Delphi Panel Briefing Document

Survey round 1 Report

Essential Research Skills Training Curriculum

Synthesising the Evidence

General Report

Version 3.0

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Contents

Version 3.0 22 Oct 2020 includes an update on the analysis from n=253 in Version 1, to n=254.

Introduction

This is the report following the first round of the *Process for developing an evidence-led Essential Research Skills Training Curriculum Delphi study*. This project developed as a collaboration between the World Health Organization's Special Programme for Research and Training in Tropical Diseases (WHO-TDR) and The Global Health Network (TGHN). The aim of this study is to find consensus on what constitutes the minimum set of skills, knowledge and key principles that would enable those without previous experience in research to undertake high-quality health research.

Delphi panel

The panel for this Delphi study is formed by both experts and stakeholders in health research and health research training with heterogeneous expertise and from diverse geographical regions. We had 594 expressions of interest and we invited 63 research experts. We invited 414 and we had 254+ (61%) responses completing Delphi round 1 survey. We aim to include the views of researchers, research participants, research training facilitators, members of research advisory committees, research funders, authors of peer-reviewed research training papers, authors of research training books/programmes, journal editors, research policy makers and regulators.

Delphi round 1 survey

We conducted a review of the responses from research training needs surveys and the feedback from research training workshops and eLearning collected by The Global Health Network from 2017 to 2019. We analysed the responses of 6912 participants from 153 countries across the globe. This provided us with a range of research skills topics and themes that generated the categories of the Delphi round 1 Survey.

This first Delphi survey offered an opportunity for panellist to indicate which of these themes they consider essential and should be included in the Essential Research Skills Training Curriculum.

Themes were scored on two dimensions: [a] relevance (should we include this category / skill at all?) and [b] clarity of each statement.

Consensus to include themes in the *Essential Research Skills Training Curriculum* was defined as more or equal to 85% of responses *Mostly Agree* and *Completely Agree*.

Consensus to exclude themes in the Essential Research Skills Training Curriculum was defined as more or equal to 85% of responses Mostly Disagree and Completely Disagree.

Acceptable statement clarity was set to ≥ 80%. Any statement's clarity below 80% will be re-defined and re-evaluated in round 2.

This report shows the quantitative and qualitative responses to the Round 1 categories.

Next steps

The Delphi round 2 survey is currently being developed and will be piloted next week. We aim to send the invitation for the 2nd delphi survey by mid-July 2020. We apologise for the delay we have had. All the team at The Global Health Network has been heavily involved in supporting COVID-19 research initiatives through the COVID-19 Research Implementation and Knowledge Hub and other international collaborations.

It is very important that you, as a panellist, complete the questionnaires in each round. The reliability of the results could be compromised if people drop out of the study before it is completed, because they feel that the rest of the group does not share their opinions. If people drop out because they feel their opinions are in the minority, the final results will overestimate how much the sample of participants agreed on this topic.

Overview

Panellists

A multidisciplinary group of 254 panellists was enrolled in the Delphi, with an average age of 39yrs, with 44% of the sample male and 56% of the sample female.

The average length of research experience reported is 12 yrs.

Panellists' experience in research and research training was self-reported as shown in Figure 1.

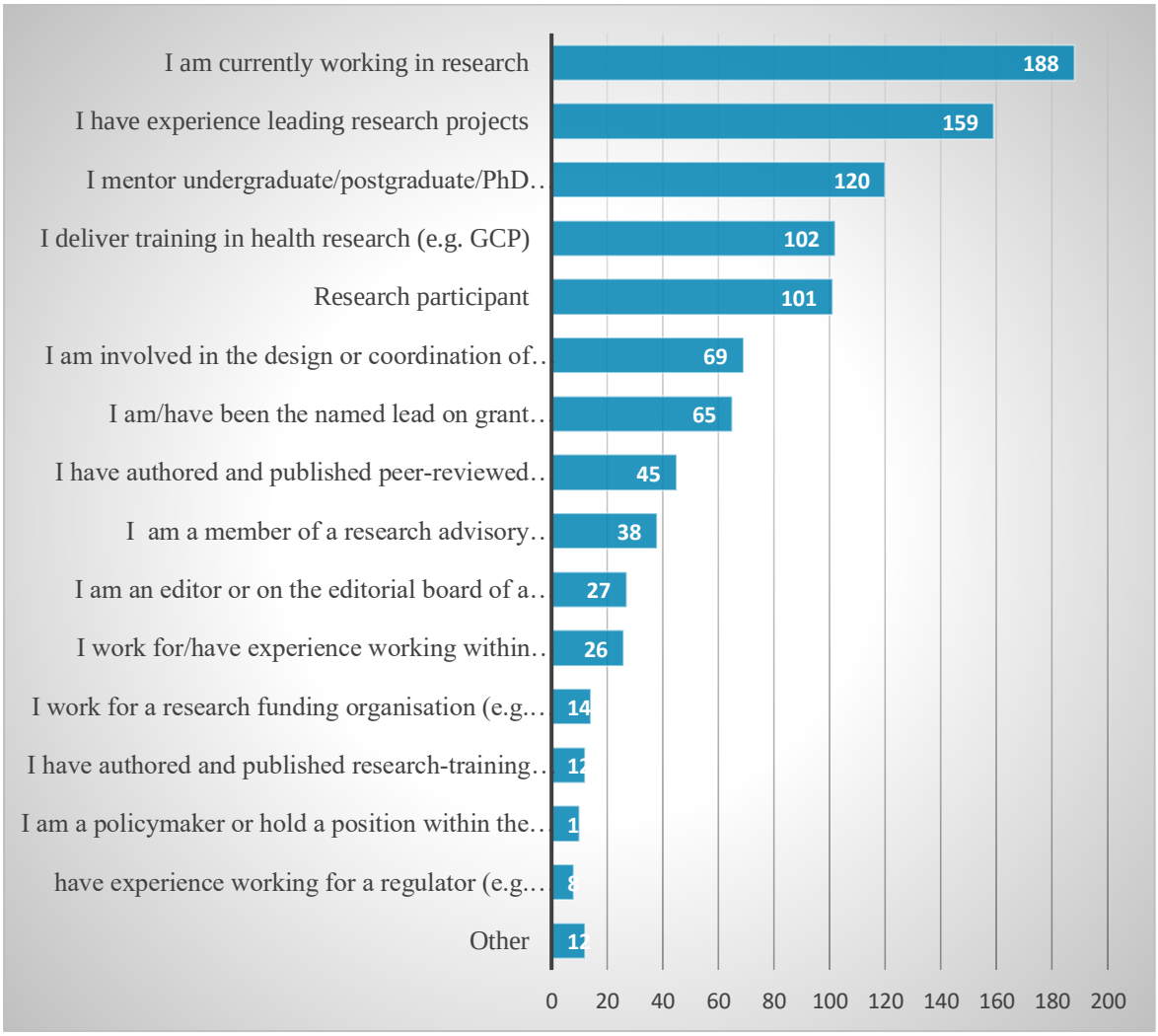

Figure 1: Panellist experience (* multiple types could be selected)

Panellists joined the Delphi from all across the globe:

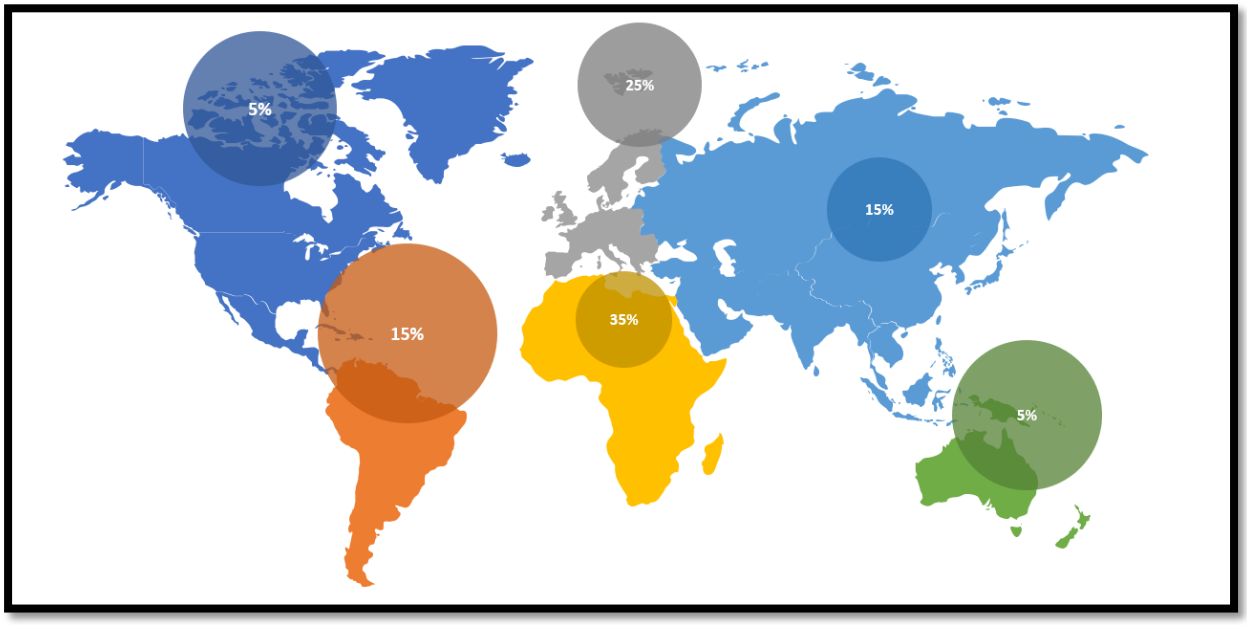

Figure 2: Proportion of panellists by region.

Panellists represented broad clinical research demographics, covering a wide range of job roles, including junior positions (e.g. Data Entry Clerk) and senior positions (e.g. Project Manager, senior investigators and directors), with input from multiple disciplines including social and medical sciences.

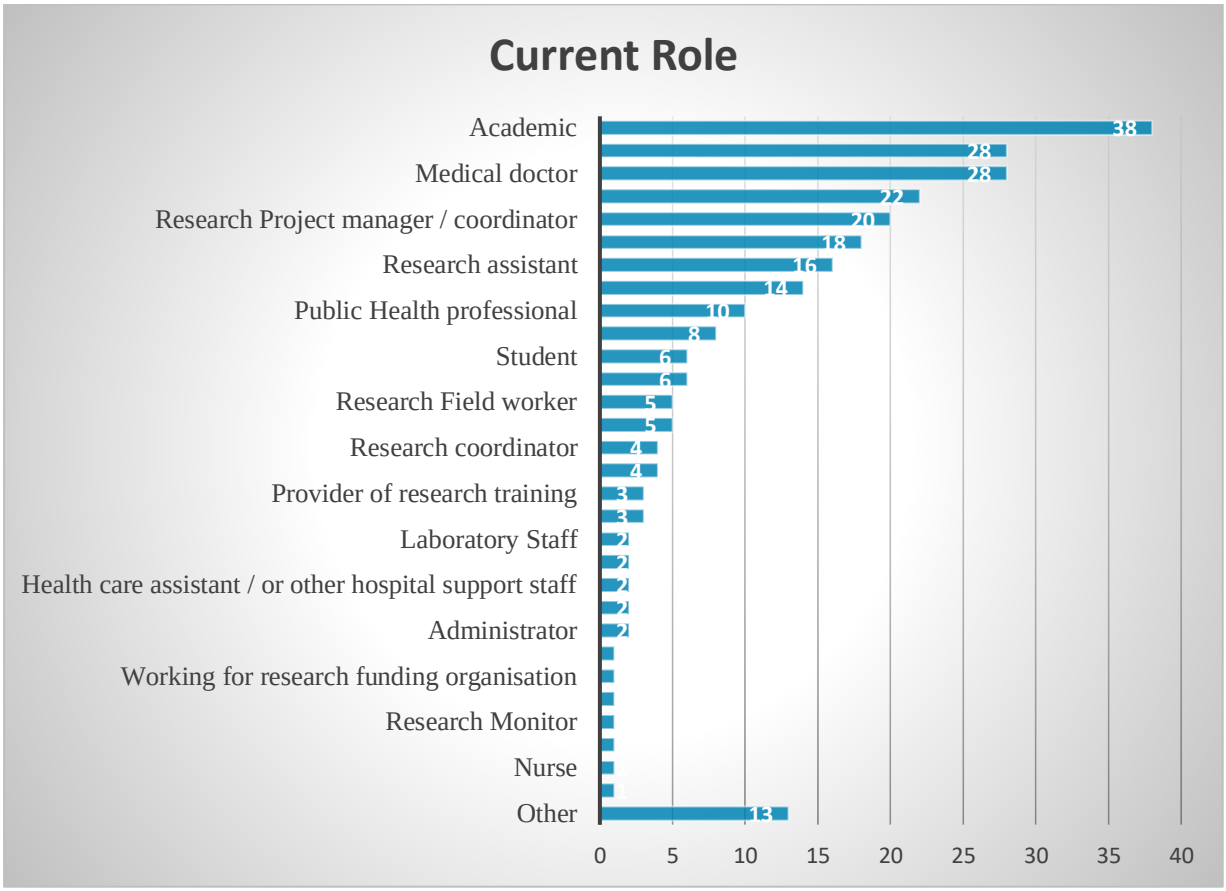

Figure 3: The research roles held by panellist enrolled in the Delphi

Panellist were mainly employed in academia, public hospitals and non-governmental institutions. However, various types of establishments featured through the sample of panellists, illustrating that the views, skills and concerns of researchers from different sectors and industries were represented.

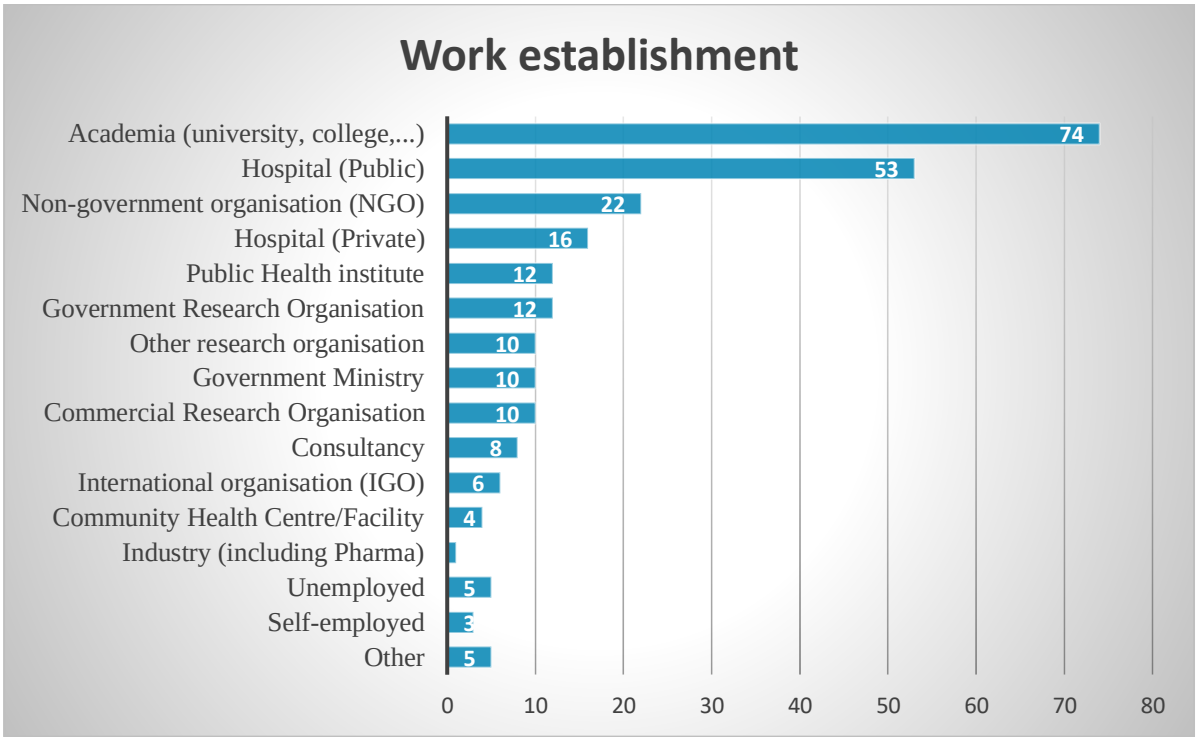

Figure 4: The type of establishment that panellists enrolled in the Delphi are affiliated with

Panellists indicated the diversity of research methods they were engaged with, illustrating significant involvement in 'Observational' and 'Clinical Trials'.

