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Panel criteria and working methods

This document sets out the assessment criteria and working methods of the main and sub-panels for the Research Excellence Framework (REF) 2021.

REF2021 Research
Excellence
Framework

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To

Heads of higher education institutions in the UK

Of interest to those responsible for Research

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Executive summary

Purpose

1. This document sets out the assessment criteria and working methods of the main and sub-panels for the Research Excellence Framework (REF) 2021.
2. This document, taken together with the 'Guidance on submissions' (REF 2019/01), provides a comprehensive description of the information required in submissions to the REF, and how the REF panels will assess submissions.

Key points

3. The REF is a process of expert review. Expert sub-panels for each of 34 units of assessment (UOA) will carry out the assessment, working under the leadership and guidance of four main panels.
4. UK higher education institutions (HEIs) will be invited to make submissions by 27 November 2020. The REF main and sub-panels will assess submissions during 2021, and results will be published in December 2021. The results will inform the allocation of research funding by the UK higher education (HE) funding bodies, from 2022–23.
5. This document sets out a combined statement of criteria and working methods across the four main panels. Supplementary criteria are set out for each main panel where applicable. The main panels' supplementary criteria are intended to be read alongside the combined criteria, and do not replace it.

Action required

6. This document is for information and to guide institutions in preparing and collecting data for inclusion in REF submissions. No action is required by HEIs at this stage.

Further information

7. For further information about the REF see www.ref.ac.uk.
8. Staff at UK HEIs should direct any queries to their institutional REF contact. Contact details for each institution are listed at www.ref.ac.uk, under Contact.
9. Other enquiries should be addressed to info@ref.ac.uk.

Introduction

10. This document sets out the assessment criteria and working methods of the main and sub-panels for REF 2021.

11. The criteria have been developed as a combined statement across the four main panels. This responds to feedback following REF 2014 that there was further scope for increased consistency in the criteria, and incorporates advice from the main and sub-panels on where further alignment across the criteria could be achieved. Supplementary criteria are set out for each main panel where applicable. The main panels' supplementary criteria are intended to be read alongside the combined criteria, and do not replace it.

12. In early 2018, the REF team invited the four main panels to develop their criteria and working methods, with input from their sub-panels. The REF team provided guidance to the panels on developing their criteria. The 'Guidance to panels' is available at www.ref.ac.uk, under Publications. This invited the main panels to develop a combined set of criteria and working methods, with supplementary criteria for each main panel and its group of sub-panels where applicable. The main panels were invited to agree differences in approaches for particular sub-panels within their remit only where justified by differences in the nature of research in those disciplines.

13. The assessment criteria and working methods are set out in this document as follows:

- Part 1 provides an overview of the REF and the expert panels.
- Part 2 sets out the descriptor for each of the 34 units of assessment (UOAs).
- Part 3 gives further details of the assessment criteria to be employed by the four main panels and their sub-panels, including the combined criteria and, where applicable, any supplementary criteria provided by any main panel.
- Part 4 sets out the generic panel procedures in place across the main and sub-panels.
- Part 5 sets out the combined working methods of the main and sub-panels.

14. This document should be read alongside REF 2019/01 'Guidance on submissions' (hereafter 'Guidance on submissions'), which provides an overview of the REF assessment framework and guidance to institutions on preparing their submissions, including the data requirements and definitions that apply.

15. Together, the two documents will give a comprehensive description of the information required in submissions to the REF, and how the REF panels will assess submissions. We will issue supplements to the guidance at later dates to clarify points of detail regarding submissions. Panels will not be permitted to depart from the final criteria once published, other than in exceptional circumstances that cannot be accommodated within the published framework. In such cases, we will publish the reason and details of the change as an amendment.

Part 1: Overview

16. The REF is the system for assessing the quality of research in HEIs in the UK. It was first conducted in 2014, and replaced the previous Research Assessment Exercise (RAE).

17. The purpose of the REF, the general principles governing its conduct, and an overview of the REF framework are set out in Part 1 of 'Guidance on submissions'.

