# How professional development can be supported for health and care research methodologists: results of the PROfesSionnal develoPmEnt for Research methodologists (PROSPER) e-Delphi and consensus study.

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**Abstract**

**Objective:** Research methodologists play a pivotal role in health and care research, yet they face many challenges relating to their professional development. The PROfessional development for Research methodologists (PROSPER) study was designed to understand and prioritise the professional development and capacity-building needs of research methodologists in the United Kingdom.

**Design, setting and participants:** Three-round electronic Delphi (e-Delphi) survey, with input from stakeholders in the development of the candidate list of professional development aspects followed by a national consensus meeting of health and care research methodologists in the UK.

**Main outcome measures:** Rated importance of each professional development aspects on a nine-point scale.

**Results:**

207 participants gave their consent to participate in the e-Delphi survey. 189 (91%) completed round one, and 75% completed all three rounds. In round one, 35 professional development aspects were rated by priority, with 21 additional aspects suggested by participants and included in subsequent rounds. Rounds 2 and 3 involved rating 56 aspects: 22 achieved 'consensus in,' 20 were 'consensus out,' and 14 had 'no consensus.' The top 'consensus in' aspects were supportive line managers, clear career pathways and promotion criteria, and time for training. A consensus meeting with 18 participants re-rated the 14 'no consensus' aspects, adding three more to the final list. The final list includes 25 priority areas for research methodologists' professional development.

**Conclusions:** This study has established the priorities from a professional development perspective for research methodologists. These priorities particularly focus on the importance of support from others, training and development, the value and recognition of the role, employer/contractual agreements, and methodological research funding. The list of priorities could help individuals, managers, employers and research funders to improve professional development opportunities and could form the start of the development of a 'methodologists' charter'.

**Keywords**

Research methodologists, health and care research methodologists, e-Delphi survey, consensus, professional development

**Strengths and limitations of this study**

1. This study is the first to prioritise the professional development needs of research methodologists.
2. The study used a systematic approach to develop the e-Delphi survey, incorporating input from Methodology Incubator Steering Group members, a review of existing evidence and survey participants' suggestions during round one of the e-Delphi survey, ensuring comprehensive coverage of barriers and facilitators to professional development.
3. While the study investigated potential attrition bias by comparing round one responses between participants who completed further rounds and those who did not, other factors contributing to attrition were not thoroughly explored, which may have affected the validity of the results.
4. Although the wide sample of research methodologists across the UK wasn't overly diverse, it was representative of people in these roles.

## Introduction

Research methodologists play a critical role in the design and conduct of health and care research. However, they face various challenges relating to their professional development and, ultimately, in a research culture that values metrics over methodology, are not valued for the expertise they bring to the team (1, 2). The National Institute for Health and Care Research (NIHR) Methodology Incubator (www.methodologyincubator.org.uk) was formed in April 2020 to increase research capacity in methodology applied to health and care research. The Incubator was funded to understand the current barriers and enablers to developing and maintaining a career in health and care research methodology and to explore potential interventions that complement NIHR's current capacity-building efforts in this area (3). The Methodology Incubator describes a 'research methodologist' as someone who "develops and applies procedures, tools and techniques for gathering, accessing, analysing and interpreting data in health, public health and social care research". This broad definition encompasses a wide range of non-clinical roles including economists, ethicists, evidence synthesists, information scientists, mixed-methods researchers, statisticians, trialists, trial managers and qualitative researchers, though this is not an exhaustive list (3). These roles are vital to conducting health and care research, yet they are not recognised for the value they add to health and care research nor naturally fit into existing career structures and pathways within academia or the National Health Service (NHS). For example, health and care research methodologists not being the named Principal Investigator (a role often held by a clinician) and thus not being recognised for generating grant income, often leading to more difficulty in meeting criteria for promotion.

Research methodologists bring valuable expertise in *how* to design and conduct research studies, to ensure they are delivered to a high standard, reducing the potential for research waste. Their expertise is needed, in the same way that health and care experience is needed. Ensuring individual team members are recognised for their expertise and contribution to the multidisciplinary team is a key principle of 'team science' (5, 6). Team science has been described in different ways but ultimately involves two or more research groups from different disciplines, institutions, countries or sectors (e.g., academia, NHS, healthcare, industry) working together to solve global challenges and realise economic and societal benefits (4). Providing capacity-strengthening and professional development opportunities for all members of a research team is important, for their own careers and to ensure sustainability of health and care research in the future and is aligned with the principles of team science.

However, professional development can be complex and multi-faceted for research methodologists (7). Methodologists encounter wide-ranging challenges, some of which are similar to those faced by other disciplines within academia, such as job stability, i.e. funding/fixed-term contracts (8). However, they also face other challenges, including a lack of recognition and the absence of clearly-defined career pathways (9), and indeed these challenges may also differ between professional roles under the umbrella term of research methodologist.

Various studies have investigated the barriers and facilitators to the career development of specific methodologist roles, such as trial managers (10) statisticians (11) and social care researchers (12). However, to understand how to best support, develop, and grow all methodologists today and in the future, the common, critical issues facing this wide range of

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professionals need to be first understood. The work reported here forms part of ongoing work within the NIHR Methodology Incubator and focuses on the *prioritisation* of the professional development needs of research methodologists, to help focus future strategy.