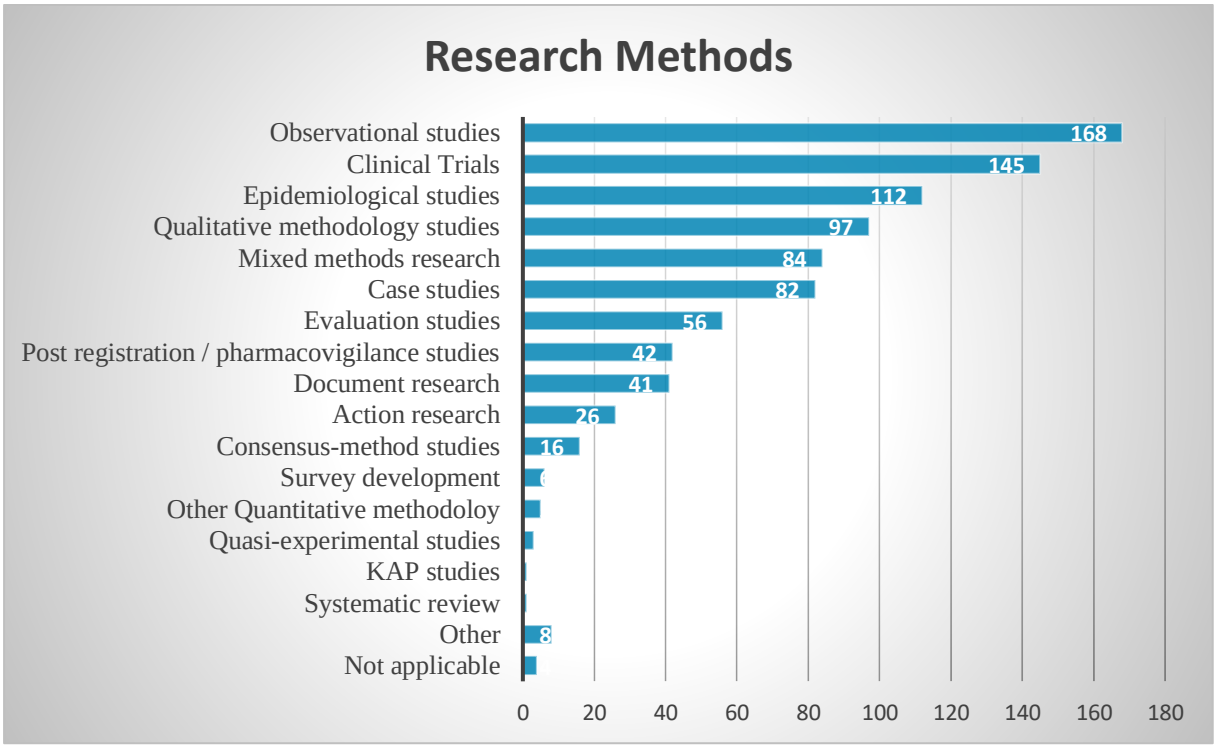

Figure 5: Panellists' research methods experience (* multiple types of studies could be selected)

Panellists also indicated the diversity of research topics (adapted from the WHO research priority list) they were engaged with, with a significant proportion involved in researching 'non-communicable diseases' and 'reproductive maternal, neonatal & child health'.

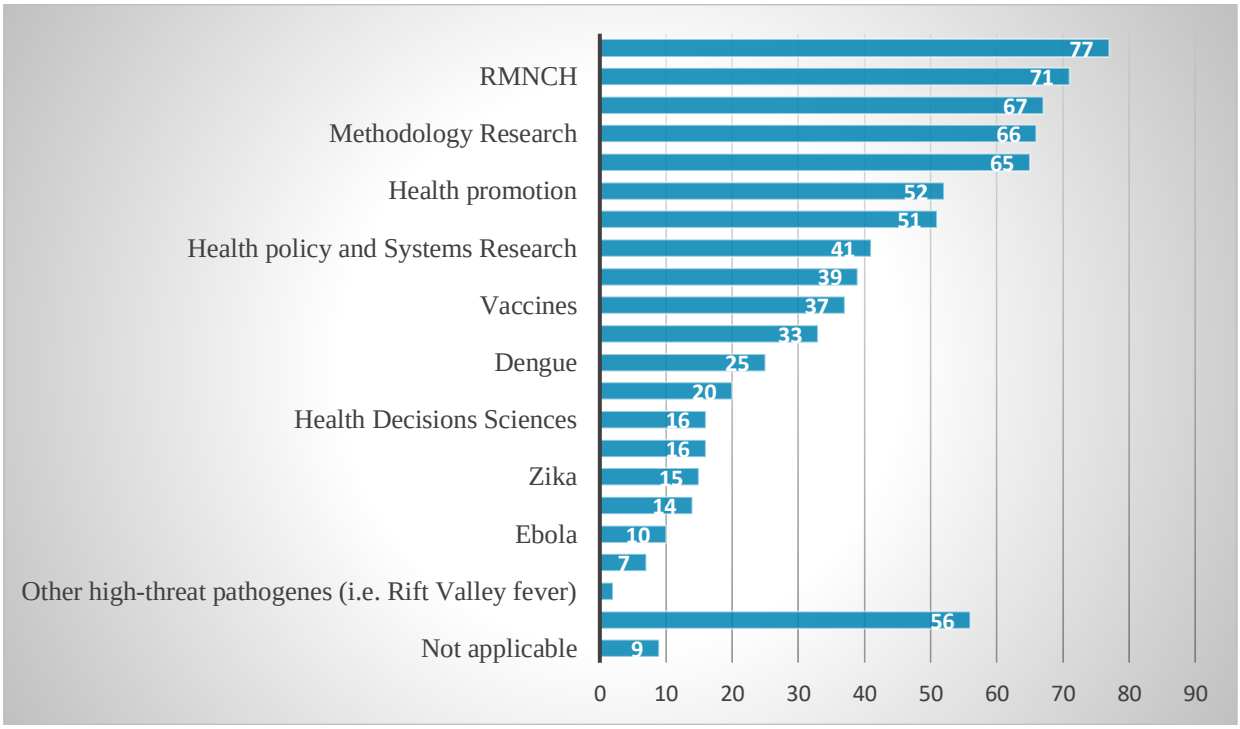

Figure 6: Panellists' research topic experience (* multiple types of studies could be selected)

Overview of responses

From a total of 98 categories presented in Delphi round 1 survey:

- The panel team has reached consensus for 43 themes to be included in the *Essential Research Skills Training Curriculum*.
- No consensus was reached for any theme to be excluded from *the Essential Research Skills Training Curriculum.*
- The remaining 55 themes will be re-evaluated in Delphi round 2 survey alongside alongside those that were identified as unclear and all new ones identified by panellists.

Delphi analysis results: Your responses relative to the wider panel

The following section provides a more detailed impression on an item-by-item basis. Furthermore, we include all the feedback commentary for each item from the panel.

Themes

1. Concept of health research.

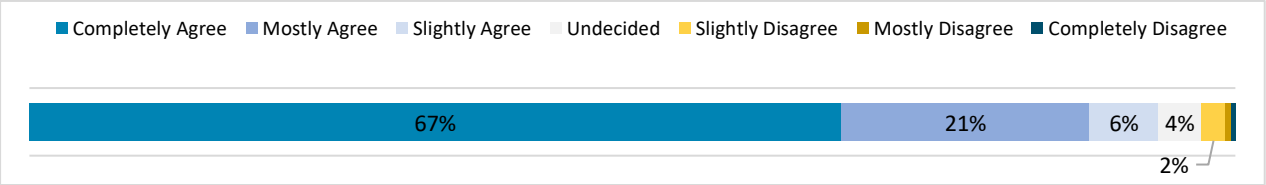

Figure 7: Percentage of panel members in each response category to statement 1

Delphi round 1 survey outcome: Consensus achieved (88%). Item included in *Essential Research Skills Training Curriculum.*

2. Understanding the difference between health research and standard of care, audit, evaluation.

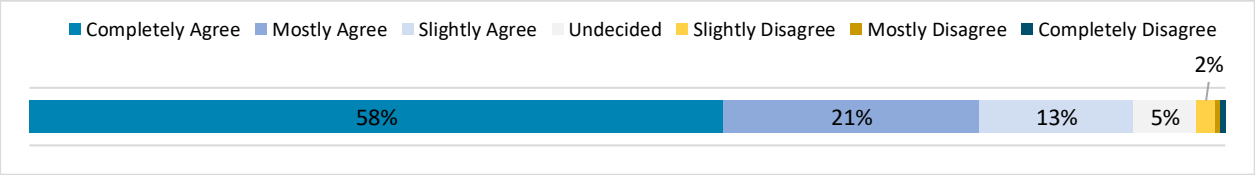

Figure 8: Percentage of panel members in each response category to statement 2

Delphi round 1 survey outcome: Consensus not achieved (79%). Item to be reviewed in delphi round 2 survey.

3. Identifying a research gap.

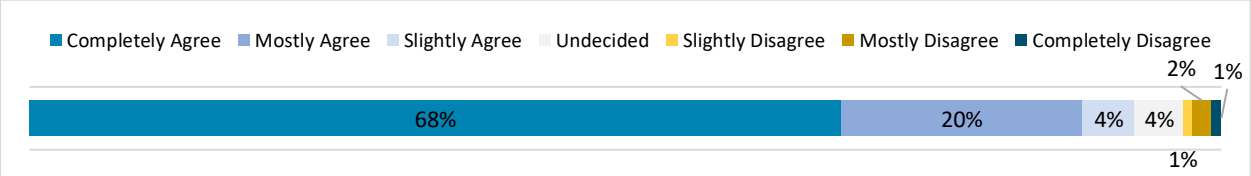

Figure 9: Percentage of panel members in each response category to statement 3

Delphi round 1 survey outcome: Consensus achieved (88%). Item included in *Essential Research Skills Training Curriculum.*

4. Development of a research question.

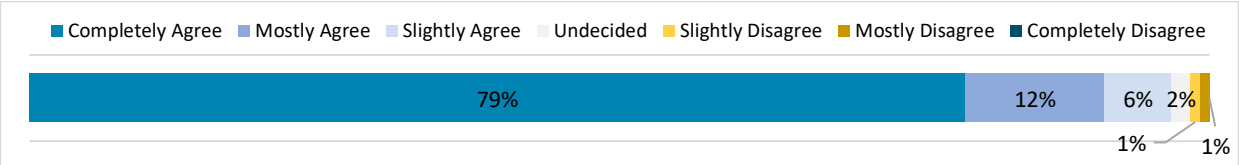

Figure 10: Percentage of panel members in each response category to statement 4

Delphi round 1 survey outcome: Consensus achieved (91%). Item included in *Essential Research Skills Training Curriculum.*

5. How to form a research agenda.

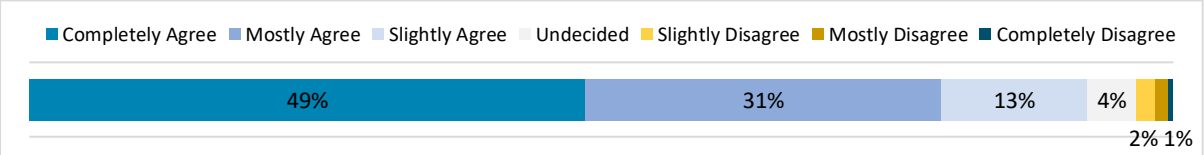

Figure 11: Percentage of panel members in each response category to statement 5

This statement was rated as 'unclear' and will be reviewed in Delphi round 2 survey

6. Qualitative methodologies.

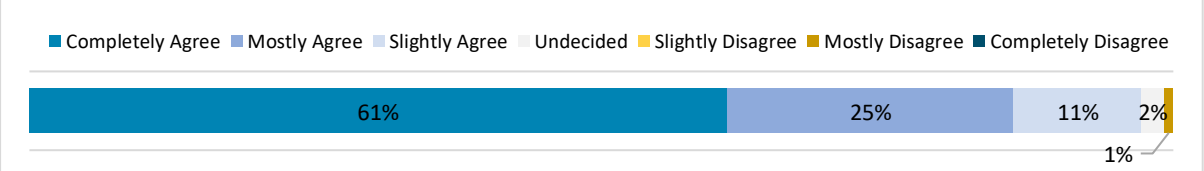

Figure 12: Percentage of panel members in each response category to statement 6

Delphi round 1 survey outcome: Consensus achieved (86%). Item included in *Essential Research Skills Training Curriculum.*

7. Quantitative methodologies.

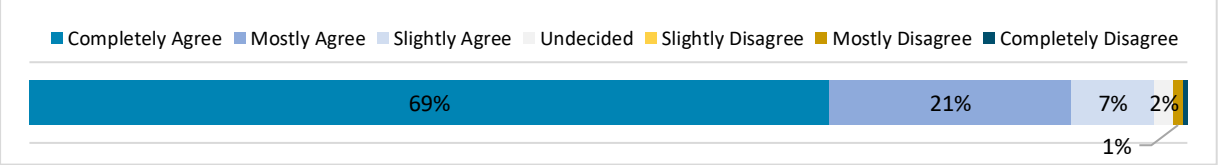

Figure 13: Percentage of panel members in each response category to statement 7

Delphi round 1 survey outcome: Consensus achieved (90%). Item included in *Essential Research Skills Training Curriculum.*

8. Mixed Methods research.

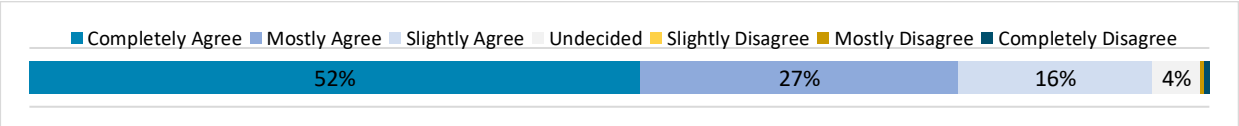

Figure 14: Percentage of panel members in each response category to statement 8

Delphi round 1 survey outcome: Consensus not achieved (79%). Item to be reviewed in Delphi round 2 survey.

9. Epidemiological studies.

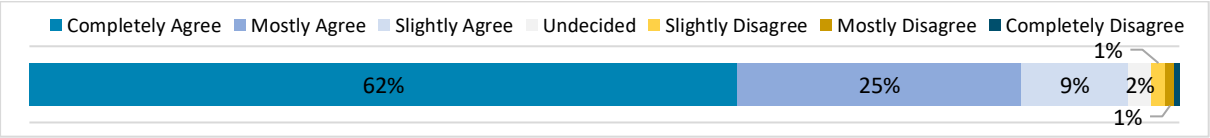

Figure 15: Percentage of panel members in each response category to statement 9

Delphi round 1 survey outcome: Consensus achieved (87%). Item included in *Essential Research Skills Training Curriculum.*

10. Meta-analysis.

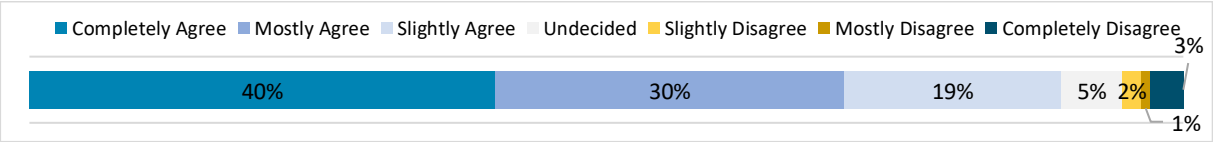

Figure 16: Percentage of panel members in each response category to statement 10

Delphi round 1 survey outcome: Consensus not achieved (70%). Item to be reviewed in Delphi round 2 survey.