Submissions and units of assessment

18. Institutions will be invited to make submissions by 27 November 2020. There are 34 UOAs, listed in Annex D of 'Guidance on submissions'. Part 2 of this document provides descriptors of each UOA. Each submission must contain, in summary:

- a. **REF1a/b:** Information on all staff in post on the census date, 31 July 2020, with significant responsibility for research; and information about former staff to whom submitted outputs are attributed.
- b. **REF2:** Details of assessable outputs that the submitted unit has produced during the publication period (1 January 2014 to 31 December 2020). The total number of outputs must equal 2.5 times the summed full-time equivalent (FTE) of the unit's submitted staff. Rounding to the nearest whole number will be applied to give a whole number of outputs for submission.
- c. **REF3:** Case studies describing specific examples of impacts achieved during the assessment period (1 August 2013 to 31 July 2020), underpinned by excellent research in the period 1 January 2000 to 31 December 2020.
- d. **REF4a/b/c:** Data about research doctoral degrees awarded, research income and income-in-kind related to the period 1 August 2013 to 31 July 2020.
- e. **REF5a/b:** An institutional-level environment statement, and a completed template describing the submitted unit's research and impact environment, drawing on quantitative indicators as appropriate, and related to the period 1 August 2013 to 31 July 2020.
- f. **REF6a/b:** Information on staff circumstances, where claiming a reduction or removal of the requirement to submit a minimum of one output per member of staff submitted.

19. The generic eligibility definitions and data requirements set out in 'Guidance on submissions' apply to all submissions.

Expert panels

20. The REF will be a process of expert review, with an expert panel assessing submissions made by HEIs in each of the 34 UOAs. The sub-panels will work under the leadership and guidance of four main panels.

21. In brief, the four main panels are responsible for:

- developing the panel criteria and working methods
- overseeing calibration
- ensuring adherence to the published procedures and consistent application of the overall assessment standards by the sub-panels
- working with the advisory panels for equality and diversity and interdisciplinary research (IDR), and advising the REF team on assessment processes
- signing off the outcomes of the assessment.

22. The sub-panels are responsible for:
- contributing to the criteria and working methods
 - working within the agreed criteria in assessing each submission made in its UOA
 - recommending the outcomes for each submission to the main panel.
23. The roles and responsibilities of the main and sub-panels are described fully in 'Roles and recruitment of the expert panels' (REF 2017/03).
24. The main and sub-panels will undertake their roles within the common framework for assessment set out in 'Guidance on submissions' and the combined statement of criteria and working methods (Parts 2 to 5 of this document). Part 3 of this document also sets out any supplementary criteria that each of the main panels and its sub-panels will employ when assessing submissions.
25. The main and sub-panels are appointed by the four UK funding bodies through an open process of nominations, as described in REF 2017/03. The appointment of the expert panels will be undertaken in two stages for REF 2021:
- a. **Criteria phase:** sufficient members were appointed in 2018 to ensure each sub-panel has appropriate expertise (including in IR and the wider use of research) for contributing to the criteria development. This is a smaller group of members than the volume required to undertake the assessment, meaning that further full sub-panel members (and impact and output assessors) will join the sub-panels for the assessment phase. The members joining at the criteria phase will input into the panel criteria development, and will contribute to the assessment of all elements of submissions (outputs, impact and environment) in 2020–2021.
 - b. **Assessment phase:** additional sub-panel members will be appointed for the assessment phase of the exercise, to ensure the sub-panel has an appropriate volume of members who will contribute to the assessment of all elements of submissions.
26. The membership of the panels appointed for the criteria phase is at www.ref.ac.uk, under 'Expert Panels'. Following advice from main and sub-panel chairs, where suitable nominations were received the funding bodies have appointed a proportion of the members who will join the sub-panels for the assessment phase. These members will take up their panel roles in 2020, and are also detailed on the REF website.

Appointment of additional sub-panel members and assessors

27. We will make further appointments to the panels of both sub-panel members and assessors in advance of the assessment year. This is to ensure the sub-panels have an appropriate breadth of expertise and number of panel members necessary for the assessment phase. We also expect to make further appointments of members with the role of interdisciplinary adviser in the assessment phase. This role is described in REF 2017/03 (Box 1).
28. A survey of institutions' submission intentions will be carried out in 2019, which will inform additional panel membership appointments, including for both further full sub-panel members as well as output and impact assessors.
29. Further members and assessors will be appointed by the chief executives (or equivalent) of the four UK funding bodies, following recommendations from main and

sub-panel chairs, made from nominated individuals. These will either be individuals with appropriate expertise who were nominated in the initial round of nominations in 2017 (see REF 2017/03), or additional nominations that the REF team will invite in a further round in 2020. This will include nominations for those with expertise in the use or benefits of research across the private, public and third sectors.

