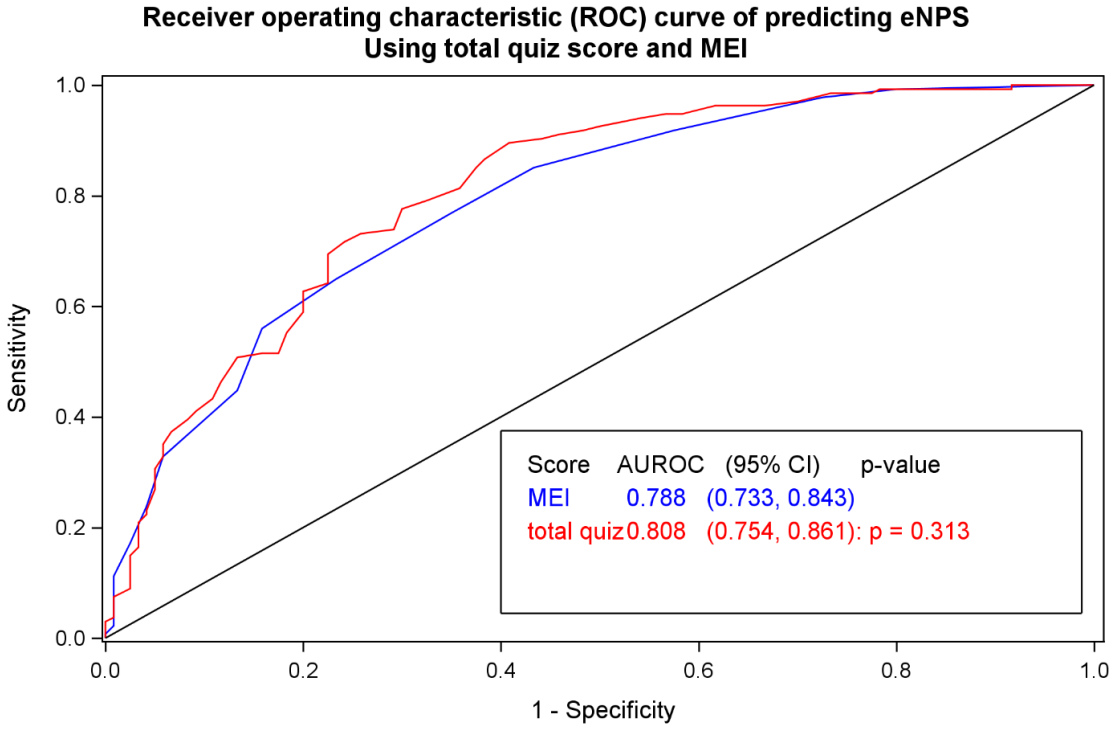


Figure 3 Receiver Operating Characteristic Curves Comparing MEI and Total Quiz scores in predicating eNPS



Number of respondents = 254
AUROC: Area Under the Receiver Operating Characteristic Curve
Total quiz is the sum of 46 questionnaire items. MEI is sum of four questionnaire items
p-value is from De Long's test

Supplementary Table 1: Exemplar Belonging, Attachment, and Belief Survey Items Related to Identity Work

	Types of Identity Work		
Exemplar item	**Retaining**	**Adding**	**Letting Go**
As a profession, we need to think more about developing doctors to become effective leaders (Belonging)		x	
Elements of the traditional 'employment promise' to doctors are an unsustainable barrier to modernising the NHS and improving care (Attachment)			x
To get things done in this Board, doctors need to become more skilled in dealing with the business, financial and political aspects of the job (Attachment)			x
Generally speaking, non-clinical managers in this board are trying to do a difficult job in difficult circumstances (Attachment)		x	
Most of my medical colleagues do not understand the need for us to work within financial and resourcing constraints (Attachment)		x	
Medical professionals have been devalued in terms of their status withing hospitals and the healthcare system generally (Attachment)	x		
I think we've lost more of our traditional autonomy, which has had a negative impact on my ability to care for patients (Belonging)	x		
Medical professionalism should be about the character and values of being a doctor, their expertise and autonomy, and the quality of the doctor patient relationship (Belonging)	x		
Most of the changes introduced into (this Board) have made it more difficult for doctors to retain their traditional sense of medical professionalism (Belief)			x
It's inevitable that politicians get involved in managing healthcare because they have to reflect changing stakeholder perspectives on how best to deliver and resource care (Belief)		x	
Even though I realise business, finance and politics have to play a role in running a modern health service, my bottom line if patient care (Attachment)	x		
Medical professionalism should be solely focused on caring for patients (Belonging)	x		
Medical professionalism should be less concerned with autonomy and doctors' expertise and more concerned with relationships with other clinical professions, mutuality with patients and the effectiveness of the system as a whole (Belonging)			x
If consultants had a greater say in establish targets patient care would be much improved (Belief)		x	

Supplementary Table 2: Means, Standard Deviations, and One-Way Analyses of Variance in factor scores by quiz score tertile

Factor	Tertile 1		Tertile 2		Tertile 3		F (2,242)	η^2
	M	SD	M	SD	M	SD		
Factor 1	-0.62	0.70	-0.15	0.77	0.84	0.92	69.67***	0.37
Factor 2	-0.59	0.98	0.19	0.92	0.45	0.78	29.85***	0.20
Factor 3	-0.30	1.18	0.14	0.91	0.17	0.80	5.99***	0.05