11. Health Policy and Systems Research.

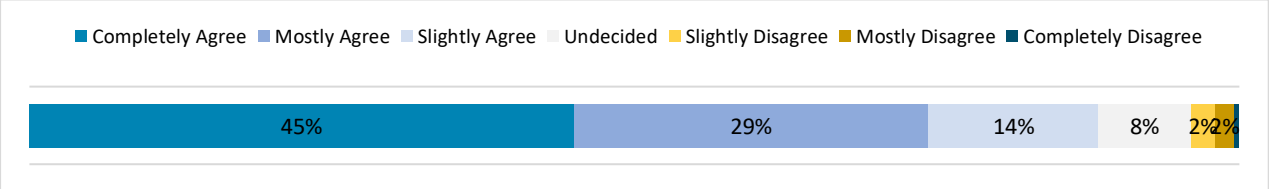

Figure 17: Percentage of panel members in each response category to statement 11

Delphi round 1 survey outcome: Consensus not achieved (74%). Item to be reviewed in Delphi round 2 survey.

12. Social sciences and anthropological studies.

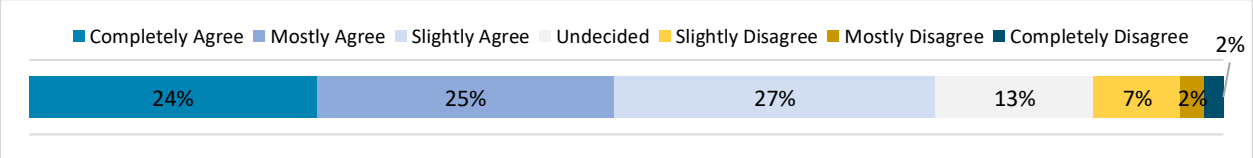

Figure 18: Percentage of panel members in each response category to statement 12

This statement was rated as 'unclear' and will be reviewed in Delphi round 2 survey.

13. Health economics and economic evaluations.

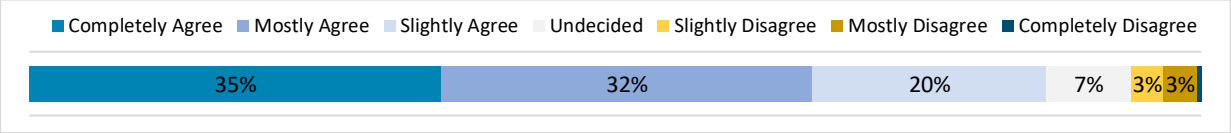

Figure 19: Percentage of panel members in each response category to statement 13

Delphi round 1 survey outcome: Consensus not achieved (67%). Item to be reviewed in Delphi round 2 survey.

14. Mathematical Modelling.

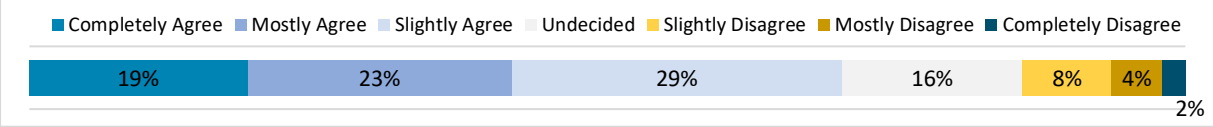

Figure 20: Percentage of panel members in each response category to statement 14

This statement was rated as 'unclear' and will be reviewed in Delphi round 2 survey.

15. Research designs for outbreaks.

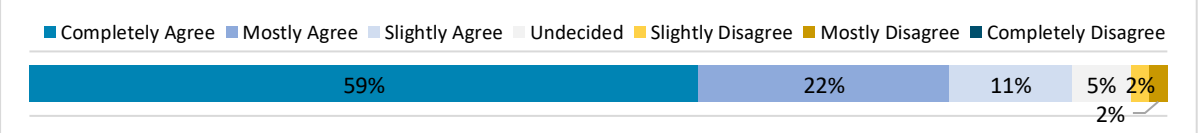

Figure 21: Percentage of panel members in each response category to statement 15

Delphi round 1 survey outcome: Consensus not achieved (81%). Item to be reviewed in Delphi round 2 survey.

16. Clinical trials.

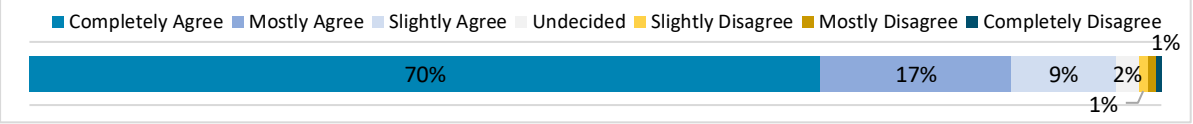

Figure 22: Percentage of panel members in each response category to statement 16

Delphi round 1 survey outcome: Consensus achieved (87%). Item included in *Essential Research Skills Training Curriculum.*

17. Methodology Research (research on research).

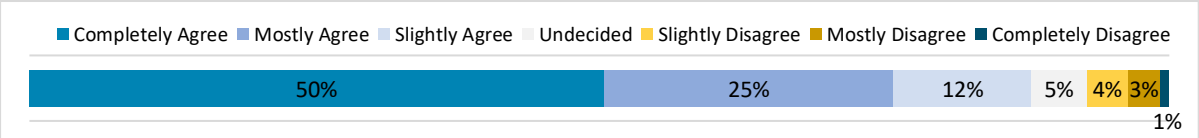

Figure 23: Percentage of panel members in each response category to statement 17

Delphi round 1 survey outcome: Consensus not achieved (75%). Item to be reviewed in Delphi round 2 survey.

18. Implementation research.

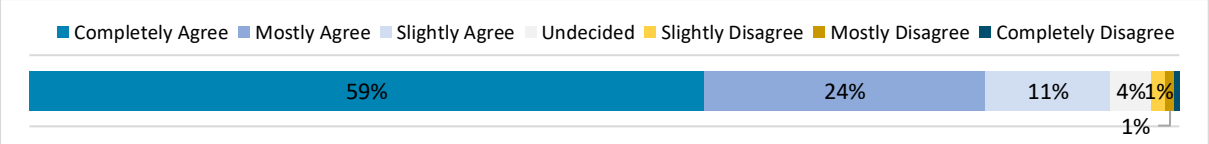

Figure 24: Percentage of panel members in each response category to statement 18

Delphi round 1 survey outcome: Consensus not achieved (73%). Item to be reviewed in Delphi round 2 survey.

19. Experimental research.

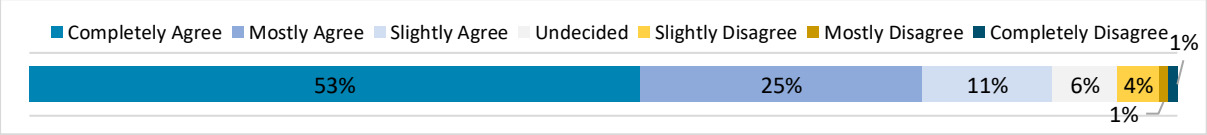

Figure 25: Percentage of panel members in each response category to statement 19

Delphi round 1 survey outcome: Consensus not achieved (78%). Item to be reviewed in Delphi round 2 survey.

20. Operational research.

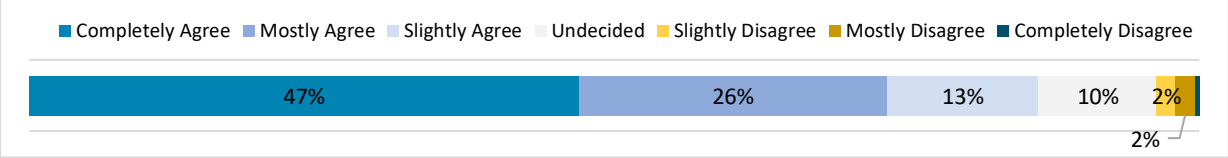

Figure 26: Percentage of panel members in each response category to statement 20

This statement was rated as 'unclear' and will be reviewed in Delphi round 2 survey.

21. Identifying various funding agencies/sources.

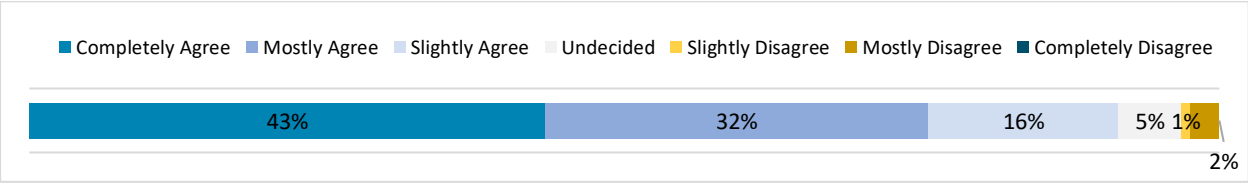

Figure 27: Percentage of panel members in each response category to statement 21

Delphi round 1 survey outcome: Consensus not achieved (75%). Item to be reviewed in Delphi round 2 survey.

22. Ability to communicate and meet with funders.

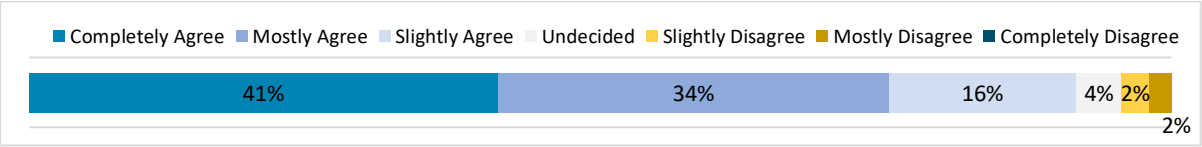

Figure 28: Percentage of panel members in each response category to statement 22

Delphi round 1 survey outcome: Consensus not achieved (75%). Item to be reviewed in Delphi round 2 survey.

23. Writing a grant application and/or grant proposal.

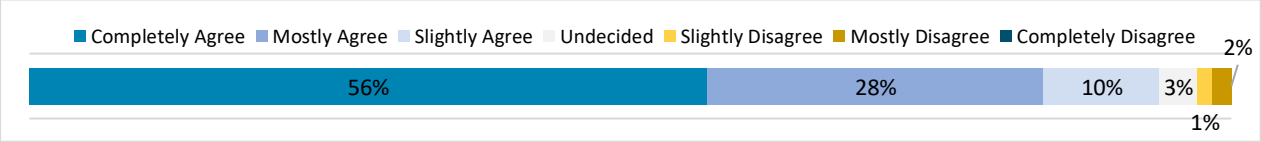

Figure 29: Percentage of panel members in each response category to statement 23

Delphi round 1 survey outcome: Consensus not achieved (84%). Item to be reviewed in Delphi round 2 survey.

24. Writing a research protocol.

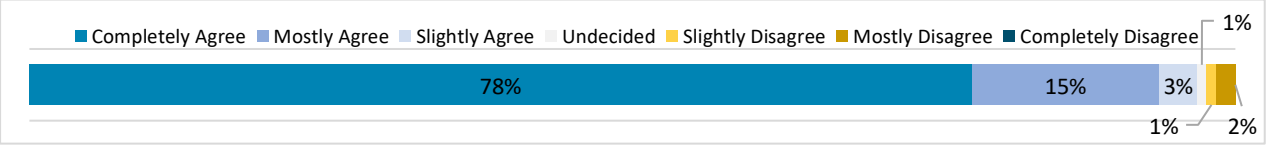

Figure 30: Percentage of panel members in each response category to statement 24

Delphi round 1 survey outcome: Consensus achieved (88%). Item included in *Essential Research Skills Training Curriculum.*

25. Identifying research participants and selection criteria.

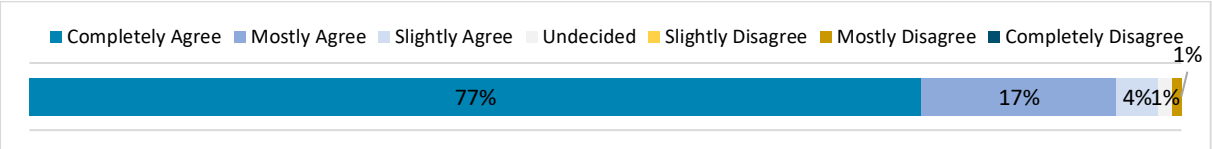

Figure 31: Percentage of panel members in each response category to statement 25

Delphi round 1 survey outcome: Consensus achieved (94%). Item included in *Essential Research Skills Training Curriculum.*

26. Qualitative sampling methods.

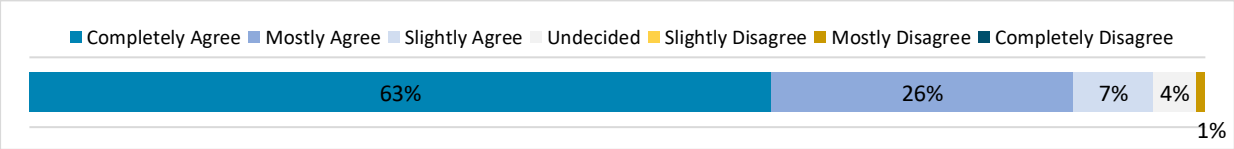

Figure 32: Percentage of panel members in each response category to statement 26

Delphi round 1 survey outcome: Consensus achieved (89%). Item included in *Essential Research Skills Training Curriculum.*

27. Quantitative sampling methods.

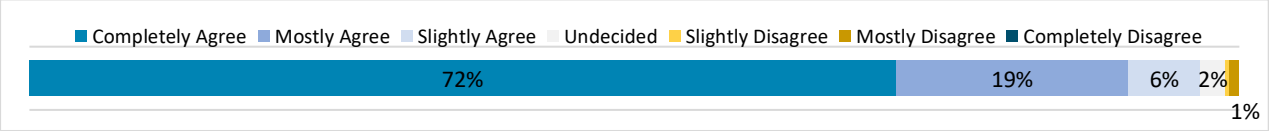

Figure 33: Percentage of panel members in each response category to statement 27

Delphi round 1 survey outcome: Consensus achieved (91%). Item included in *Essential Research Skills Training Curriculum.*

28. Definition and methods of randomization.

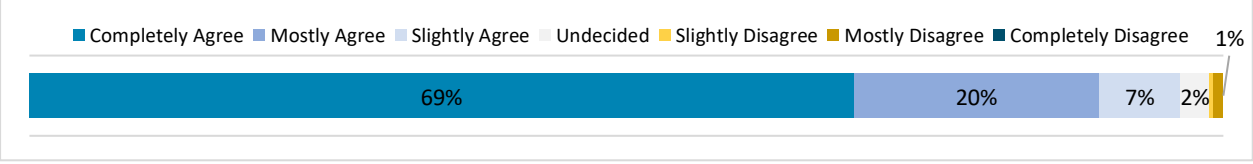

Figure 34: Percentage of panel members in each response category to statement 28

Delphi round 1 survey outcome: Consensus achieved (89%). Item included in *Essential Research Skills Training Curriculum.*

29. Calculation of participant sample size and sample power.

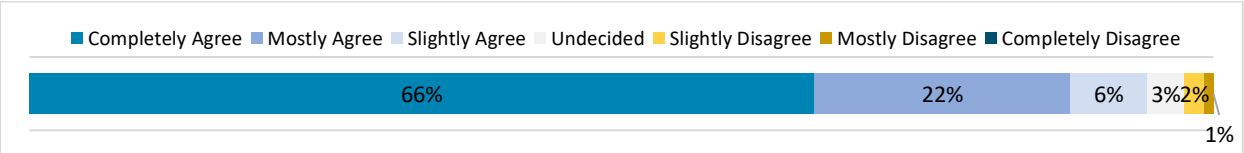

Figure 35: Percentage of panel members in each response category to statement 29

Delphi round 1 survey outcome: Consensus achieved (88%). Item included in *Essential Research Skills Training Curriculum.*

30. Selection of control groups for comparison purposes.

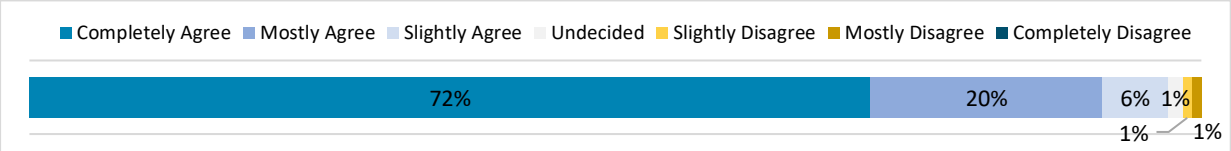

Figure 36: Percentage of panel members in each response category to statement 30

Delphi round 1 survey outcome: Consensus achieved (92%). Item included in *Essential Research Skills Training Curriculum.*

31. Setting up a research laboratory.

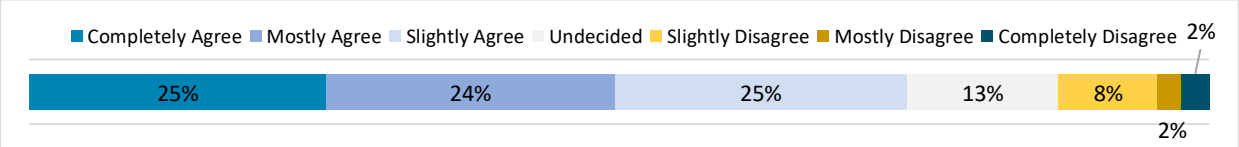

Figure 37: Percentage of panel members in each response category to statement 31

Delphi round 1 survey outcome: Consensus not achieved (48%). Item to be reviewed in Delphi round 2 survey.