30. Where further nominations are invited, the REF team will again ask nominating bodies to provide information on how equality and diversity considerations were taken account of during the nominations process. The Equality and Diversity Advisory Panel (EDAP) have reviewed the templates provided by nominating bodies in the 2017 round of nominations, and will produce a report summarising good practice identified in the nominations process. Nominating bodies will be invited to consider this report when making nominations in 2020. In recommending further panel members and assessors, sub-panel chairs will give consideration to enhancing the extent to which the overall body of members reflects the diversity of the research community. The REF team are currently undertaking an analysis of the representativeness of panel membership, which will be able to further inform chairs' considerations in this regard.

Assessors

31. Assessors appointed to the sub-panels will undertake either one of the following roles:

- a. To assess the impact element of submissions and develop the impact sub-profiles, alongside sub-panel members. These will be people with professional experience of making use of, applying or benefiting from academic research.
- b. To assess research outputs and develop the output sub-profiles, alongside existing panel members. These will be practising researchers with relevant expertise.

32. Assessors will play a full and equal role to sub-panel members in developing the sub-profiles for either the impact or outputs element of the assessment. They will be fully briefed, take part in calibration exercises and attend panel meetings at which the relevant aspects of submissions (outputs or impact) are discussed.

Appointment process

33. Main and sub-panel chairs' recommendations for further membership will be guided by the principle of ensuring that sub-panels have access to appropriate expertise to reach robust and valid judgements with regard to submitted material. Appointments will be made as follows:

- a. In 2019, the REF team will survey institutions about the volume and nature of work that they intend to submit to the REF. The survey data will provide information to the REF team and the panels about how the changes to the submission process in REF 2021 may affect the volume and range of work submitted, compared with previous exercises.
- b. In early 2020, the main and sub-panels will consider the breadth and depth of expertise of each sub-panel's current membership, in the light of institutions' submission intentions. Each sub-panel will seek to identify:
 - where the membership required to assess submissions should be expanded to ensure appropriate expertise in accordance with the anticipated volume of submissions

- where additional IDR advisers may be required to support and advise the sub-panel on the assessment of IDR outputs
 - areas where additional expertise would be required to assess the range and volume of outputs indicated in the survey responses
 - areas where additional user expertise would be required to assess the range of impacts indicated in the survey responses.
- c. Where a clear gap in the expertise of a sub-panel required to assess either outputs or impact has been identified during the criteria development and consultation phase, additional appointments may be made during 2019.
34. Before recommending the appointment of further members and assessors, sub-panel chairs will discuss the recommendations with their main panels. The following issues will be considered across each main panel:
- the identified expertise requirements in the context of the current panel membership's breadth and volume of expertise
 - the overall size of the sub-panel in the context of anticipated submissions
 - the potential for interdisciplinary advisers to work across sub-panels
 - the need to ensure that impact case studies are given fair consideration, with the intention of ensuring that there is sufficient user expertise to review the range of likely impact case studies that will be submitted
 - where assessors are recommended:
 - o whether there is a sufficient body of activity requiring an additional assessor appointment
 - o whether serious workload issues or conflicts of interest for existing panel members have been identified, requiring an additional assessor for a particular subject area
 - o the potential for individual assessors to be appointed to two sub-panels, where there is a significant overlapping body of work expected (and, if appropriate, the potential to appoint existing user members to also act as assessors for other sub-panels).

35. Once appointed at each stage, the names of sub-panel members and assessors will be published on www.ref.ac.uk alongside the current panel membership. Assessors will be eligible to receive fees and expenses on the same basis as panel members.

36. As stated in REF 2017/03 (paragraph 67), as the REF progresses, main or sub-panels may recommend to the funding bodies the appointment of a small number of members or assessors in addition to the members already appointed and/or the members and assessors to be appointed through the processes outlined above, to provide further expertise where this is desirable and in accordance with the criteria for appointments.

Assessing submissions

37. As with the previous REF and RAEs, the assessment process is based on expert review. Each sub-panel will examine the submissions made in its UOA, taking into account all the evidence presented. Each sub-panel will use its professional collective judgement to form

an overall view about each submission and recommend to the main panel an overall quality profile to be awarded to each submission made in its UOA. The process is objective and evidence based but is not and cannot be purely algorithmic.