## Methods

### Study Design

We conducted a three-round electronic-Delphi study (referred to hereafter as 'e-Delphi') and held an online consensus meeting. To develop the e-Delphi survey, first a candidate list of barriers and facilitators was developed (13) via several methods. First, Methodology Incubator Steering Group members and Working Group leads (all of whom are health and care research methodologists; see acknowledgements) were asked to identify barriers and facilitators to their professional development, either reporting back in a personal capacity or by consulting with other methodologists they work with or represent via a working group. Themes were reported back to the research team for potential inclusion in round one of the e-Delphi survey. In addition, the researcher (MI) undertook a basic literature search and reviewed existing evidence (4, 10-12, 14-16). Once the draft candidate list of professional development needs was developed, it was iteratively reviewed and discussed with the lead researcher (EM), and then checked and approved by the members of the Methodology Incubator Steering Group.

DelphiManager software (17) was used to build and disseminate the surveys. The e-Delphi survey was user-tested by three individuals, based in the same department as the researchers (MI, EM) but independent of the study team, to check for errors and ease of use prior to dissemination.

The Guidance on Conducting and Reporting Delphi Studies (CREDES) (18) was used to report the PROSPER e-Delphi study.

*Panel*

As there is no standard method for sample size calculation in an e-Delphi survey, a pragmatic approach was followed based on practicality, the scope of the questions, and the time available for analysis (19). Our aim was to recruit as large a panel as possible and encourage individuals from different role groups to participate.

*Recruitment*

An invitation email was sent to target personal and network/group email addresses. The invitation included the study aims, the definition of a research methodologist, and a short video which explained the study and emphasised the importance of completing all three rounds. We adopted a snowball approach, by asking 17 groups/networks in the UK (Supplementary 1), to disseminate study information to their members/contacts; this included members of the Methodology Incubator Steering Group and working group leads, who may also have chosen to participate in the study. The video was also shared via X (formerly Twitter), with groups/networks tagged for the study to be publicised widely. Reminder emails were sent at the end of both week one and week two of each round to prompt completion of the survey.

*Patient and Public Involvement (PPI)*

Patients and members were not involved in the design or delivery of this study, since this study aimed to determine the professional development priorities for health and care methodologists. However, a wide range of researchers, for whom the findings would be

relevant for, were involved throughout, including contributing to the candidate list of professional development needs.

*The e-Delphi survey process*

The e-Delphi survey process included three online rounds, each of which are described below. In each round, participants were asked to rate their agreement for each statement relating to an aspect of professional development. The Grading of Recommendations Assessment Development and Evaluation (GRADE) scale was used, which suggests a Likert 9-point scale (1 to 9) to rank importance (17). Scores of 1 to 3 mean the aspect is deemed 'not important', scores of 4 to 6 are 'important but not critical', and scores of 7 to 9 denote themes of 'critical' importance. An 'unable to score' option (score 10) was available and a space to provide optional feedback on reasons for allocating particular scores was included.

Round one included two sections: (i) participant characteristics and (ii) professional development needs. Participant characteristics included age, gender, ethnicity, geographical location, role type, years of experience, organisation type, job family/pathway, contract type, part-time/full-time status and salary range as an indicator of level of seniority in an organisation. Participant name and contact details were recorded to enable personalised reminders to complete the survey to be sent. However, to maintain anonymity following online registration, the software assigned a unique study identifier to each participant that was linked to their survey responses. We also asked if participants would be willing to attend an online consensus meeting to finalise the list of professional development aspects. To understand commonalities and differences between different types of roles, we asked participants to select whether their main role was predominantly:

1. qualitative study design/analysis (e.g., qualitative researcher, behavioural scientist)

2. quantitative study design/analysis (e.g., statistician, clinical trialist, data scientist, epidemiologist, economist)
3. study conduct (e.g., data manager, ethicist, information retrieval specialist, information system specialist, project and trial management staff).

The second part of the e-Delphi survey included 35 statements about aspects that could impact upon the professional development of research methodologists (Table 1). This list was provided for participants to score from 1-9, as per definitions previously described. The statements were organised into aspects that were more specific to the role of a research methodologist and those that were also relevant to other professions. Participants were also asked, in this round only, if there were any additional statements they would like to add for future rounds.

**Table 1 Statements relating to professional development that participants were asked to score.**

| **Methodologist specific aspects** |
|---|
| 1. Having **funding** available to attend **training** courses relevant to methodologists |
| 2. Having **accessibility** to attend **training** courses relevant to methodologists |
| 3. Having **time** to attend **training** courses relevant to methodologists |
| 4. Having **funding** available to undertake **qualifications** applicable to methodologists (e.g. pre-doctoral placements, studentships, sustainable fellowships and professorships) |
| 5. Having time available to **develop applications for fellowships and** other personal career development awards. (e.g. pre-doctoral placements, studentships, sustainable fellowships and professorships) |
| 6. Having **funding** available to attend **conferences, workshops and seminars** |
| 7. Having **accessibility** to attend **conferences, workshops and seminars** |
| 8. Having **time** to attend **conferences, workshops and seminars** |
| 9. Having the **opportunity** to lead/contribute to **academic writing and publications** |
| 10. Having a clear and transparent **contribution statement (that has multiple uses, e.g. grant applications, outputs)** enabling recognition of the role of the methodologist |
| 11. **Implementing the Research Concordat** that ensures having time to focus on methodological career development (e.g. decreasing other activities such as teaching, marking, supporting other people's research, administrative duties) |
| 12. Having the **opportunity** to work with teams who are designing research projects and preparing grant applications and applying for funding for research projects, in order to improve own grant writing skills |
| 13. Securing **funding** to conduct methodological projects |
| 14. **Shadowing others** who may be undertaking a similar methodologist role |