32. Specific laboratory techniques and equipment handling.

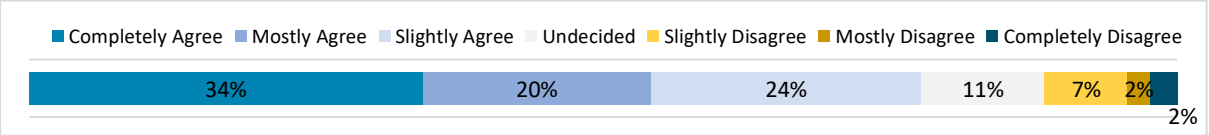

Figure 38: Percentage of panel members in each response category to statement 32

Delphi round 1 survey outcome: Consensus not achieved (54%). Item to be reviewed in Delphi round 2 survey.

33. Laboratory sample handling and storage.

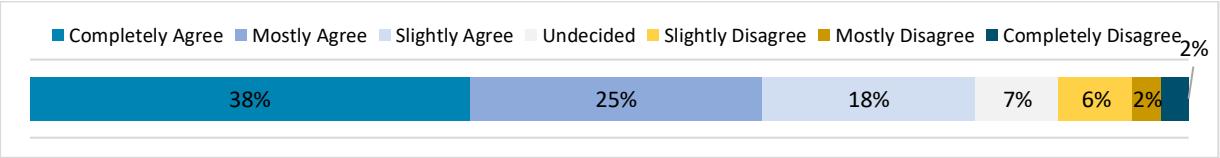

Figure 39: Percentage of panel members in each response category to statement 33

Delphi round 1 survey outcome: Consensus not achieved (63%). Item to be reviewed in Delphi round 2 survey.

34. Laboratory management.

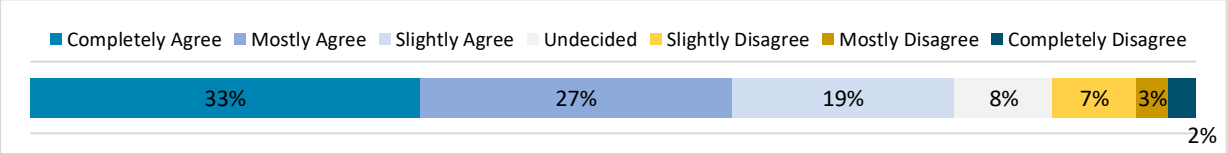

Figure 40: Percentage of panel members in each response category to statement 34

Delphi round 1 survey outcome: Consensus not achieved (60%). Item to be reviewed in Delphi round 2 survey.

35. Laboratory standards and regulations.

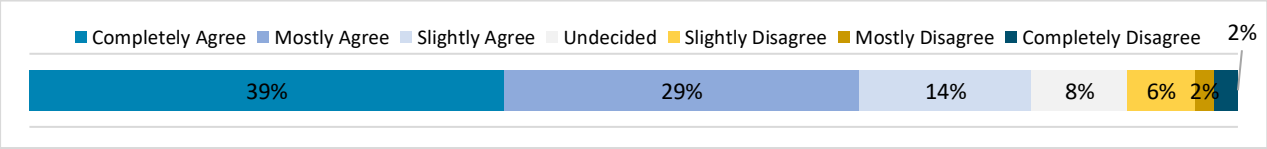

Figure 41: Percentage of panel members in each response category to statement 35

Delphi round 1 survey outcome: Consensus not achieved (68%). Item to be reviewed in Delphi round 2 survey.

36. Laboratory quality best practices.

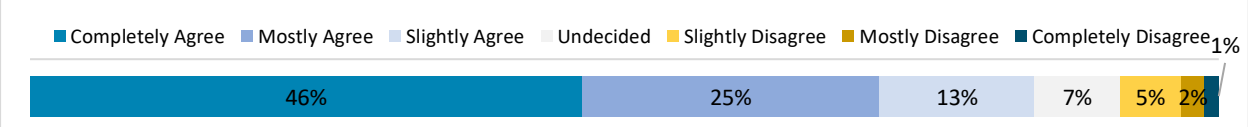

Figure 42: Percentage of panel members in each response category to statement 36

Delphi round 1 survey outcome: Consensus not achieved (71%). Item to be reviewed in Delphi round 2 survey.

37. Laboratory safety practices.

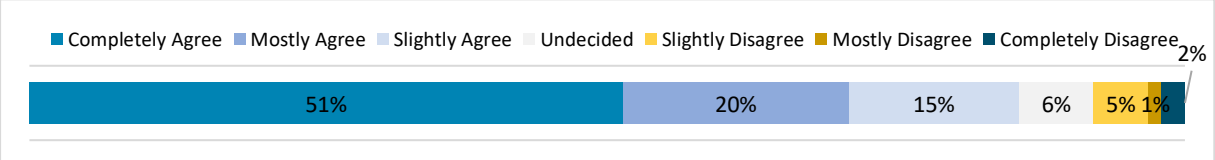

Figure 43: Percentage of panel members in each response category to statement 37

Delphi round 1 survey outcome: Consensus not achieved (71%). Item to be reviewed in Delphi round 2 survey.

38. Good Clinical Laboratory Practice (GCLP).

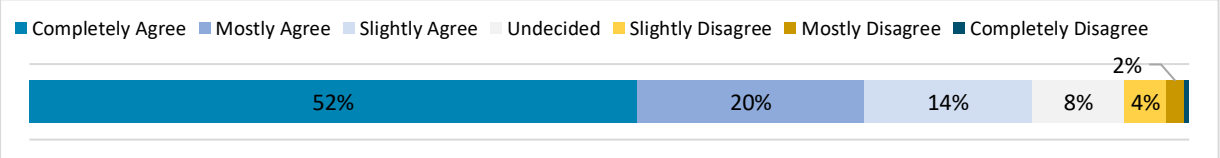

Figure 44: Percentage of panel members in each response category to statement 38

Delphi round 1 survey outcome: Consensus not achieved (72%). Item to be reviewed in Delphi round 2 survey.

39. Good Participatory Practice (GPP).

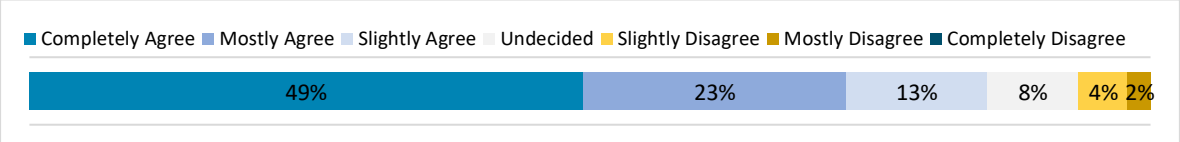

Figure 45: Percentage of panel members in each response category to statement 39

This statement was rated as 'unclear' and will be reviewed in Delphi round 2 survey.

40. Community engagement principles and activities.

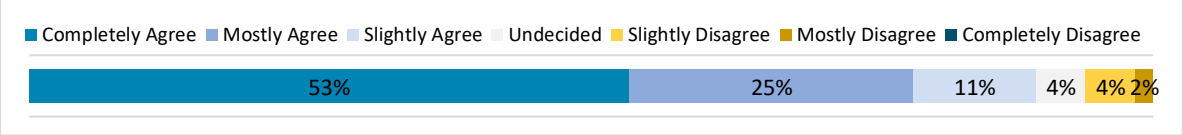

Figure 46: Percentage of panel members in each response category to statement 40

This statement was rated as 'unclear' and will be reviewed in Delphi round 2 survey.

41. How to manage expectations of study communities.

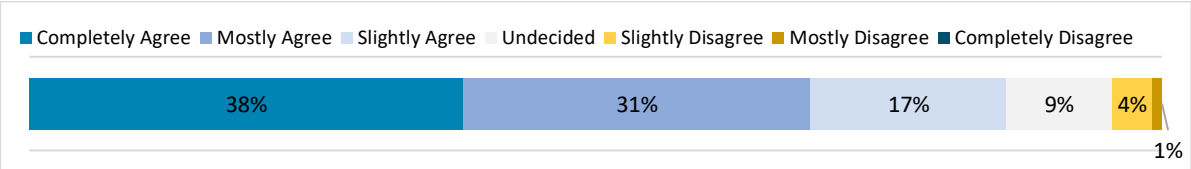

Figure 47: Percentage of panel members in each response category to statement 41

This statement was rated as 'unclear' and will be reviewed in Delphi round 2 survey.

42. Participants' retention strategies.

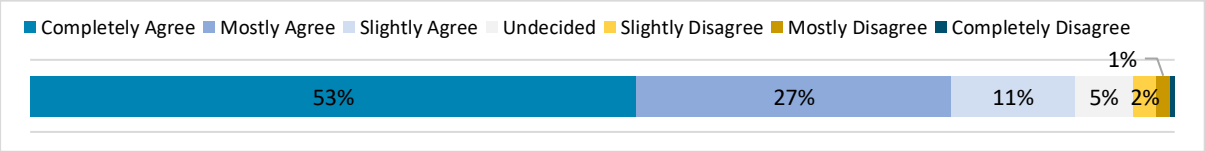

Figure 48: Percentage of panel members in each response category to statement 42

Delphi round 1 survey outcome: Consensus not achieved (80%). Item to be reviewed in Delphi round 2 survey.

43. Participants' "loss to follow-up".

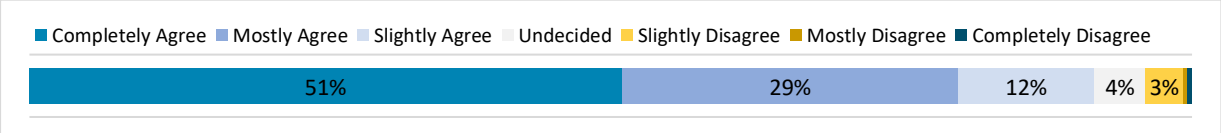

Figure 49: Percentage of panel members in each response category to statement 43

Delphi round 1 survey outcome: Consensus not achieved (80%). Item to be reviewed in Delphi round 2 survey.

44. Attrition bias and prevention methods.

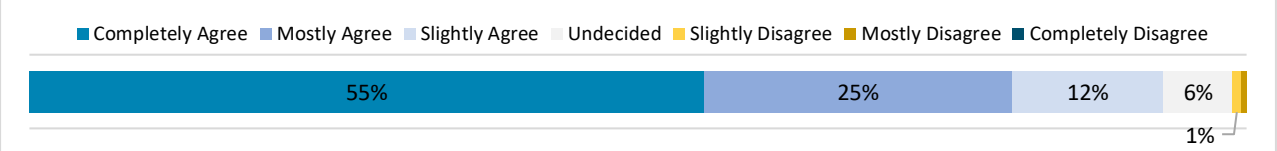

Figure 50: Percentage of panel members in each response category to statement 44

Delphi round 1 survey outcome: Consensus not achieved (80%). Item to be reviewed in Delphi round 2 survey.

45. Definition of quality data.

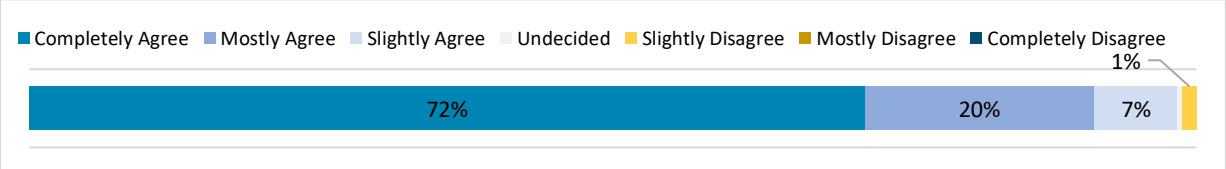

Figure 51: Percentage of panel members in each response category to statement 45

Delphi round 1 survey outcome: Consensus achieved (92%). Item included in *Essential Research Skills Training Curriculum.*

46. Qualitative data collection methods.

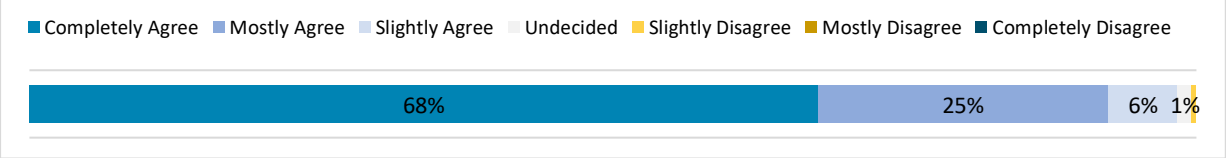

Figure 52: Percentage of panel members in each response category to statement 46

Delphi round 1 survey outcome: Consensus achieved (93%). Item included in *Essential Research Skills Training Curriculum.*

47. Quantitative data collection methods.

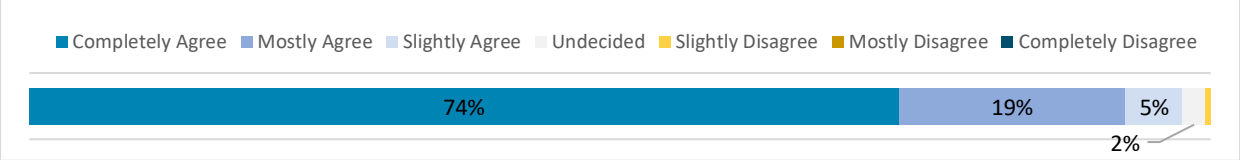

Figure 53: Percentage of panel members in each response category to statement 47

Delphi round 1 survey outcome: Consensus achieved (93%). Item included in *Essential Research Skills Training Curriculum.*

48. Data collection tools (e.g. designing surveys and CRF's).

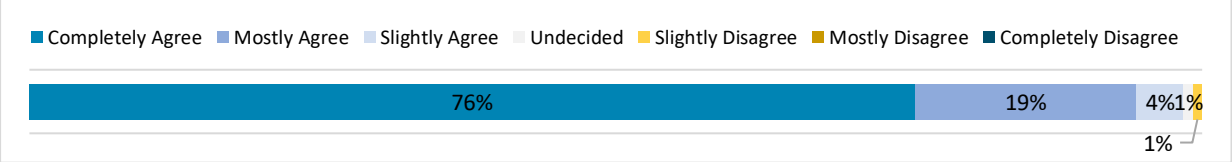

Figure 54: Percentage of panel members in each response category to statement 48

Delphi round 1 survey outcome: Consensus achieved (95%). Item included in *Essential Research Skills Training Curriculum.*