38. The primary outcome of the panels' work will be an overall quality profile awarded to each submission, to be published in December 2021. An example overall quality profile is in Annex B of 'Guidance on submissions', and further details about the published outcomes and feedback that panels will produce are in paragraphs 34 to 43 of that document.

39. In forming their overall quality judgements, the sub-panels will assess three distinct elements of each submission – outputs, impact and environment – against the following generic criteria:

- a. **Outputs:** The sub-panels will assess the quality of submitted research outputs in terms of their 'originality, significance and rigour', with reference to international research quality standards. This element will carry a weighting of **60 per cent** in the overall outcome awarded to each submission.
- b. **Impact:** The sub-panels will assess the 'reach and significance' of impacts on the economy, society, culture, public policy or services, health, the environment or quality of life that were underpinned by excellent research conducted in the submitted unit. This element will carry a weighting of **25 per cent**.
- c. **Environment:** The sub-panels will assess the research environment in terms of its 'vitality and sustainability', including the approach to enabling impact from its research, and its contribution to the vitality and sustainability of the wider discipline or research base. This element will carry a weighting of **15 per cent**.

40. The generic definitions of the starred quality levels in the overall quality profile in each of the three sub-profiles – outputs, impact and environment – are in Annex A of 'Guidance on submissions'. All sub-panels will apply these generic assessment criteria, level definitions and weightings for each element, in forming the overall quality profiles to recommend to their main panel.

41. In Part 3 of this document, the main panels' criteria statement provides a descriptive account of these generic assessment criteria, and of the starred level definitions for outputs. These are provided to inform their subject communities on how the panels will apply the criteria and definitions in making their judgements. These descriptive accounts should be read alongside, but do not replace, the generic definitions.

Outputs

42. As set out in 'Guidance on submissions', each submission must include a set number of items of research output, equal to 2.5 times the combined FTE of Category A submitted staff included in the submission. Rounding to the nearest whole number will be applied to give a whole number of outputs for submission. The total number of outputs for return may be adjusted, as appropriate, to take account of staff circumstances (see 'Guidance on submissions', paragraphs 151 to 201).

43. An underpinning principle of the REF is that for each discipline all types of research and all forms of research output shall be assessed on a fair and equal basis. Panels have been instructed to define criteria and adopt assessment processes that enable them to recognise, and treat on an equal footing, excellence in research across the spectrum of applied, practice, basic and strategic research, wherever that research is conducted; and for

identifying excellence in different forms of research endeavour including interdisciplinary and collaborative research, while attaching no greater weight to one form over another.

44. 'Guidance on submissions' (Annex C) sets out the generic definition of research and its Annex K provides a glossary of the different output types that may be submitted, and is intended to highlight the diversity of research outputs that may be submitted in any UOA. Any assessable form of output that embodies research is eligible for assessment.

Impact

45. 'Guidance on submissions' sets out the generic submission requirements in relation to impact, including the number of case studies required in each submission (paragraph 309), the eligibility criteria for impact case studies (paragraphs 311 to 313), and a template and guidance on completing impact case studies (Annex G).

46. The generic definition of impact for the REF given in 'Guidance on submissions' (Annex C) is broad, and any impact that meets this definition is eligible for assessment, in any UOA. The panel criteria statement in Part 3 and examples in Annex A in this document provide some further descriptions of the diversity of impacts that may apply in their UOAs. These are provided to inform their subject communities: they should be read alongside, but do not replace, the generic definition in 'Guidance on submissions'.

47. The main panels' criteria statement in Part 3, and the examples in Annex A, provide guidance on the forms of evidence that would be appropriate for submissions to include in impact case studies (REF3). The statement in Part 3 also states how the panels will assure that the quality of research that underpins impact case studies is equivalent to at least two-star quality.

Environment

48. 'Guidance on submissions' sets out the generic requirements for the environment element of submissions, which comprise:

- a. standard data on research doctoral degrees awarded, research income and research income-in-kind (REF4a/b/c)
- b. a completed institutional-level environment statement (REF5a)
- c. a completed environment template (REF5b).