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| 15. Participating in **leadership programmes** appropriate to career level |
| 16. Having **clearly defined methodologist roles**, accompanied with a competency framework (e.g. being able to benchmark oneself across different organisations, in terms of role clarity, grading and structure) |
| 17. Having the opportunity to join **funding and prioritisation** committees/groups relevant to research |
| 18. Having the opportunity to contribute to **guide/advise other people's** research, e.g. advisory board, study steering committee member |
| 19. Having the opportunity to work on more methodologically challenging or complex research studies. |
| 20. Having the opportunity to provide methodological expertise across **a range of clinical or social care areas** |
| 21. Having the opportunity to become a methodological expert **in a particular area of health or social care** |
| 22. Increasing **recognition** of the role of a methodologist by **professional registration** |
| 23. Leading or co-leading health or social care-related research projects (i.e. as a non-clinical Chief Investigator or co-lead) |
| 24. Having the opportunity to connect with people who share common interests and perform similar roles to increase awareness of new methodologies and raise awareness of the methodologist role |
| 25. Having the opportunity to work closely with or be based in an alternative infrastructure/department (e.g. UKCRC-registered Clinical Trials Unit, evidence synthesis centre) |
| 26. Having a career pathway, including promotion criteria, that recognise the specialist/technical expertise of a methodologist (e.g. team science) |
| 27. Having the opportunity to apply for promotion without the requirement for substantial administrative duties that are outside the areas of expertise/interests of staff |
| 28. Increasing recognition/nomination of the role of a methodologist by external award prizes |
| **Non-research methodologist specific aspects** |
| 29. Having a permanent rather than a fixed-term **contract,** leading to better job security and to help with longer-term life plans |
| 30. Having a post that has permanent rather than fixed-term **funding**, leading to better job security and to help with longer-term life plans |
| 31. Having a line manager who is supportive and encouraging of my professional development |
| 32. Accessing **formal mentoring opportunities** |
| 33. Having the ability **to adjust working hours** in order to fit alongside lifestyle commitments, e.g. caring responsibilities or studying |
| 34. Having the ability **to adjust working location** in order to fit alongside lifestyle commitments, e.g. caring responsibilities or studying |
| 35. Linking all research outputs together via an **ORCID number** |

In rounds two and three, participants were presented with the original statements and any additional statements, generated by the participants in round one. The key difference between round 1 and rounds 2-3 were that participants were presented with a reminder of their score from the previous round, and the distribution of scores of other participants. These data were presented in tables and pictorially in pie charts. Participants were asked if

they would like to adjust their score in view of those of others as well as to score any additional new aspects suggested by participants in round one.

Consensus meeting

On the 25th of September 2023, we conducted an online consensus meeting using Microsoft© Teams. Participants who had previously expressed an interest in participating were invited to the meeting, along with members of the NIHR Methodology Incubator Steering Group. The meeting included a short presentation to provide a recap of the background to the study, the study's aims and objectives, and the results from the e-Delphi survey. Participants discussed and rated statements that had not reached consensus, as per Table 2. Polls within Microsoft Teams were used to allow participants to anonymously vote for each of the 'no consensus' statements whether they felt they should be 'consensus in' or 'consensus out'. Following the ACCORD guideline for reporting reaching consensus, the cut-off percentage used for 'consensus in' was 80% or more of the participants voting 'yes' (20). It was agreed this consensus definition was more appropriate for the consensus meeting, since participants would be asked to respond 'in' or 'out' as to whether a statement should be included or not. Uncertainties were discussed during the consensus meeting and participants suggested some rewording but when asked to rate, these statements did not reach consensus so the team agreed to add them as other areas for consideration.(20).

*Statistical analysis*

Descriptive analyses of participant characteristics were undertaken. In each round, for each aspect of professional development, mean score, frequency count and proportion (percentage) of responses for each outcome and for each stakeholder group (as defined previously), was calculated. After all three rounds had been completed, each statement was

rated as either 'consensus in,' 'consensus out,' or 'no consensus,' (Table 2). Our definition of consensus was agreed a priori and outlined in a study protocol.

**Table 2 Definition of consensus in the e-Delphi survey**

| Consensus classification | Description | Definition |
|---|---|---|
| Consensus in | Consensus that a professional development aspect should be included | 70% or more participants scoring as 7 to 9 |
| Consensus out | Consensus that a professional development aspect should not be included | 50% or less participants scoring as 7 to 9 |
| No consensus | Uncertainty about the importance of a professional development aspect | Anything else |

To investigate potential attrition bias, we compared the round one mean item score and the percentage of participants scoring as 'critical' for participants who only completed round one with those of participants who went on to complete further rounds.

**Ethics approval and informed consent**

Ethics approval was obtained via the Faculty of Medicine & Health Sciences Research Ethics Committee/ University of Nottingham (FMHS 13-0422) on 2nd August 2023. Online consent was sought from participants in the e-Delphi survey before completing round 1 of the survey.