49. Data management systems.

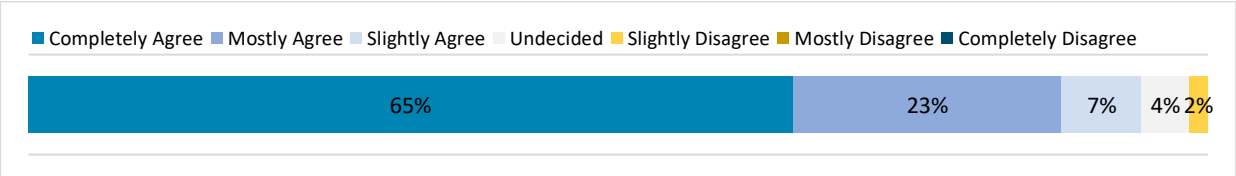

Figure 55: Percentage of panel members in each response category to statement 49

Delphi round 1 survey outcome: Consensus achieved (88%). Item included in *Essential Research Skills Training Curriculum.*

50. Qualitative analysis.

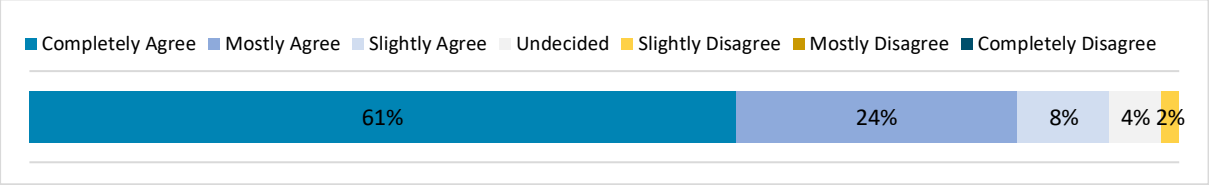

Figure 56: Percentage of panel members in each response category to statement 50

Delphi round 1 survey outcome: Consensus achieved (85%). Item included in *Essential Research Skills Training Curriculum.*

51. Statistics.

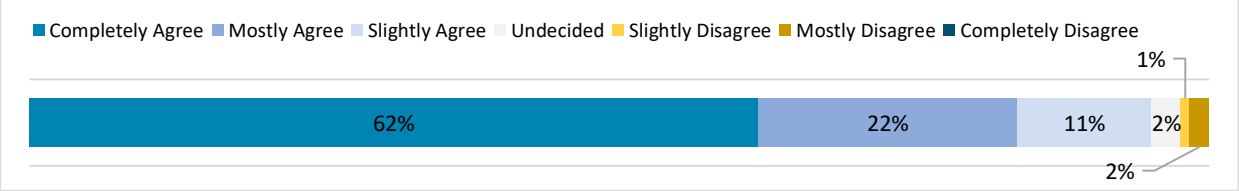

Figure 57: Percentage of panel members in each response category to statement 51

Delphi round 1 survey outcome: Consensus not achieved (84%). Item to be reviewed in Delphi round 2 survey.

52. Data analysis software (qualitative and quantitative).

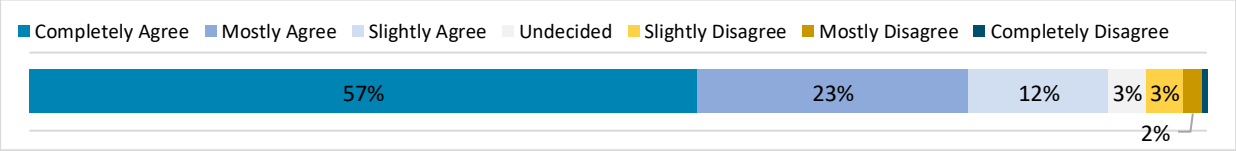

Figure 58: Percentage of panel members in each response category to statement 52

Delphi round 1 survey outcome: Consensus not achieved (80%). Item to be reviewed in Delphi round 2 survey.

53. Data presentation.

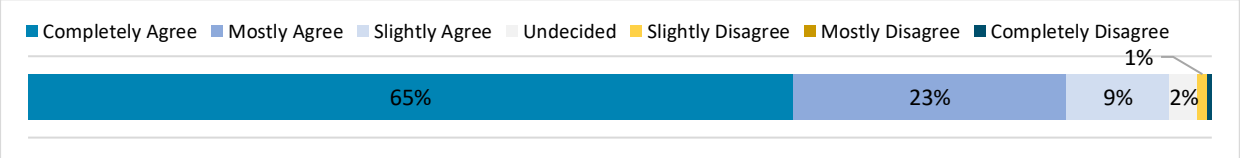

Figure 59: Percentage of panel members in each response category to statement 53

Delphi round 1 survey outcome: Consensus achieved (88%). Item included in *Essential Research Skills Training Curriculum.*

54. Data sharing best practices and governance.

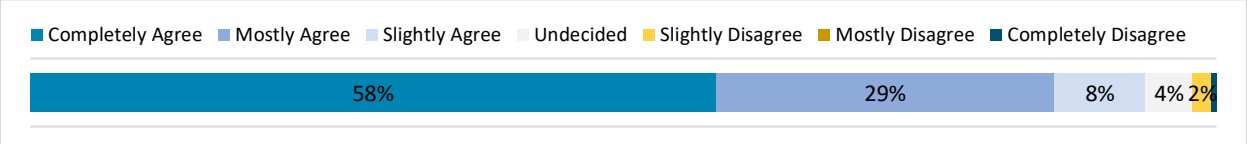

Figure 60: Percentage of panel members in each response category to statement 54

Delphi round 1 survey outcome: Consensus achieved (87%). Item included in *Essential Research Skills Training Curriculum.*

55. Quality assurance systems.

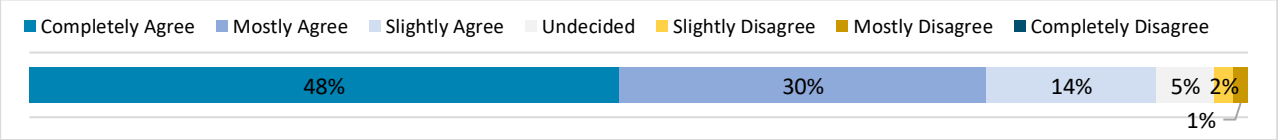

Figure 61: Percentage of panel members in each response category to statement 55

Delphi round 1 survey outcome: Consensus not achieved (78%). Item to be reviewed in Delphi round 2 survey.

56. Quality management systems.

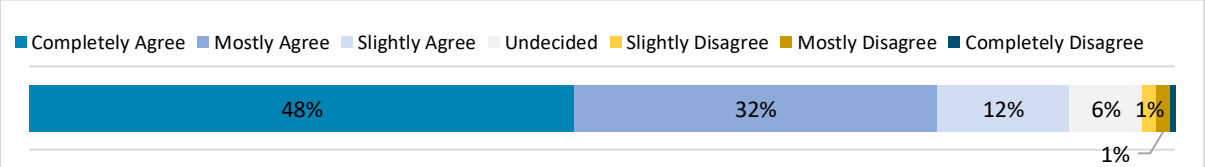

Figure 62: Percentage of panel members in each response category to statement 56

Delphi round 1 survey outcome: Consensus not achieved (80%). Item to be reviewed in Delphi round 2 survey.

57. Monitoring and Evaluation.

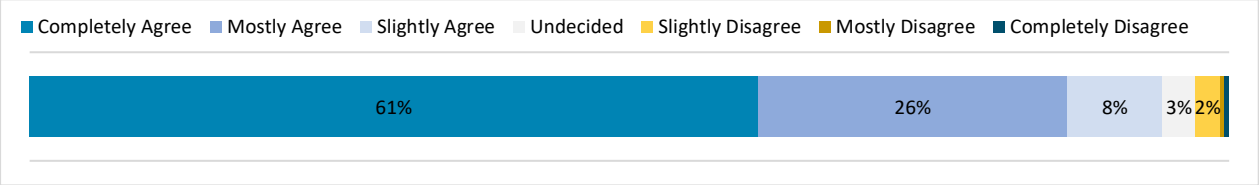

Figure 63: Percentage of panel members in each response category to statement 57

Delphi round 1 survey outcome: Consensus achieved (87%). Item included in *Essential Research Skills Training Curriculum.*

58. Audit.

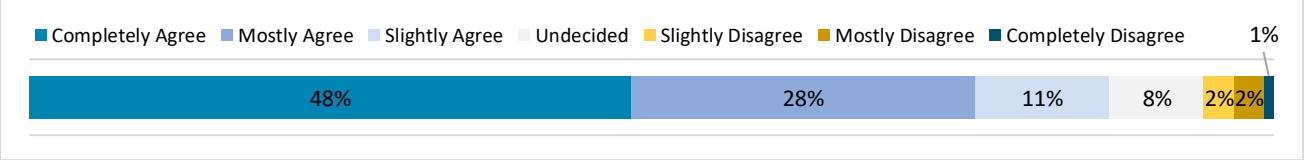

Figure 64: Percentage of panel members in each response category to statement 58

Delphi round 1 survey outcome: Consensus not achieved (76%). Item to be reviewed in Delphi round 2 survey.

59. Development of Standard Operating Procedures (SOPs).

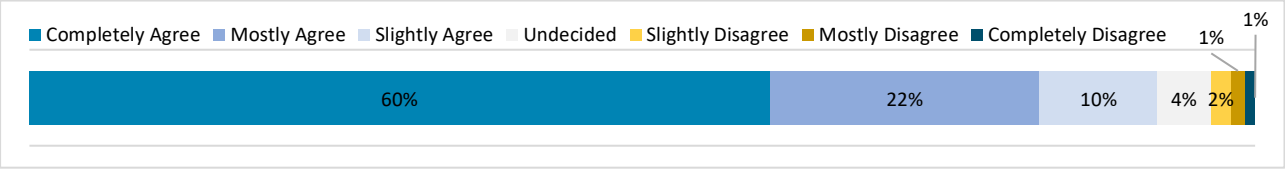

Figure 65: Percentage of panel members in each response category to statement 59

Delphi round 1 survey outcome: Consensus not achieved (82%). Item to be reviewed in Delphi round 2 survey.

60. Governance and regulation.

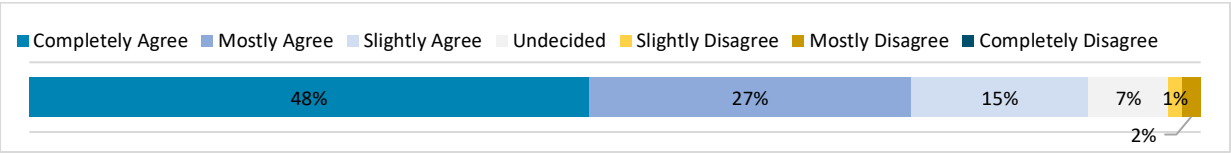

Figure 66: Percentage of panel members in each response category to statement 60

This statement was rated as 'unclear' and will be reviewed in Delphi round 2 survey.

61. Good clinical practice (GCP).

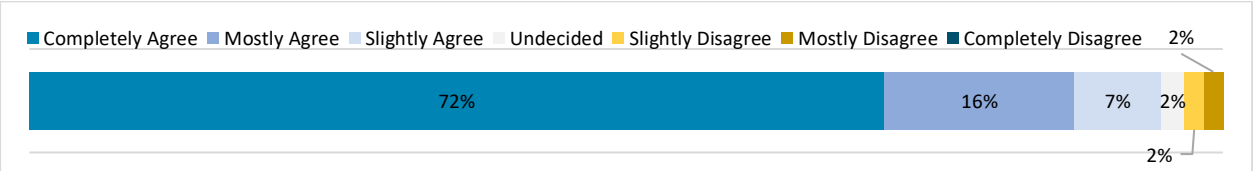

Figure 67: Percentage of panel members in each response category to statement 61

Delphi round 1 survey outcome: Consensus achieved (88%). Item included in *Essential Research Skills Training Curriculum.*

62. Research Project management and planning.

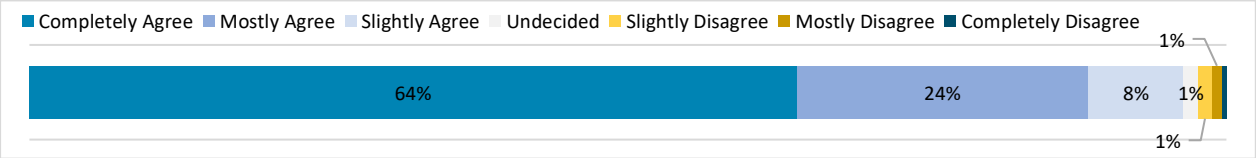

Figure 68: Percentage of panel members in each response category to statement 62

Delphi round 1 survey outcome: Consensus achieved (88%). Item included in *Essential Research Skills Training Curriculum.*

63. Research Time management.

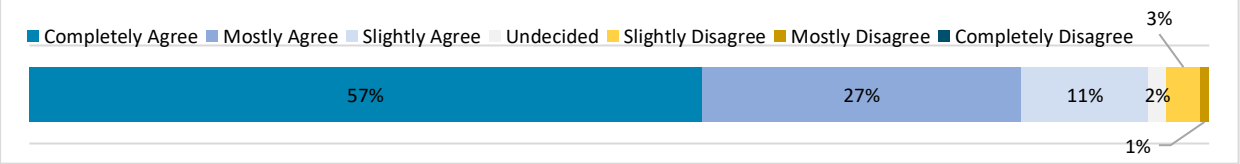

Figure 69: Percentage of panel members in each response category to statement 63

Delphi round 1 survey outcome: Consensus not achieved (84%). Item to be reviewed in Delphi round 2 survey.

64. Study set-up.

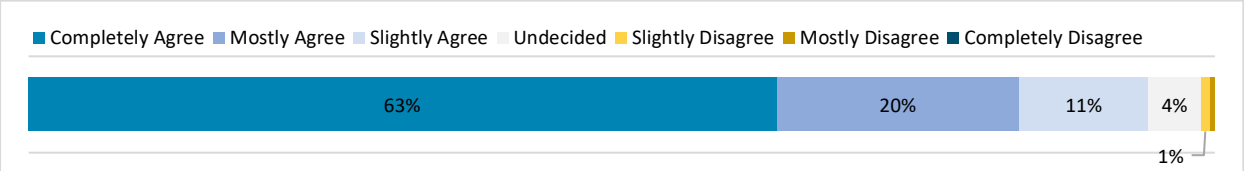

Figure 70: Percentage of panel members in each response category to statement 64

Delphi round 1 survey outcome: Consensus not achieved (83%). Item to be reviewed in Delphi round 2 survey.

65. Storage of research materials.

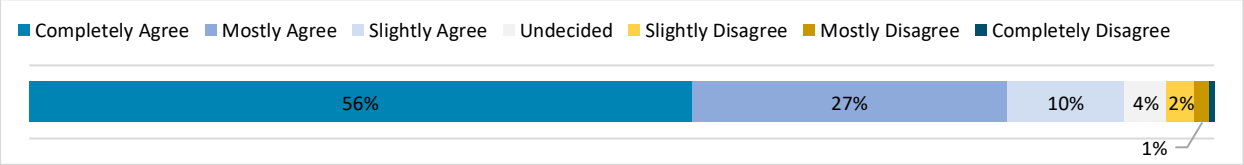

Figure 71: Percentage of panel members in each response category to statement 65

Delphi round 1 survey outcome: Consensus not achieved (83%). Item to be reviewed in Delphi round 2 survey.

66. Writing a study budget.

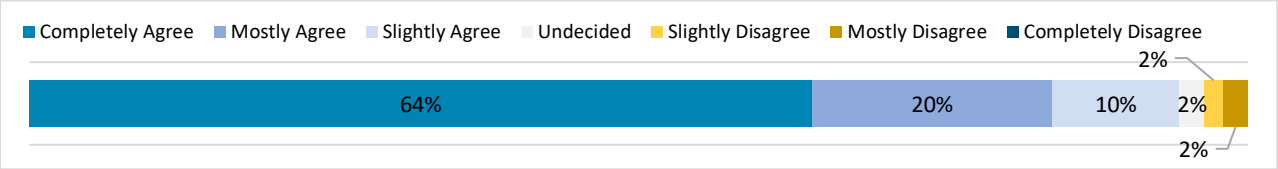

Figure 72: Percentage of panel members in each response category to statement 66

Delphi round 1 survey outcome: Consensus not achieved (84%). Item to be reviewed in Delphi round 2 survey.