49. In Part 3, the panel criteria provide guidance on the forms of evidence that would be appropriate for submissions to include in the environment template (REF5b), including any quantitative indicators that should be provided within REF5b, where applicable. The template for REF5b is set out in Annex I of the 'Guidance on submissions'.

50. REF panels will form an environment sub-profile by assessing the information submitted in REF5b, informed by the data submitted in REF4a/b/c and REF5a. When the REF team provides submissions to sub-panels, we will supply a standard analysis of the quantitative data submitted in REF4a/b/c, in respect of each submission in that UOA, and aggregated for all submissions in that UOA (see 'Guidance on submissions', Annex J). Panels will consider these data within the context of the information provided in REF5b, and within the context of the disciplines concerned. In Part 3, the panels' criteria statement indicates how the data analyses will be used in informing the assessment of the research environment.

Part 2: Unit of assessment descriptors

51. Details of the assessment of interdisciplinary work and work that crosses UOA boundaries, including pedagogic research, are provided in paragraphs 166 to 177.

Main Panel A: UOAs 1–6

Introduction

52. The UOAs within Main Panel A's remit cover research into the practices, services, policies, education and underpinning science relevant to these disciplines, and associated methodological and theoretical advancement. The UOAs cover a full spectrum of research approaches, ranging from qualitative to quantitative, as well as theoretical and mixed method studies. This includes IDR and research that informs these areas from a range of stakeholders' perspectives, including research users and service users.

53. Where it is relevant to the UOAs, submissions will be welcome whether the context is local, national or international, including work carried out in relation to developing countries.

54. The main panel encourages institutions to structure their submissions using research groups, noting that there is no expectation that submissions will necessarily comprise a single coherent body of research. Where submissions are structured using research groups, the sub-panels' written qualitative feedback to institutions may highlight individual research groups of particular note.

Unit of assessment descriptors and boundaries

Unit of Assessment 1: Clinical Medicine

55. The UOA includes research into all aspects of clinical medicine and its cognate sub-disciplines except for bodies of research more explicitly linked to UOA 2 (Public Health, Health Services and Primary Care), UOA 3 (Allied Health Professions, Dentistry, Nursing and Pharmacy), UOA 4 (Psychology, Psychiatry and Neuroscience) and UOA 5 (Biological Sciences).

56. The sub-panel expects submissions that demonstrate integrated strategies relating to all aspects of medical research. Submissions may cover the full range of research related to medicine, from basic underpinning studies through experimental medicine to clinical trials. In view of the breadth of research covered by this UOA, the sub-panel expects some degree of overlap with UOA 4 (Psychology, Psychiatry and Neuroscience) in the fields of neurology and with UOA 5 (Biological Sciences) in the area of basic biological sciences underpinning medical research.

Unit of Assessment 2: Public Health, Health Services and Primary Care

57. The UOA includes research into all aspects of public health, health services and/or primary care and all their cognate disciplines. The research may be applied, theoretical or methodological research from relevant health or healthcare disciplines.

58. The sub-panel expects submissions in this UOA from all areas of public health and epidemiology (from aetiology to intervention), health services and primary care, including clinical trials, health social sciences, health policy research and healthcare management, and from other related disciplines having a relevance to the research covered by the UOA. It recognises the breadth and diverse range of single, multidisciplinary and/or multi-professional research across public health, health services and primary care.

Unit of Assessment 3: Allied Health Professions, Dentistry, Nursing and Pharmacy

59. The UOA includes research into all aspects of the disciplines of allied health professions, dentistry, nursing, midwifery and pharmacy. Its boundaries include research in underpinning science, laboratory-based work, applied clinical research, healthcare technologies, and research into public health, social care and health promotion. Research into psychosocial, philosophical and ethical aspects of healthcare, as well as education, policy and methodology relevant to these disciplines, is also included. It is anticipated that such work will use qualitative, quantitative and mixed methods, as well as theoretical approaches.