**Results**

207 participants registered and gave their consent to participate in the e-Delphi survey. Participants were predominantly female (77%), white (77%), aged between 35-54 years (61%), and employed full-time (78%) at a university (88%) (Table 3).

**Table 3 Characteristics of individuals who registered to participate.**

| Characteristics | Number (%) |
|---|---|

| | |
|---|---|
| **Stakeholder group** | |
| Quantitative researchers | 100 (49) |
| Qualitative researchers | 54(26) |
| Study conduct | 53(25) |
| **Age** | |
| 18-24 | 1 (0) |
| **25-34** | 38 (18) |
| 35-44 | 64 (31) |
| 45-54 | 63 (30) |
| 55-64 | 39 (19) |
| 65-74 | 2 (1) |
| **Gender** | |
| Female | 159 (77) |
| Male | 41 (20) |
| Prefer not to say | 6 (3) |
| Other | 1 (0) |
| **Disability** | |
| No | 185 (89) |
| Yes | 17 (8) |
| Prefer not to say | 5 (3) |
| **Ethnicity** | |
| White (English; Welsh; Scottish; Northern Irish or British) | 160 (77) |
| Other White background | 20 (10) |
| Asian or Asian British (Indian) | 5 (2) |
| Prefer not to say | 4 (2) |
| White (Irish) | 3 (1) |
| Asian or Asian British (Chinese) | 3 (1) |
| Other Asian background | 3 (1) |
| Black or Black British (African) | 2 (1) |
| Other Mixed or multiple ethnic background | 2 (1) |
| Mixed or multiple ethnic groups (White and Asian) | 1 (0) |
| Asian or Asian British (Bangladeshi) | 1 (0) |
| Mixed or multiple ethnic groups (White and Black African) | 1 (0) |
| Black or Black British (Caribbean) | 1 (0) |
| Arab | 1 (0) |
| **Location/UK** | |
| London | 34 (16) |
| North West | 27 (13) |
| Yorkshire and the Humber | 24 (12) |
| West Midlands | 24 (12) |
| East Midlands | 20 (10 |
| South West | 18 (7) |
| North East | 16 (8) |
| Scotland | 11 (5) |
| Wales | 7 (3) |
| Oxfordshire | 6 (3) |
| South East | 6 (3) |
| East of England | 6 (3) |
| South Central | 3 (1) |
| **Role** | |

| | |
|---|---|
| Statistician | 46 (22) |
| Qualitative researcher | 34 (16) |
| Project/trial management staff | 21 (10) |
| Mixed-method researcher | 18 (9) |
| Information retrieval specialist | 16 (8) |
| Clinical trialist | 12 (6) |
| Evidence synthesist | 11 (5) |
| Others | 11 (5) |
| Economist | 9 (4) |
| Epidemiologist | 7 (3) |
| Data scientist | 5 (2) |
| Data manager | 4 (2) |
| Information system specialist | 3 (1) |
| Ethicist | 1 (0) |
| **Years of experience** | |
| 1-5 | 49 (24) |
| 6-10 | 35 (17) |
| 11-20 | 71 (34) |
| 21-30 | 43 (21) |
| 30+ | 9 (3) |
| **Employer** | |
| University | 182 (88) |
| NHS | 17 (8) |
| Charity/Not for profit/Third sector | 4 (2) |
| Commercial/private sector (including research/evidence companies) | 2 (1) |
| Other (NICE, Joint University/NHS Trust) | 2 (1) |
| **Contract type** | |
| Permanent | 104 (50) |
| Fixed-term | 86 (42) |
| Other (e.g., open ended subject to grant renewals/funding) | 17 (8) |
| **Full/part time** | |
| Full-time | 162 (78) |
| Part-time | 45 (22) |

189 participants completed round 1, 161 (85%) round 2, and 141 (75% of people completing round 2) completed round 3 (Figure 1).

**Fig. 1: Study flowchart**

Twenty-one additional statements were proposed by participants in round 1 to be rated in rounds 2 and 3 (Supplementary 2), leading to a total of 56 professional development aspects being rated in rounds 2 and 3. There were no other changes in rounds 2 and 3.

Twenty-two statements were categorised as 'consensus in,' 20 as 'consensus out,' and 14 as 'no consensus' (Table 4). The three top-ranked 'consensus in' professional development aspects were:

1- 'Having a line manager who is supportive and encouraging of my professional development' (100% of participants scoring this as critical)
2- 'Having a career pathway, including promotion criteria, that recognises the specialist/technical expertise of a methodologist (e.g., team science)' (93% of participants scoring this as critical)
3- 'Having time to attend training courses relevant to methodologists' (92% of participants scoring this as critical).

Table 4 presents each statement included in the e-Delphi survey and reports the mean score and the number and proportion of participants who scored the statement as consensus in, categorised into whether the statement then reached the criteria for 'consensus in' (i.e. ≥70% of participants scored 7-9), 'consensus out' or 'no consensus'.