67. Budget management.

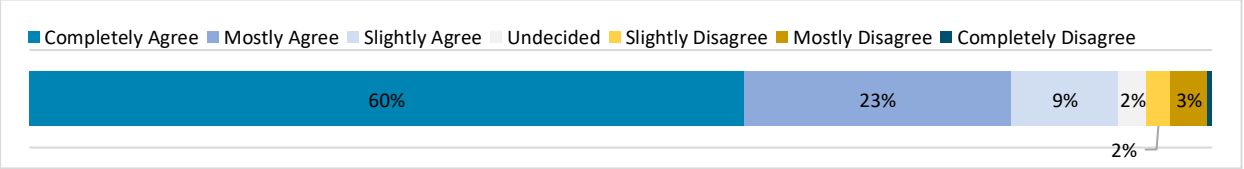

Figure 73: Percentage of panel members in each response category to statement 67

Delphi round 1 survey outcome: Consensus not achieved (83%). Item to be reviewed in Delphi round 2 survey.

68. Security issues during data collection and how to manage risk.

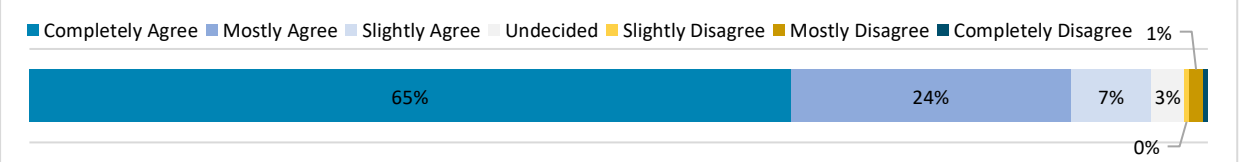

Figure 74: Percentage of panel members in each response category to statement 68

Delphi round 1 survey outcome: Consensus achieved (89%). Item included in *Essential Research Skills Training Curriculum.*

69. Laboratory biosafety and how to manage hazards.

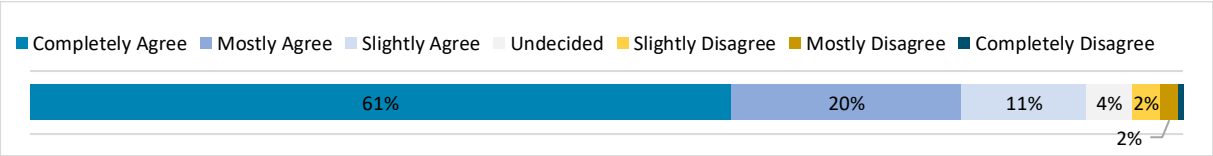

Figure 75: Percentage of panel members in each response category to statement 69

Delphi round 1 survey outcome: Consensus not achieved (81%). Item to be reviewed in Delphi round 2 survey.

70. Pharmacovigilance principles and reporting adverse effects.

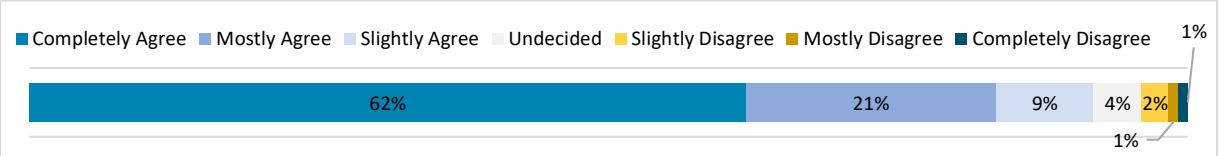

Figure 76: Percentage of panel members in each response category to statement 70

Delphi round 1 survey outcome: Consensus not achieved (83%). Item to be reviewed in Delphi round 2 survey.

71. Professional guidelines and codes of ethics which apply to the conduct of clinical research.

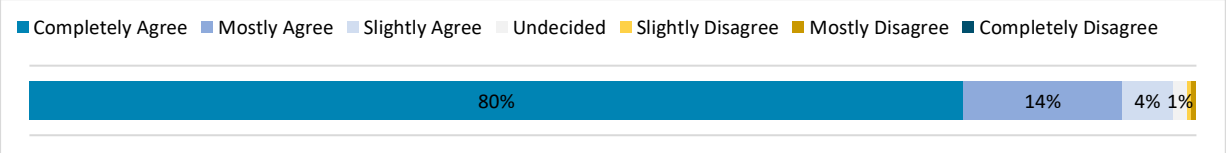

Figure 77: Percentage of panel members in each response category to statement 71

Delphi round 1 survey outcome: Consensus achieved (94%). Item included in *Essential Research Skills Training Curriculum.*

72. Informed Consent and assent.

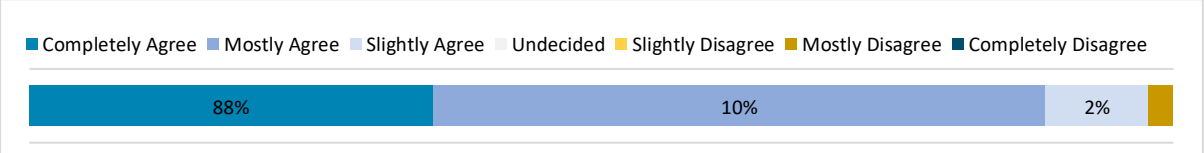

Figure 78: Percentage of panel members in each response category to statement 72

Delphi round 1 survey outcome: Consensus achieved (98%). Item included in *Essential Research Skills Training Curriculum.*

73. Participant's confidentiality and privacy.

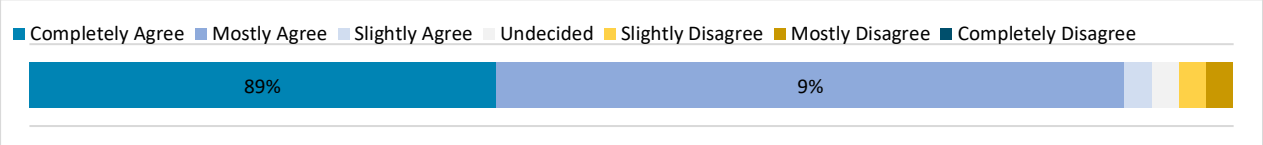

Figure 79: Percentage of panel members in each response category to statement 73

Delphi round 1 survey outcome: Consensus achieved (98%). Item included in *Essential Research Skills Training Curriculum.*

74. Definition of vulnerable populations and ethics of working with these populations.

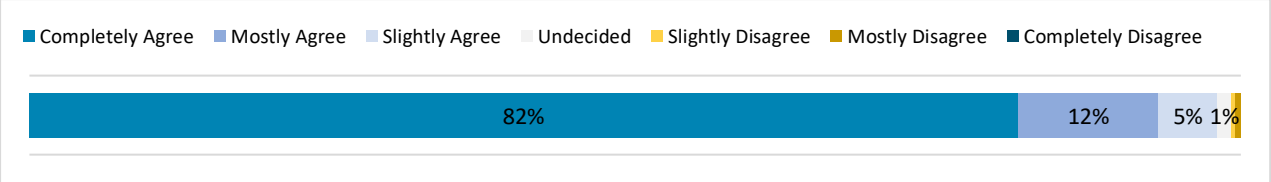

Figure 80: Percentage of panel members in each response category to statement 74

Delphi round 1 survey outcome: Consensus achieved (94%). Item included in *Essential Research Skills Training Curriculum.*

75. Ethical practices around data handling/management.

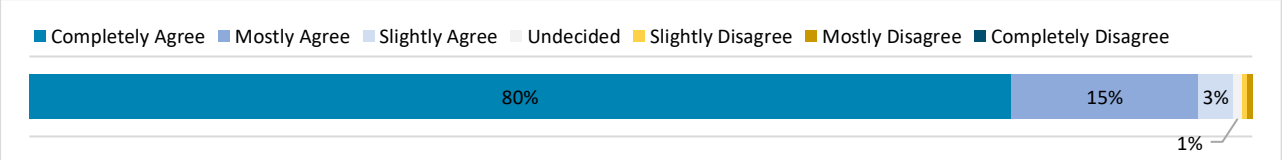

Figure 81: Percentage of panel members in each response category to statement 75

Delphi round 1 survey outcome: Consensus achieved (95%). Item included in *Essential Research Skills Training Curriculum.*

76. Ethical issues related to biological samples.

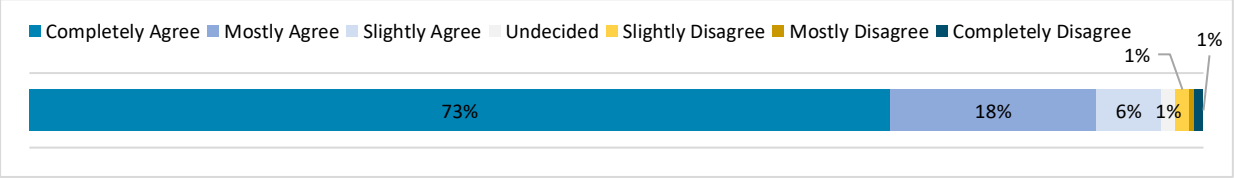

Figure 82: Percentage of panel members in each response category to statement 76

Delphi round 1 survey outcome: Consensus achieved (91%). Item included in *Essential Research Skills Training Curriculum.*

77. Ethical issues related to genetic procedures.

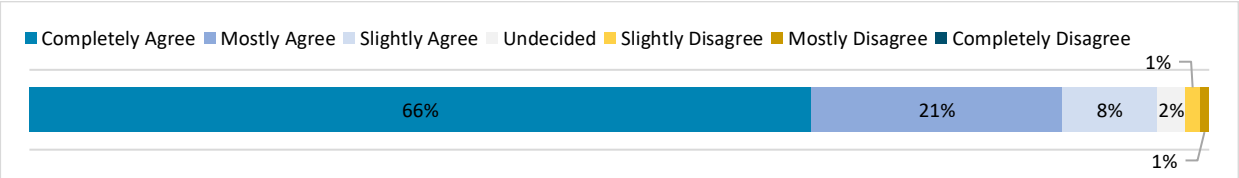

Figure 83: Percentage of panel members in each response category to statement 77

Delphi round 1 survey outcome: Consensus achieved (87%). Item included in *Essential Research Skills Training Curriculum.*

78. Setting up an ethical review board or committee.

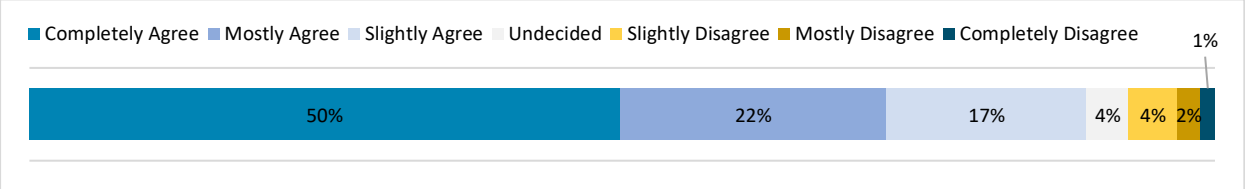

Figure 84: Percentage of panel members in each response category to statement 78

Delphi round 1 survey outcome: Consensus not achieved (72%). Item to be reviewed in Delphi round 2 survey.

79. Study reporting procedures and practices.

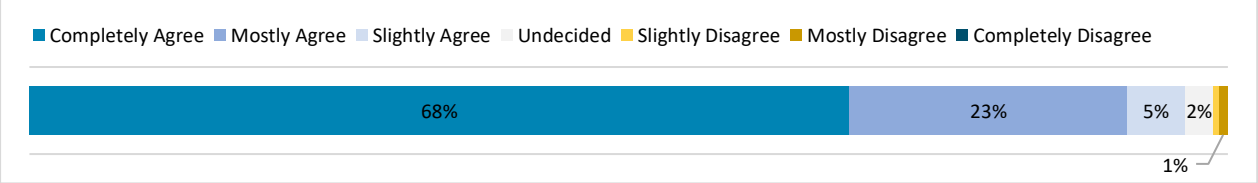

Figure 85: Percentage of panel members in each response category to statement79

Delphi round 1 survey outcome: Consensus achieved (91%). Item included in *Essential Research Skills Training Curriculum.*

80. Study close (archiving data, sample storing, notification of closure processes).

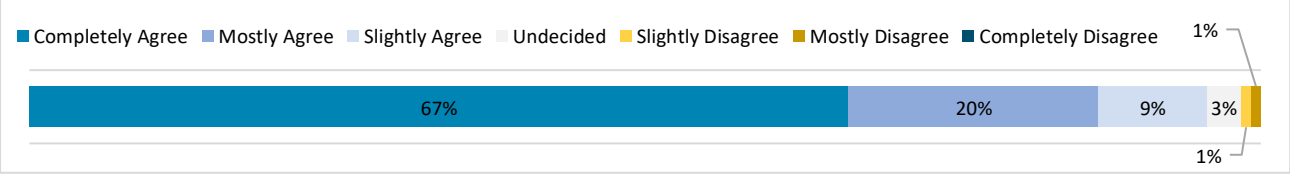

Figure 86: Percentage of panel members in each response category to statement 80

Delphi round 1 survey outcome: Consensus achieved (87%). Item included in *Essential Research Skills Training Curriculum.*

81. Scientific writing for journal publications.

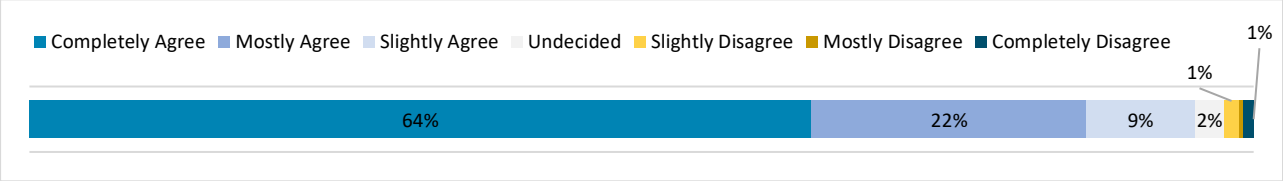

Figure 87: Percentage of panel members in each response category to statement 81

Delphi round 1 survey outcome: Consensus achieved (86%). Item included in *Essential Research Skills Training Curriculum.*

82. How to search for secondary datasets in different databases.

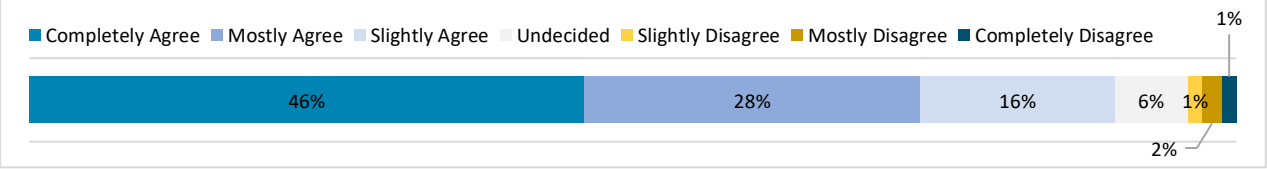

Figure 88: Percentage of panel members in each response category to statement 82

Delphi round 1 survey outcome: Consensus not achieved (74%). Item to be reviewed in Delphi round 2 survey.