60. For allied health professions, submitted research is expected to underpin clinical practice and policy development and implementation, and includes research in biomedical and nutritional sciences, dietetics, biology of health and disease, vision sciences, optometry, orthoptics, osteopathy, operating department practitioners, diagnostic imaging, therapeutic radiography, audiology, podiatry, occupational therapy, physiotherapy, speech and language therapy, clinical linguistics, paramedics, prosthetics/orthotics, music therapy, drama therapy and arts therapy. For dentistry, it includes research in basic and applied dental, oral and craniofacial sciences encompassing all the related clinical disciplines, primary dental care, biomaterials sciences relevant to oral and craniofacial science, and other such sciences relevant to dentistry. For nursing and midwifery, it includes specialist, community and public health nursing, and all the contexts within which they operate. For pharmacy, it includes all aspects of the design, synthesis, formulation, action and use of pharmaceuticals (including biological and nutraceuticals), to include medicinal chemistry, pharmaceutics, pharmacology, clinical pharmacy, underlying biomedical science, and the practice of pharmacy.

61. Submissions may cover the full translational range of research, from basic underpinning studies through to implementation research. Bodies of research more explicitly linked to UOA 1 (Clinical Medicine), UOA 2 (Public Health, Health Services and Primary Care), UOA 4 (Psychology, Psychiatry and Neuroscience), UOA 5 (Biological Sciences) and UOA 6 (Agriculture, Food and Veterinary Sciences) should be submitted to those panels and such outputs submitted to UOA 3 will be cross-referred.

Unit of Assessment 4: Psychology, Psychiatry and Neuroscience

62. The UOA expects submissions in all areas of psychology, psychiatry and neuroscience.

63. This includes all areas of psychological research with humans and animals. It covers quantitative and qualitative approaches to typical and atypical populations in all settings at the cultural, societal, group and individual levels, across the full range of areas of psychological practice and outside of formalised settings, and includes all aspects of psychological experience. For psychiatry, it covers research on all aspects of the study of mental disorders. This includes their aetiology, epidemiology, mechanisms and consequences, as well as pharmacological and non-pharmacological treatments, systems of care and mental health policy. For neuroscience it covers all aspects of research from the molecular through to whole-system behavioural level, genetics and varieties of imaging, and both neurodevelopmental and adult work. This includes research on the understanding and treatment of all types of neurological and neurosurgical conditions, including those related to neurodegeneration and neurodevelopment.

64. The remit of the sub-panel is broad, covering submissions with the potential to transform research into practice as well as those reporting theoretical and methodological advances in basic research. Overlap is expected with UOA 1 (Clinical Medicine), UOA 2 (Public Health, Health Services and Primary Care), UOA 3 (Allied Health Professions, Dentistry, Nursing and Pharmacy), UOA 5 (Biological Sciences), UOA 8 (Chemistry), UOA 9 (Physics), UOA 11 (Computer Science and Informatics), UOA 12 (Engineering), UOA 17 (Business and Management Studies), UOA 20 (Social Work and Social Policy), UOA 21 (Sociology), UOA 23 (Education), UOA 24 (Sports and Exercise Sciences, Leisure and Tourism), UOA 26 (Modern Language and Linguistics) and UOA 30 (Philosophy).

Unit of Assessment 5: Biological Sciences

65. The UOA includes research into all aspects of biological and biomedical sciences that encompasses the full spectrum of the fundamental and applied biology of all organisms, at all levels of organisation from the molecular to the ecosystem, employing a diversity of approaches including experimental, theoretical, computational and mathematical. The UOA also covers all aspects of the biomedical sciences, including biochemistry, physiology, pharmacology and anatomy at the genetic, molecular, cellular, organ system and whole-organism level. It includes work relevant to the nervous and cardiovascular systems at all levels of enquiry.

66. Submissions may include work which is on the boundaries of other UOAs in Main Panel A, such as: UOA 1 (Clinical Medicine), UOA 3 (Allied Health Professions, Dentistry, Nursing and Pharmacy), UOA 4 (Psychology, Psychiatry and Neuroscience) and UOA 6 (Agriculture, Food and Veterinary Sciences); as well as UOAs in other main panels, such as: UOA 7 (Earth Systems and Environmental Sciences), UOA 8 (Chemistry), UOA 9 (Physics), UOA 10 (Mathematical Sciences), UOA 11 (Computer Science and Informatics), UOA 14 (Geography and Environmental Studies) and UOA 24 (Sport and Exercise Sciences, Leisure and Tourism).

Unit of Assessment 6: Agriculture, Food and Veterinary Sciences

67. The UOA includes research into all aspects of the agricultural, food and veterinary sciences, including basic through to applied research, and interdisciplinary research with significant content in any of these areas of science.