**Table 4 Proportion of participants scoring consensus on e-Delphi survey statements.**

| Professional development needs statement | Mean score | N (%) of participants who scored a statement 7-9 |
|---|---|---|
| **Consensus in (≥70% of participants rated the statement as critical (score 7-9)** | | |

| | | |
|---|---|---|
| 1. Having a line manager who is supportive and encouraging of my professional development | 8.7 | 141 (100) |
| 2. Having a career pathway, including promotion criteria, that recognise the specialist/technical expertise of a methodologist | 8.3 | 140 (93) |
| 3. Having time to attend training courses relevant to methodologists | 7.6 | 144 (92) |
| 4. Having funding available to attend training courses relevant to methodologists | 7.5 | 144 (90) |
| 5. Having a permanent rather than a fixed-term contract, leading to better job security and to help with longer-term life plans* | 8.3 | 141 (90) |
| 6. Having a post that has permanent rather than fixed-term funding, leading to better job security and to help with longer-term life plans* | 8.2 | 141 (90) |
| 7. Principal Investigators understanding that methodologists need to be costed adequately, including not squeezing leads down to 2% | 7.9 | 137 (90) |
| 8. Having accessibility to attend training courses relevant to methodologists | 7.3 | 144 (88) |
| 9. Having the opportunity to lead/contribute to academic writing and publications | 8.0 | 144 (87) |
| 10. More funding streams to support methodology work | 7.5 | 139 (85) |
| 11. For institutions to understand the importance of methodological research | 7.3 | 140 (82) |
| 12. Having funding available to attend conferences, workshops and seminars | 7.2 | 144 (80) |
| 13. Having the ability to adjust working hours in order to fit alongside lifestyle commitments, e.g. caring responsibilities or studying | 7.5 | 141 (80) |
| 14. Funding streams dedicated to methodology | 7.3 | 140 (80) |
| 15. Having the opportunity to work with teams who are designing research projects and preparing grant applications and applying for funding for research projects, in order to improve own grant writing skills | 7.3 | 143 (79) |
| 16. Having the ability to adjust working location in order to fit alongside lifestyle commitments, e.g. caring responsibilities or studying | 7.3 | 141 (78) |
| 17. Having time to attend conferences, workshops and seminars | 7.1 | 144 (76) |
| 18. Having the opportunity to connect with people who share common interests and perform similar roles to increase awareness of new methodologies and raise awareness of the methodologist role | 7.2 | 143 (76) |
| 19. Securing funding to conduct methodological projects | 7.1 | 142 (73) |
| 20. Having accessibility to attend conferences, workshops and seminars | 6.9 | 143 (71) |
| 21. Having the opportunity to apply for promotion without the requirement for substantial administrative duties that are outside the areas of expertise/interests of staff | 7.1 | 137 (70) |
| 22. Buy-in from trials units for methodological research to be embedded in their trials | 6.8 | 134 (70) |
| **No consensus (neither 70% of participants rated the statement as critical (7-9) nor ≤50% of participants scoring critical (7-9)** | | |
| 1. Having time to read published literature | 6.9 | 141 (68) |
| 2. Have allocated time to work on funding applications out with project role | 6.7 | 137 (63) |
| 3. Having time available to develop applications for fellowships and other personal career development awards (e.g. pre-doctoral placements, studentships, sustainable fellowships and professorships) | 7.0 | 143 (62) |
| 4. Leading or co-leading health or social care-related research projects (i.e. as a non-clinical Chief Investigator or co-lead) | 6.7 | 142 (62) |
| 5. Having protected time to develop your own trial methodology ideas alongside other work activity | 6.6 | 138 (62) |
| 6. Implementing the Research Concordat that ensures having time to focus on methodological career development (e.g. decreasing other activities such as teaching, marking, supporting other people's research, administrative duties) | 6.8 | 140 (61) |

| | | |
|---|---|---|
| 7. Having a clear and transparent contribution statement (that has multiple uses, e.g. grant applications, outputs) enabling recognition of the role of the methodologist | 6.9 | 143 (59) |
| 8. Having the opportunity to work on more methodologically challenging or complex research studies | 6.6 | 141 (59) |
| 9. Recognition from local academics and/or host organisation for the contribution clinical trials unit (CTU) methodologists make at the pre-award stage to the success of the trial | 6.6 | 134 (59) |
| 10. Opportunity to be part of a community of practice with similar methodologists | 6.6 | 139 (59) |
| 11. Having funding available to undertake qualifications applicable to methodologists (e.g. pre-doctoral placements, studentships, sustainable fellowships and professorships) | 6.5 | 144 (56) |
| 12. Having funding committees specifying the need for specific methodologies/methodologies in team composition | 6.4 | 141 (56) |
| 13. Small pots of money that early career researchers (ECRs) can apply for | 6.6 | 136 (56) |
| 14. Training and opportunities to work as part of an interdisciplinary team during different career stages | 6.5 | 139 (55) |
| **Consensus out (≤50% of participants scoring critical (7-9)** | | |
| 1. Opportunities to collaborate with methodologists from other disciplines to explore using multi-methodology | 6.2 | 139 (34) |
| 2. Having the opportunity to become a methodological expert in a particular area of health or social care | 5.9 | 142 (33) |
| 3. Opportunity to peer review for journals/other scholarly outputs (and chance to shadow someone doing this in first instance) | 6.0 | 141 (33) |
| 4. Clarity on what work is methodology (research on how to improve clinical trials) and what work is application of methods (most aspects of doing clinical trials) | 5.7 | 137 (33) |
| 5. Having the opportunity to contribute to guide/advise other people's research, e.g. advisory board, study steering committee member | 6.2 | 141 (32) |
| 6. Accessing formal mentoring opportunities | 6.2 | 141 (32) |
| 7. Having the opportunity to join funding and prioritisation committees/groups relevant to research | 6.1 | 142 (31) |
| 8. Increasing the job profile of methodologist outside the field (e.g. promoting professional identity to a lay audience) | 6.0 | 141 (31) |
| 9. Having clearly defined methodologist roles, accompanied with a competency framework (e.g. being able to benchmark oneself across different organisations, in terms of role clarity, grading and structure) | 5.9 | 143 (29) |
| 10. Shadowing others who may be undertaking a similar methodologist role | 5.9 | 143 (28) |
| 11. Having the opportunity to work closely with or be based in an alternative infrastructure/department (e.g. UKCRC-registered Clinical Trials Unit, evidence synthesis centre) | 5.7 | 139 (26) |
| 12. Opportunities to observe external groups and committees reviewing proposals and ethics applications | 5.7 | 139 (26) |
| 13. Having the opportunity to provide methodological expertise across a range of clinical or social care areas | 5.7 | 142 (25) |
| 14. Increasing recognition of the role of a methodologist by professional registration | 5.4 | 142 (24) |
| 15. Linking all research outputs together via an ORCID number | 5.8 | 137 (23) |
| 16. Participating in leadership programmes appropriate to career level | 5.8 | 143 (22) |
| 17. Having clinical mentor or supervisor to provide motivating examples for methodology | 5.5 | 140 (22) |
| 18. Workshops with clinical researchers to understand their input and to explain to them what statisticians do | 5.5 | 137 (21) |