83. Steps to conduct a literature review.

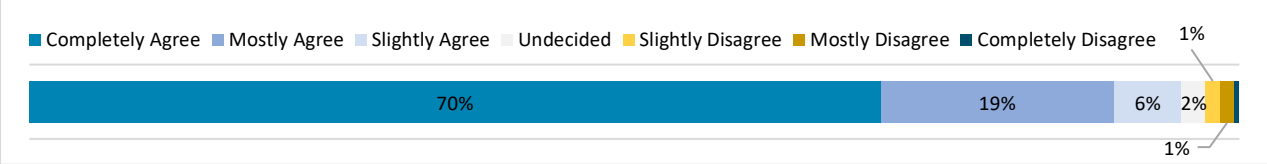

Figure 89: Percentage of panel members in each response category to statement 83

Delphi round 1 survey outcome: Consensus achieved (89%). Item included in *Essential Research Skills Training Curriculum.*

84. Best practices regarding referencing and plagiarism.

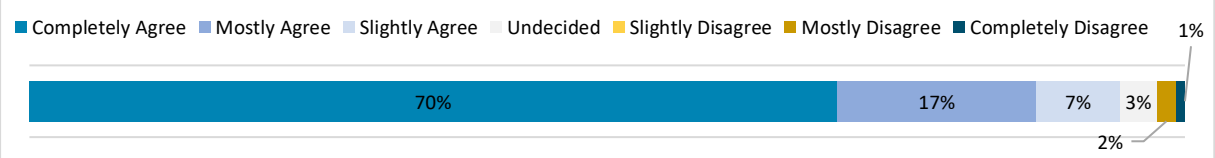

Figure 90: Percentage of panel members in each response category to statement 84

Delphi round 1 survey outcome: Consensus achieved (87%). Item included in *Essential Research Skills Training Curriculum.*

85. Use of citation tools (i.e. Mendeley).

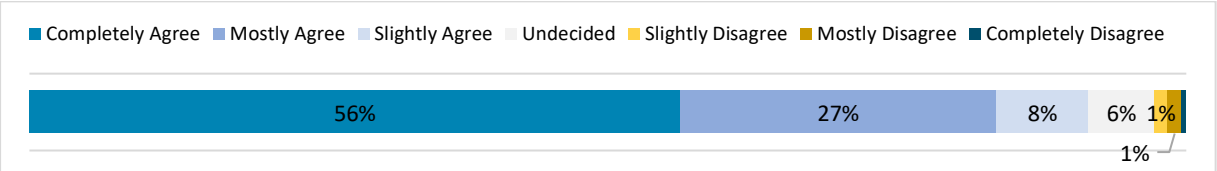

Figure 91: Percentage of panel members in each response category to statement 85

Delphi round 1 survey outcome: Consensus not achieved (83%). Item to be reviewed in Delphi round 2 survey.

86. How to translate research results into policy (policy formulation and reviews).

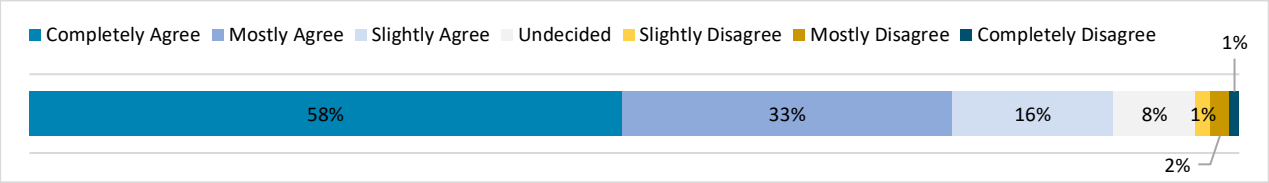

Figure 92: Percentage of panel members in each response category to statement 86

Delphi round 1 survey outcome: Consensus achieved (91%). Item included in *Essential Research Skills Training Curriculum.*

87. How to translate research results into practice within healthcare settings.

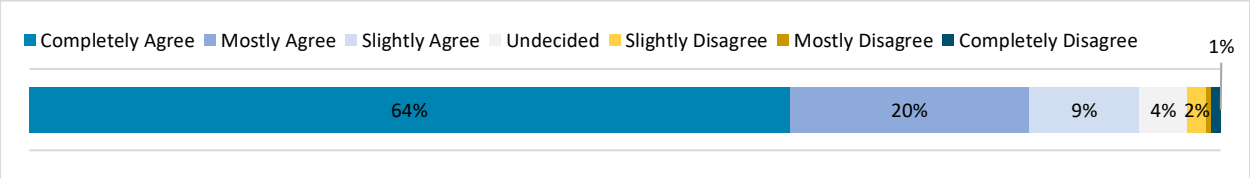

Figure 93: Percentage of panel members in each response category to statement 87

Delphi round 1 survey outcome: Consensus not achieved (84%). Item to be reviewed in Delphi round 2 survey.

88. Leadership in research.

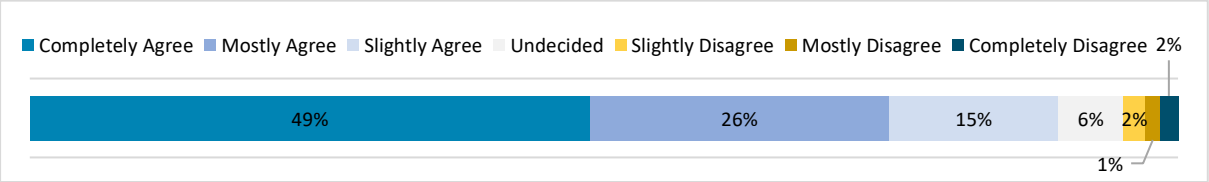

Figure 94: Percentage of panel members in each response category to statement 88

Delphi round 1 survey outcome: Consensus not achieved (75%). Item to be reviewed in Delphi round 2 survey.

89. Leading and managing complex research groups.

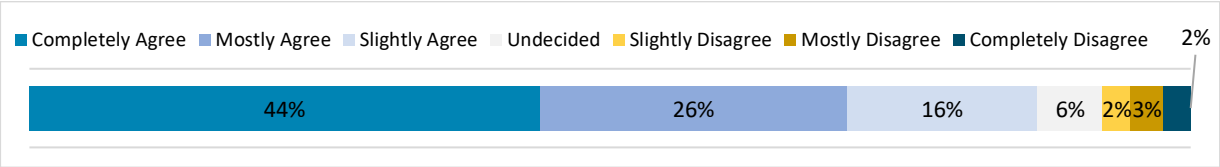

Figure 95: Percentage of panel members in each response category to statement 89

Delphi round 1 survey outcome: Consensus not achieved (70%). Item to be reviewed in Delphi round 2 survey.

90. Influencing at institutional level to enable research.

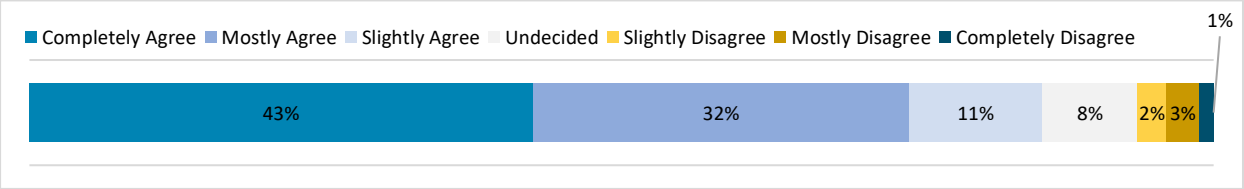

Figure 96: Percentage of panel members in each response category to statement 90

Delphi round 1 survey outcome: Consensus not achieved (65%). Item to be reviewed in Delphi round 2 survey.

91. Teamwork

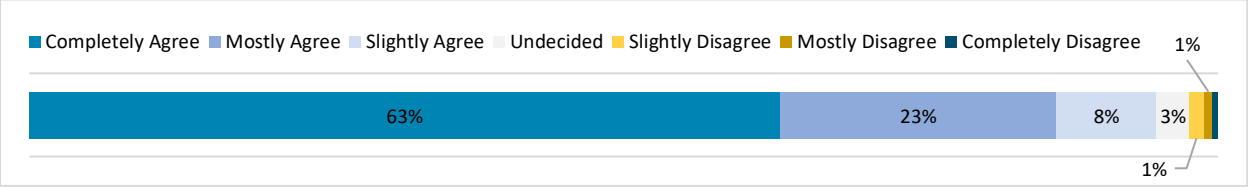

Figure 97: Percentage of panel members in each response category to statement 91

Delphi round 1 survey outcome: Consensus achieved (86%). Item included in *Essential Research Skills Training Curriculum.*

92. Handling and negotiating with a range of stakeholders

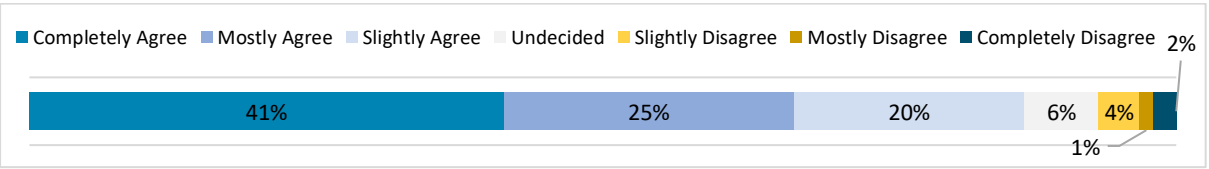

Figure 98: Percentage of panel members in each response category to statement 92

Delphi round 1 survey outcome: Consensus not achieved (66%). Item to be reviewed in Delphi round 2 survey.

93. Critical thinking in research

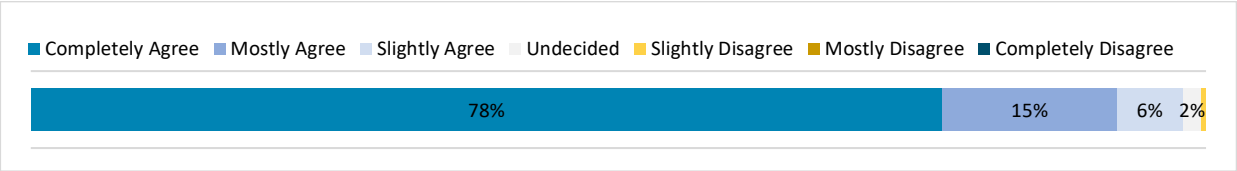

Figure 99: Percentage of panel members in each response category to statement 93

Delphi round 1 survey outcome: Consensus achieved (93%). Item included in *Essential Research Skills Training Curriculum.*

94. Building trust within a team

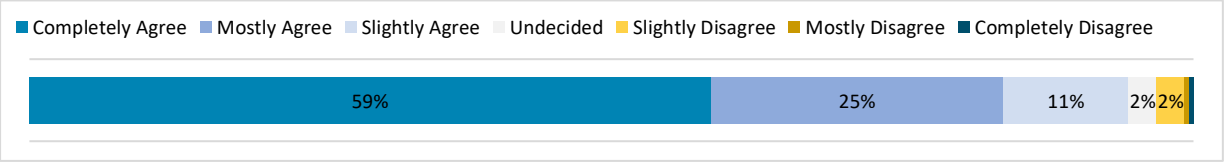

Figure 100: Percentage of panel members in each response category to statement 94

Delphi round 1 survey outcome: Consensus not achieved (84%). Item to be reviewed in Delphi round 2 survey.

95. Communicating research

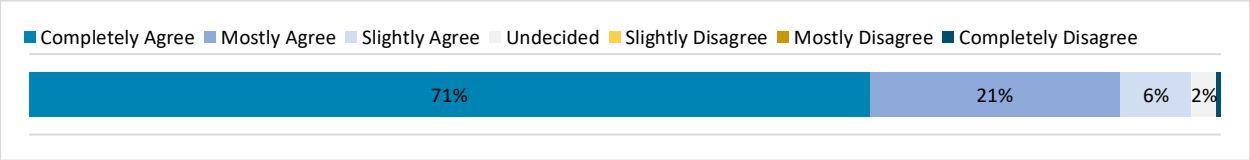

Figure 102: Percentage of panel members in each response category to statement 95

Delphi round 1 survey outcome: Consensus achieved (92%). Item included in *Essential Research Skills Training Curriculum.*

96. Developing effective research teams with named roles and responsibilities for team

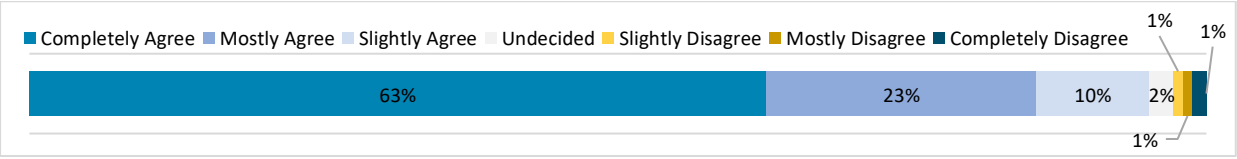

Figure 102: Percentage of panel members in each response category to statement 96

Delphi round 1 survey outcome: Consensus achieved (86%). Item included in *Essential Research Skills Training Curriculum.*

97. Networking and how to create collaborations

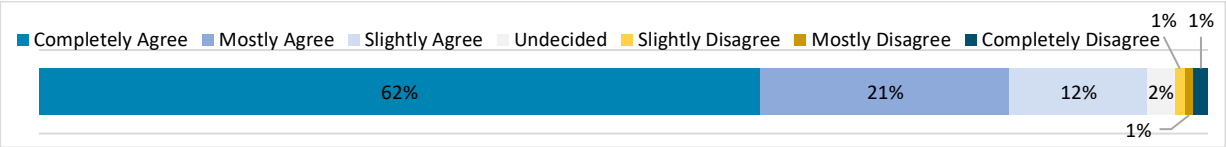

Figure 103: Percentage of panel members in each response category to statement 97

Delphi round 1 survey outcome: Consensus not achieved (83%). Item to be reviewed in Delphi round 2 survey.

98. Building your career in research

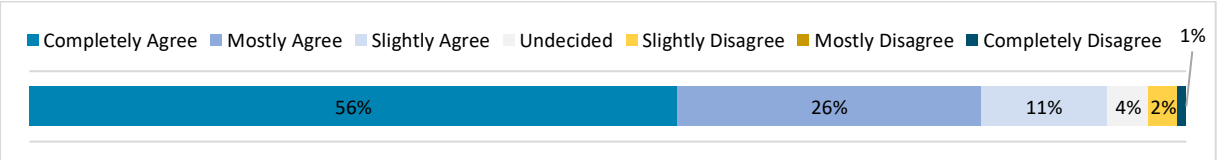

Figure 104: Percentage of panel members in each response category to statement 98

Delphi round 1 survey outcome: Consensus not achieved (82%). Item to be reviewed in Delphi round 2 survey.