| | | |
|---|---|---|
| 19. Enable people on professional service type contracts to do research, even if it is part time | 5.4 | 131 (18) |
| 20. Increasing recognition/nomination of the role of a methodologist by external award prizes | 5.4 | 140 (14) |

* Items 5 and 6 are similar, though refer to the fact that whilst some posts have permanent contract, the funding for the actual role remains fixed-term. Whereas some posts have fixed-term contract, including fixed-term funding.

There were some similarities and some differences in the priorities identified by the three stakeholder groups (Supplementary 3). For example, having a supportive line manager was consistently chosen as the top priority (100% agreement) for all stakeholder groups. However, for 'Having a post that has permanent rather than fixed-term funding, leading to improved job security and support for longer-term life plans', 100% of the qualitative stakeholder group prioritised this, compared to 83% of the quantitative stakeholder group, and 91% of the study conduct stakeholder group. Qualitative group participants had more (29) professional development aspects that were categorised as a priority for them compared to quantitative (22) and study conduct group (17).

Online consensus meeting

One hundred and sixty-one participants who completed the e-Delphi survey gave their contact details to be invited to join the online consensus meeting. Twenty-nine participants agreed to participate in the online consensus meeting, and 18 participants joined on the day. Fourteen 'no consensus' statements were discussed and voted on. For three statements, ≥80% of participants rated them as 'yes', therefore meeting the ACCORD 'consensus in' definition (previously described); seven statements did not meet this definition and were subsequently not included. Four statements received ratings between 51-69% and were considered to remain as reaching 'no consensus' (Supplementary 4). These statements include leading or co-leading health or social care-related research projects; having

protected time to read/access published literature; receiving support to develop your research methodology ideas alongside other work activities; and access to small pots of money that early career researchers (ECRs) can apply for. In addition to discussion about the statements which did not reach consensus, there were two further key points for discussion that participants raised. First, the importance of raising awareness of the value of the role of research methodologists, and the importance of their contributions to health and care research; addressing this fundamental issue could, start to address the issue of challenges in professional development for research methodologists. Second, the importance of team science and that high-quality health and care research studies are usually designed and conducted by collaborative, multi-disciplinary teams, rather than single individuals, and the importance, therefore, of recognising the value that research methodologists add to teams.

After the consensus meeting the list of 'consensus in' professional development aspects was finalised (Table 5). The 'consensus in' list of professional development aspects was reviewed and themes were generated by the authors, creating five themes.

**Table 5 List of the professional development aspects for research methodologists grouped in five themes**

| **Professional development aspects themes (% rating as critical)** |
|---|
| **SUPPORT FROM OTHERS**<br>• Having a line manager who is supportive and encouraging of my professional development. (100%)<br>• Having support available to develop applications for fellowships and other personal career development awards (e.g. pre-doctoral placements, studentships, sustainable fellowships, and professorships). (100 %)*<br>• Opportunity to be part of a community of practice with similar methodologists. (89%)*<br>• Having the opportunity to connect with people who share common interests and perform similar roles to increase awareness of new methodologies and raise awareness of the methodologist role. (76%) |

| |
|---|
| **TRAINING AND DEVELOPMENT**<br>• Having time to attend training courses relevant to methodologists. (92%)<br>• Having funding available to attend training courses relevant to methodologists. (90%)<br>• Having accessibility to attend training courses relevant to methodologists. (88%)<br>• Having the opportunity to lead/contribute to academic writing and publications. (87%)<br>• Having funding available to attend conferences, workshops, and seminars. (80%)<br>• Having the opportunity to work with teams who are designing research projects and preparing grant applications and applying for funding for research projects, in order to improve own grant writing skills. (79%)<br>• Having time to attend conferences, workshops and seminars. (76%)<br>• Having accessibility to attend conferences, workshops, and seminars. (71%) |
| **VALUE AND RECOGNITION OF THE ROLE**<br>• Having a career pathway, including promotion criteria, that recognizes the specialist/technical expertise of a methodologist. (93%)<br>• Principal Investigators understanding that methodologists need to be costed adequately, including not squeezing leads down to 2%. (90%)<br>• Implementing the Research Concordat that ensures having time to focus on methodological career development (e.g. decreasing other activities such as teaching, marking, supporting other people's research, administrative duties). (83%)*<br>• For institutions to understand the importance of methodological research. (82%)<br>• Having the opportunity to apply for promotion without the requirement for substantial administrative duties that are outside the areas of expertise/interests of staff. (70%) |
| **EMPLOYER / CONTRACTUAL**<br>• Having a permanent rather than a fixed-term contract, leading to better job security and to help with longer-term life plans a post that has permanent rather than fixed-term funding. (90%)<br>• Having a post that has permanent rather than fixed-term funding, leading to better job security and to help with longer-term life plans. (90%)<br>• Having the ability to adjust working hours in order to fit alongside lifestyle commitments, e.g. caring responsibilities or studying. (80%)<br>• Having the ability to adjust working location to fit alongside lifestyle commitments, e.g., caring responsibilities or studying. (78%) |
| **Methodological research funding**<br>• More funding streams to support methodology work. (85%)<br>• Funding streams dedicated to methodology. (80%)<br>• Securing funding to conduct methodological projects. (73%)<br>• Buy-in from trials units for methodological research to be embedded in their trials. (70%) |

*Agreed as 'consensus in' after the consensus meeting

## Discussion

Research methodologists face various professional development challenges. Numerous studies have recognised different factors (e.g. training, relevant qualifications, time and funding for research and clarity of career pathway) that act as both barriers and facilitators to research development and capacity building (10, 21, 22). However, there remains a gap in understanding how to provide optimal support for the current and future growth of

methodologists, and the key priorities to focus on in terms of supporting capacity-building and professional development. The PROSPER study has developed a list of professional development aspects that are considered priority areas for research methodologists, who considered their main role to predominantly utilise quantitative, qualitative or study conduct methods in health and care research. It is worth noting that we recognise that some professional development aspects are 'general' (e.g., job security through permanent contracts) rather than methodologist-specific (e.g., opportunities for academic writing and publications). We discuss each of the five themes below.

**Support from others**

Consistent with other literature, PROSPER highlighted that having a supportive line manager (23, 24), as being a key area of focus to support research methodologists' professional development, and indeed 100% of participants felt this is important. In addition, having support available for developing applications for fellowships and personal career development awards plays a pivotal role in fostering a thriving community of methodologists. The importance of various support mechanisms, including pre-doctoral placements, studentships, sustainable fellowships, and professorships, not only empowers individual methodologists but also contributes significantly to the advancement of innovative methodologies within the broader research landscape (25, 26). Furthermore, there was a dual emphasis on individual support and community collaboration which reflect the broader commitment to advancing methodological practices in a collective and inclusive manner. Being part of a community of practice with similar methodologists is a key aspect to connect with like-minded professionals to enhance the awareness of new methodologies

and elevates the visibility of the methodologist role, fostering a sense of camaraderie and shared expertise within the community (27, 28).

**Training and development**

A career pathway that recognises the specialist/technical expertise of a methodologist (21) was a key area of focus to support research methodologists' professional development. To promote dynamism within the methodologist career path, it is essential to acknowledge the wide spectrum of experiences and backgrounds among methodologists. For instance, individuals can advance in their career journey by taking on more senior roles within the field of methodology or by pursuing research and technical specialist positions, e.g. within analytical or digital professions (22).

Participants recognised that having time, funding, and accessibility to training courses are crucial for their professional development. These results reflect those of Bell et al. (2022), who also found that the most common barrier for researchers working on translational research, translating results from basic research into outcomes that directly benefit humans, was the lack of time to attend training. (29).

Consistent with other literature (10, 30), funding was frequently rated as a priority in different situations, e.g. attending conferences and conducting methodological research projects. There is evidence that funding for attending conferences is a significant institutional support that is needed to enhance research productivity (31). Obtaining funding is getting more restricted and challenging, yet there is limited training on writing research grants (32). To increase opportunities to apply for funding, participants highlighted the importance of working with multidisciplinary teams who design research projects and prepare grant applications to improve their own grant writing skills.

Leading and contributing to academic writing and publication were of great importance to participants. Contribution to academic writing is considered one of the ways to demonstrate researcher competency and progress in their field, bringing in more funding to their institution as well as disseminating the results of the research that is being conducted (33).

**Value and recognition of the role**

A key area of discussion during the consensus meeting was the importance of raising awareness of the role of the research methodologist and how research methodologists play a vital role in team science. As recognised by other initiatives (8, 32), it is important, in order to have a sustainable pipeline of skilled researchers in the future, that there is time invested into promoting the discipline of research methodology. It is important that these roles are publicised to people outside of academia/NHS and to recent graduates, and continuing to promote the specialist skills, expertise and added value these roles bring to research teams working in health and care research. The importance of team science should continue to be promoted as it recognises the importance and value that each team member, with their multi-disciplinary specialist expertise, brings to the team.