Panellists comments

Are there any other categories that, in your opinion, should be included in the essential research skills curriculum?
appropriate knowledge of british and american english ability to choose a peer-reviewed journal (and what it means) use of scopus and other abstract and citation database of peer-reviewed literature
development of contingency plans (in light of the current covid-19 pandemic this has been crucial) training procedures (i.e. How to organize training (e.g. Gcp, critical scales, ethics) for researchers participating in a particular study) recruitment procedures
validating informed consent in rural african settings
1. Details of study/trial registry with other agencies 2. Exploration of funding source
1. It skills especially ms word, ms excel and power point presentation skills 2. Critical appraisal of a research paper
1. Participants privacy and confidentiality. 2. Establishing a sustainable model for collaboration.
1. Tackling the united nations' sustainable development goals through research. 2. Interdisciplinary and multidisciplinary research teams for novel approaches to research.
1.)Advantages & disadvantages of data collection directly using electronic system. 2.) Advantages & disadvantages of collecting data using papers.
1.assessing clinical trial site 2.providing feedback to communities 3. Shipping samples
1.understanding meetings and how to run them 2. Appreciating people have different approaches depending on clinical background 3.understanding decision making and how to change peoples minds
Action research how to identify research objectives
Ae/sae reporting awareness and pharmacovigilance signal detection
Analyse local population knowledge and cultural and faith impact on research success.
As of this stage all the questions raise are ok .
Assumptions
Authorship in research; working and contributing in multidisciplinary collaborative research teams; coordination of multicultural international research projects
Basic concepts in epistemology

Basic research for health
Being able to perform a critical review of an article.
Bibliographic search: resources and strategies critical analysis of scientific literature research methodology: approaches and study designs
Buenas prácticas de investigación en salud (GCP)
Build and validate models create and validate a collection instrument of data técnicas de estadística: descriptiva e inferencial para datos univariados,bivariados y multivariados, técnicas de análisis cualitativo y técnicas de simulación. Scientific citation techniques - learn the style of scientific writing
Capacidades de los integrantes de equipo
Capturing and assessing metrics of performance for research sites
Clinical experience in the specific research, not only research experience.
Clinical trial management systems
Communicating to the general public; peer review; measures of impact of research;
Community engagement and involvement community-based research study tools development pretesting of study tools mock sessions for data collection
Community engagement strategies. Project management software (i.e., smartsheet, Microsoft project)
Conference presentations, and PPI (patient and public involvement)
Consideration and understanding of cultural issues and beliefs. Community entry - for example presenting the research to county and sub county health management teams, local administrative leaders etc to seek support authorization processes - irb and ethics review boards and research permits with government bodies importance of dissemination of results to study participants and ministry of health and other government authorities how to write abstracts ?
Coordinación entre instituciones publicas con investigadores independientes
Creo que es muy completo
Critical thinking of researchers to generate new knowledge, researchers must have patience and confidence beside having competency in assessing various factors and variables more judicially.
Data management
Design of research study and clear objectives matching the funders topics and requirements

Developing an appropriate theoretical framework for the research ontology epistemology how to align research questions/hypotheses and theoretical frameworks with ontology, epistemology and methodology validity and reliability strategies (although maybe included under data quality) discussing results, implications and recommendations structuring papers, articles, reports etc.
Development of research tools using xls forms
Education on research: teaching people how to teach research
Effective patient and public involvement, co-production of research with communities
English proficiency
Enumerator training validity and random reliability tests
Evidence-based medicine skills to share research results in scientific events (posters, presentations, etc)
Evidence-based practice evidence-informed practice critical event reporting patient involvement
Experience
Formulating a scientific hypothesis understanding the difference between experiment and measurement
Globally, the research should also put into consideration measures on life style diseases preventions since it has remain the greatest global threat. Last but not least, the effect of the research on common man within our locality.
Good clinical practice data management regulatory file development data security hierarchy of reporting surveillance and research
-handling and proper storage of the laboratory chemicals and reagents -handling of spillage in the laboratory
Handling of registries: no major guidelines i think otherwise done exhaustively
How to consider the variance of each country/region's settings (regulations, languages, cultures and systems like health system) in multi-regional clinical research research "sponsor" responsibilities.
How to prepare for grant applications. (this should include sections on the appropriate duration to plan and prepare for target rfps, and essential documents usually required in grants applications.) How to set-up a research grant application support office or team(this should include sections on the kind of personnel required for this and essential expertise/trainings the team needs.)
How to publication in international journal

How to read a protocol - the how and why behind the protocol deviations in clinical trials (protocol, sop, gcp, temp/samples) amendments - when and how do you implement them how to develop source documents how to prepare for an audit and respond to audit observations
How to search online databases e.g. Pubmed how to identify predatory journals and conferences/ how to identify a suitable journal for publication principles of ethical research how to come up with a good research question how to identify important research topics for your country performing critical appraisal how to write a scientific article
I am not sure if this is covered by any of the categories mentioned but perhaps some hands-on training with data management and analysis systems such as r or stata?
I can't recall if it was already listed, but it would be great to include research methodologies (ie: rct, bayesian, observational) and how to apply ethics requirements/standards to different research methods. Writing a business case, a protocol synopsis and a research proposal would all be very useful. Proficiency in computer programs may be outside the scope of this project, however understanding how to proficiently use microsoft excel, for example, can assist with budgets, data management, stats, staff management and more. Tools such as visio can help provide clarity to organisation of workflows and sops and power bi can assist in providing real time trends in studies with large sample sizes.
I missed pharmacy management/ drug quality and regulations
I think a very important issue is defining the operatinazation of the variables in the study. How really are measure in the study. Creo que una cuestion muy importante es la operacionalizacion de variable, como se miden en la realidad also counfounding and effect modifiers in the study and selection bias and others one important issue is the historical perspectives of the diseases and how different societies aswers to the situation: antropology la estrategia de atencion primaria en salud y los determianantes sociales de la salud enfermedad el indice ginni and the happy planet index as measure of wellbeing (bienestar)
I think all previous categories are the essential required categories to be included in the program. I see that understanding types of journals & indexing rules is are also beneficial.
I think all the essential elements have been mentioned
I think if one lesson the current covid-19 crisis would teach us in this context, it will be about the anthropological role of a researchers, their responsibility toward the public concerns, sense of duty toward the well being of human regardless of race, colour, geography ,backgrounds and so.

I think it is broad enough, but then research is multifaceted involving various interest groups and many roles, there may arise competition on patents and or litigation; in lmics issue of equipment, subsidy on laboratory investigations, is so important, budget may be higher as most participants are not insured, they usually pay out of pocket, and some investigations can be very expensive or unavailable in many service delivery points it may be wise to add a bit of caution in the spirit of carrot and stick, a category dealing with legal consequences of a botched or bungled research project wouldn't be a bad addendum, equally important for those in hard to reach locations would be provision of a good teleguidance gadgets for very timely resolution/getting prompt information! The latest statistical softwares should be put on dvd, with enough exercises to benefit even the novice. I think it is broad enough if all the categories are dealt with extensively it would ceased to be essential but becomes a compendium of research skills for all.
I think it should be important to understand the mainstream methodologies in both qualitative and quantitative research, depending on the researcher´s interest and this person should be able to identify in other studies what can be applied in his/hers.
I think that the proposals that you listed are very complete
I think that the use of drade methodology to formulate clinical practice guidelines based on scientific evidence should be included among the skills.
I think the curriculum can have more categories on dealing with the hardships of research in different areas according to the access to information.
I think the list is very comprehensive. A modular format would be useful to stop new researchers feeling overwhelmed. Possibly some assistance/resources for writing skills for those for whom english is not their mother tongue might be helpful. Even ensuring the teaching and learning materials are written in plain english would be helpful. You have covered academic literacy to some extent but this may well need to be scaffolded for participants.
I think you have capture all relevant areas
I would prefer the term biostatistics instead of 'statistics'. This could be purely semantics. Other topics - concept paper - formulation conducting a pilot study systematic review
Identification of study areas
Importance of multi-sectoral research
Knowledge of whole process in clinical trials from idea, through bench test, phases of trial and hta into community and pharmacovigilance. Knowledge of global healthcare systems eg who, regulations etc. Give them a context for their own healthcare system. Knowledge of non-clinical trial research eg healthcare policy, mental health, registries of patients, community healthcare etc
legal precedents for data sharing, availability of data sharing platforms, compatibility issues for data sharing there should be a module on national and local considerations for research, national policy, national ethics review processes --cultural sensitivity and linguistic competence
Maintaining data quality throughout the project and excel/application practices for data storing.
Management o pharmacovigilance

Managing and maintaining the blind when multiple blinding levels are set in a single study.
Managing and reporting human errors among study participants and risk mitigation writing useful, understandable informed consents and participant tools
Medical device related chapters viz. Iso 14155, additional methods for medical device research, differences between other health research and medical device research reporting skill related aspects - interpretation of various statistical outputs, graphs, listing. Ich guidelines, e2, e3, e9 21cfr part 11, iso 27001
Medical writing in clinical research protocol writing csr writing health blog writing entrepreneurship in clinical research
Mentor mentee research forum in academia - stimulate young minds to discuss their research question with right research mentors with experience who will enable them to formulate a right research hypothesis.
Mentoring investigational medicinal product management data cleaning data monitoring
Mentorship in research
Minimum skills really should be things like critical thinking, communication, *attention to detail*, punctuality, ability to multitask, some basic computer skills, abilities to learn new information. Many of the listed skills i would consider to be unimportant for a new hire, but a must for someone a few months into a new job.
Myths and misconceptions in clinical and health related research
Naming places where researches will be done depending on the type of research and specific topic which will relates to the place
No, the categories are sufficient at this stage. But, a little modification can be done on the aspects of data ethics.
Not a category but an item of negotiation: negotiating with your superiors time for research. This is because most professionals in lmic have clinical, teaching and/or administrative work as priorities, so it is difficult to get time to do research because it is usually not considered necessary
Participant recruitment methods, tools and strategies. Interacting with regulatory agencies.
Participatory action research
Personal development.
Piloting and testing of research tools. Mobilising and engaging research participants skills. Crisis management in research. Training of research team
Policy formulation
Presentation in front of ethical board
Pretty much everything has been included in the previous questionnaire

Principal investigator roles and responsibilities ip accountability/storage/destruction
Procedures for handling epidemiological disease outbreaks. Data management practices. Quality control methods in research laboratories. Intellectual property rights. Fraud and misconduct.
Project management tools risk based monitoring
Promotion on internacional basis how to get funding from external programs
Publication ethics
Publications
1. Regular training of all health care workers or involved in the clinical research 2. Need of centralized database in the entire world for therapy area
Requirements for grant writing standard formats for specific grant organizations
Research designs statistical tests of significance
Research in different contexts i.e. Low income countries vs high income countries. Research and politics. Youth and research.
Research in low resource settings
Research infra structure development for academic institution, private sector and ngos- setting of standards
Research methodology
Research methodology as a separate course.
Research methods
Research results communication
Researcher-patient communication in clinical settings microsoft excell and/or other programs for data management - how to properly transfer results into research data?
Resilience as a trait for a career in research
Responsible conduct of research (which is expressed by some categories already, but needs to be covered in the final version); more categories for research ethics are needed, including ones pertaining to participant incentives / compensation, distributive justice, and other aspects of benevolence, nonmaleficence, and respect for persons; more details about what is meant by epidemiological, quantitative, and qualitative study design, data collection, and data analysis methods.
Ritengo sufficienti le categorie presenti nel questionario
Security, confidentiality & privacy of research data.
Self-reliance, resilience

Skill in managing the increasing volume of academic literature to keep the researcher's knowledge and awareness about research issues updated, not necessary having to perform a systematic review.
Strategies for recruitment and retention of participants, especially in vulnerable groups. ¨statistics¨ and ¨quantitative methods¨ sound too vague. In addition to clinical trials would explicitly include: - different observational study designs and quasi experiments. - applied essential statistical methods such as bivariate and most common multivariable analysis (regression models) and perhaps exploratory factor analysis when building evaluation instruments methods to evaluate treatment effects from observational studies and ¨real world¨ data causal inference
Synchronization of data to relevant officials with proper confidential disclosure agreement.
The listed items are comprehensive and if they are incorporated in a training, it should be enough. This is because in most cases junior researchers are usually left at data collection and never go beyond that. Given a training in the listed items, everybody should go along way in the best practices of research.
The principles of big data analysis.
The role of patient, public, carers in involvement and engagement in collaborative/co-produced research. I.e. Participation, involvement and engagement. The inclusion of gripp2 tool to measure method/impact of patient, public, carer involvement in research. Methods/ resources to promote participation, involvement and engagement with patients, public, carers, & traditionally 'hard to reach groups'
The topics of risk-based monitoring (rbm) or rbqm and patient centricity in clinical research.
These are sufficient
This method of evaluating the research capability is excellent
Timeframes publications and public speaking
Token for research participants when the need arises
Tools and tests selection (validity and reliability) problem-solving skills basic programming skills
Tools for translate information based on stakeholder categories. Stakeholder mapping
Triangulation of research methods/data case study research participatory action research narrative research
Understanding the role of critical assumptions. Hypothesis framing and testing.
Use of emotional intelligence
We have a complete set of topics to study.
Well , proposal design , formulation of problem , trials design , and how to implementation research , i know all mentioned above are so important
Working with industry or third sectors

Yes, i think in the lmics we need improve the capacity of professionals to search for scientific evidence at indexing library databases, and colect a realiable body of evidency on a specific subject. Actually, i think the delphi's essential research skills list should expande the point on meta-analysis to comprise skills on systematic reviews as a whole.
Yes, i think something that has to do with understanding context and community entry should be included
Yes, something like organization and priorities during emergency situation (covid19 inspired).
Yes. How to formulate research hypotheses and interpret contingency tables and graphs.
Yes. The importance between endemic diseases and diseases present in all countries and how this impact in the clinical research. The gap 10/90 and the research in rare diseases.the particularity of clinical research in underdeveloped countries. I slightly agree that these topics are added to a core topics curriculum.
Your questionnaire is more focused on practical and technical abilities of the researcher and less focus on his personality. For instance be able to build trust among a research team, as well as collaboration, the researcher must be sociable, patient, tolerant and got communication skills. Because most of time we have to work or collaborate with people coming from various and different cultural backgrounds.

Summary

Consensus achieved Themes included in the Essential Research Skills Training Curriculum
Concept of research for health Identifying a research gap Development of a research objective and a research question / formulating a hypothesis Qualitative methodologies (including epistemology & ontology) Quantitative methodologies Epidemiological studies Clinical trials Writing a research protocol - the why and how (deviations, amendments, how to prepare and then defend protocol) Identifying research participants and selection criteria Qualitative sampling methodologies Quantitative sampling methodologies Definition of Randomization and methods Calculation of participant sample size and sample power Selection of control groups for comparison purposes Definition of quality data Qualitative data collection methods (including the concept of triangulation) Quantitative data collection methods Data collection tools (e.g. designing surveys and CRF's), advantages and disadvantages Data management systems Qualitative analysis (including for example thematic content analysis) Data presentation Data sharing best practices and governance (including security confidentiality and privacy of R data / legal precedents for DS /intellectual property rights) Monitoring and Evaluation GCP Research Project management and planning Security issues during data collection and how to manage risk Professional guidelines and codes of ethics which apply to the conduct of clinical research (including principles of benevolence, non-maleficence, etc) Informed Consent and assent (definitions, how to write/formulate consent forms and various tools to communicate with participants) Participant's confidentiality and privacy Definition of vulnerable populations and ethics of working with these populations Ethical practices around data handling/management Ethical issues related to biological samples Ethical issues related to genetic procedures Study reporting procedures skills and best practices Study close (archiving data, sample storing, notification of closure processes) Scientific writing for journal publications (including how to write abstracts) Steps to conduct a literature review (including bibliographic search) Best practices regarding referencing and plagiarism How to translate research results into policy (policy formulation and reviews) Teamwork Critical thinking in research Communicating research to different populations- general public, scientific community, (public speaking) Developing effective research teams with named roles and responsibilities for team
Consensus not achieved Themes for inclusion in Delphi round 2 survey
Understanding the difference between health research and standard of care, audit, evaluation. Mixed Methods research. Meta-analysis. Health Policy and Systems Research. Health economics and economic evaluations.

Research designs for outbreaks. Methodology Research (research on research). Implementation research. Experimental research. Identifying various funding agencies/sources. Ability to communicate and meet with funders. Writing a grant application and/or grant proposal. Setting up a research laboratory. Specific laboratory techniques and equipment handling. Laboratory sample handling and storage. Laboratory management. Laboratory standards and regulations. Laboratory quality best practices. Laboratory safety practices. Good Clinical Laboratory Practice (GCLP). Participants' retention strategies. Participant 'loss to follow-up'. Attrition bias and prevention methods. Statistics. Data analysis software (qualitative and quantitative). Quality assurance systems. Quality management systems. Audit. Development of Standard Operating Procedures (SOPs). Research Time management. Study set-up. Storage of research materials. Writing a study budget. Budget management. Laboratory biosafety and how to manage hazards. Pharmacovigilance principles and reporting adverse effects. Setting up an ethical review board or committee. How to search for secondary datasets in different databases. Use of citation tools (i.e. Mendeley). How to translate research results into practice within healthcare settings. Leadership in research. Leading and managing complex research groups. Influencing at institutional level to enable research. Handling and negotiating with a range of stakeholders Building trust within a team Networking and how to create collaborations Building your career in research
Unclear themes **Themes for inclusion in Delphi round 2 survey**
How to form a research agenda Social sciences and anthropological studies Mathematical Modelling Operational research Good Participatory Practice (GPP) Community engagement principles and activities, from the beginning of the research cycle through to feeding back research results to communities How to manage expectations of study communities Governance and regulation

Further information and contact details
If you require further information, you can contact:

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Thank you for being part of this project