Currently, there is an increased emphasis on research culture within the research landscape. This encompasses the conduct, values, expectations, attitudes, and norms prevalent in our research communities. It plays a pivotal role in shaping the career paths of researchers and determines the methodologies and communication strategies employed in research (33). The list of professional needs developed in this study reflects the needs identified in the literature to promote positive research culture such as job security, life work balance (34) training and support (35), effective leadership, productive institutional characteristics,

internal and external research recognition, networks and collaboration, and support innovation and risk-taking in research endeavour (36).

UK research funders recognise the importance of a positive research culture. UKRI have emphasised the importance of supporting a positive research culture to attract and retain talented individuals from all backgrounds and support them to flourish (1). The NIHR has outlined in its “Best Research for Best Health: The Next Chapter” strategy how they wish to focus on strengthening research careers, especially for individuals who were previously underrepresented in the field (6). Moreover, the ongoing evolution of the Research Excellence Framework (REF) in the UK, with an increased emphasis on "people, culture, and the environment," further underlines the growing recognition of the importance of a supportive research culture. These initiatives/strategies collectively contribute to a positive research culture, aligning with the broader goals of advancing knowledge and promoting excellence in research and innovation. It is evident that a positive research culture contributes to the advancement of knowledge and the development of a supportive and dynamic research community. Conversely, a poor research culture may hinder scientific progress and innovation. Universities, research institutions, and funding agencies play crucial roles in shaping and nurturing the research culture, and we recommend that all roles, including research methodologists, are considered when thinking about improving research culture as a whole.

**Employer / Contractual**

It is unsurprising that permanent jobs/funding were perceived as crucial for job security and future life plans compared to fixed-term contracts/funding. It is interesting to note that all participants in the qualitative stakeholder group considered having a permanent job

contract as one of their first priorities compared to the quantitative (86%) and the study conduct (88%) group participants. Perhaps this could be because most qualitative researcher respondents were employed on a fixed term contract which could lead to a perception of job insecurity and inconvenience (34), prompting them to prioritise secure employment. This is consistent with previous work that reported that lack of funding and having a fixed-term contract is a barrier to career development for trial managers in the UK (10).

**Methodological research funding**

Although there are some sources of funding to support conducting methodology research projects such as the NIHR (35) and the UKRI Medical Research Council (MRC) Better Methods, Better Research programme (36, 37), there remains a lack of funding opportunities for methodology projects. Participants prioritised three main areas relating to methodology funding. First, the need for more funding streams to fund methods research within substantive projects. Second, funding streams dedicated specifically to methodology research. Third, having the time, support, and experience to secure and win the funding. It is highly recommended that more funding for methodology research is made available so methodologists can have the opportunity to apply for it.

The findings from PROSPER will shape the future of NIHR Methodology Incubator activities by providing a strategic and proactive approach that should significantly benefit researchers, their careers, and the broader research community. The findings will be also shared with groups such as the UKCRC Clinical Trials Unit Network, MRC-NIHR Trials Methodology Research Partnership (TMRP), UK Trial Managers' Network (UKTMN), and the NIHR Academy

to ensure that time and resources are invested wisely in areas that matter most to individual and collective success.

One of the strengths of the PROSPER study was its engagement with research methodologists from various roles across the UK, with input from key individuals within the NIHR Methodology Incubator. The iterative nature of the e-Delphi process facilitated the attainment of more refined and well-thought-out responses, as participants had the opportunity to reconsider their answers in light of group feedback.

The study could have been strengthened by having a higher response and lower attrition rate. Approximately 25% of participants who participated in round 1 did not participate in the final round, which could have affected the quality and representativeness of the final consensus; however, there is no reason to believe that dropout after round 1 is related to potential scores since those not subsequently participating in round 2 would not have seen the group feedback. In addition, study participants were predominantly white females and the sample could have benefited from a more diverse group of participants, though in our experience many of these roles are held by white females.

To the best of our knowledge, this is the first study to report areas that research methodologists consider the most important to prioritise in terms of their professional development. The study has identified 25 core professional development aspects, grouped in to five themes, for research methodologists. In addition to having the Researcher Concordat (38), we recommend the development of a charter for research methodologists, incorporating the results of the PROSPER study. Institutions, employers, and professional bodies at local and national levels could consider implementing a future charter to enhance their work and play a role in helping gain recognition of the roles and retain these specialists

in those roles. Future work will focus on dissemination of this list to relevant groups and organisations and follow up to identify initiatives that could be implemented and evaluated in local and national contexts.

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**Contributors**

EJM, MI and PW were involved in the design of the study. MI was the Research Fellow and wrote the first draft of the manuscript. The e-Delphi survey questions were designed by MI with input from EJM, PW and members of the NIHR Methodology Incubator Steering Group.

MI conducted data analyses. MI and EM facilitated discussions in the consensus meeting. All authors have read, revised and approved the final version of manuscript.

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**Competing interests**

None declared

**Ethics approval and consent to participate**

Ethics approval was obtained via the Faculty of Medicine & Health Sciences Research Ethics Committee/ University of Nottingham (FMHS 13-0422) on August 02, 2023. Online consent was sought from participants in the e-Delphi survey before completing round 1 of the survey.

**Consent for publication**

N/A

**Provenance and peer review**

Not commissioned; externally peer reviewed

**Data availability statement**

Data are available on reasonable request. The unpublished data used and/or analysed during the current study are available from the corresponding author on reasonable request.

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