68. The sub-panel expects submissions in this UOA from all areas of relevant science.

- a. In agricultural science this includes the scientific exploration of all aspects of agriculture, horticulture, forestry, aquaculture and marine, including the sciences underpinning and impacted by them, and the emerging technologies that support these industries with particular reference to the combination of economic, environmental and social disciplines into defining optimal systems of land use, the development of the bio-economy and integrated approaches to farming.
- b. For veterinary science, submissions may cover the full range of research related to veterinary medicine and surgery. These include studies ranging from basic underpinning research through to clinical, applied and social science. Submissions may include research relevant to normal and abnormal function of animals, their health, behaviour, welfare, nutrition and productivity, as well as their role in human health, environment and society, or as models for human diseases.

- c. For food, this includes submissions of primary relevance to food science and technology (including chemistry, physics, microbiology, engineering and processing), human nutrition, diet and health, food biotechnology, food safety, packaging, sensory science, food consumer science, and food security, sustainability and environmental aspects.

69. In view of the breadth of research covered by this UOA, the sub-panel expects some degree of overlap with underpinning sciences research which may be presented to all panels.

Main Panel B: UOAs 7–12

Introduction

70. The six sub-panels that fall within Main Panel B invite submissions in UOAs 7 to 12 as set out in the following paragraphs.

71. Institutions should make submissions to the most appropriate UOA. Sub-panels will utilise cross-referral and interdisciplinary research processes where appropriate.

72. Main Panel B recognises that work in materials science takes places in several of its disciplines and as a result crosses the boundaries of UOAs 7, 8, 9 or 12.

73. HEIs may choose to associate outputs with research groups if they have used these research groups to structure their environment submission. This is not a mandatory field and neither the presence nor absence of research groups is assumed.

Unit of assessment descriptors and boundaries

Unit of Assessment 7: Earth Systems and Environmental Sciences

74. The UOA includes Earth, environmental and planetary sciences, including: geophysics; geochemistry; palaeontology; geology; mineral physics; evolution of planetary atmospheres, surfaces and interiors; Earth surface processes; the physics, chemistry and biology of the environment, including ecology and conservation; atmospheric, marine, freshwater, terrestrial and soil sciences; innovative measurement systems and data analysis; global change; natural resources; natural hazards; pollution; and environmental management and impact.

75. The sub-panel expects submissions in this UOA from all areas of Earth systems and environmental sciences, as defined above, and expects that the majority of the research activity submitted will have made a direct contribution to the UOA as characterised in the UOA descriptor. It recognises, however, the increasingly interdisciplinary nature of research, and expects that submissions may contain work that contributes to this UOA and other cognate disciplines. It is expected, however, that submissions will be made to the UOA where there is the most appropriate expertise to assess the body of work as a whole.

Unit of Assessment 8: Chemistry

76. The UOA includes all areas of experimental and theoretical chemistry, including appropriate areas of pharmacy, chemical engineering and materials science, where the research is primarily concerned with chemical aspects rather than clinical or engineering.

77. The sub-panel expects submissions in this UOA from all areas of chemistry, as defined above, and expects that the majority of the research activity submitted will have made a direct contribution to the UOA as characterised in the UOA descriptor. It recognises and

welcomes, however, the increasingly interdisciplinary nature of research, and expects that submissions may contain work that contributes to this UOA and other disciplines, including those which have boundaries with this UOA, such as UOA 5 (Biological Sciences), UOA 7 (Earth Systems and Environmental Sciences), UOA 9 (Physics) and other cognate disciplines.

Unit of Assessment 9: Physics

78. The UOA includes all areas of physics encompassing, but not limited to, theoretical, computational and experimental studies of: quantum physics; atomic, molecular and optical physics; plasma physics; fusion and energy; particle physics; nuclear physics; surface and interface physics; condensed matter, materials and soft matter physics; biophysics; semiconductors, nanoscale physics, lasers, optoelectronics and photonics; magnetism, superconductivity and quantum fluids; fluid dynamics; statistical mechanics, chaotic and nonlinear systems; astronomy and astrophysics, planetary and atmospheric physics; space physics; cosmology and relativity; medical physics; applied physics; chemical physics; and instrumentation.

79. The sub-panel expects submissions in this UOA from all areas of physics, as defined above, and expects that the majority of the research activity submitted will have made a direct contribution to the UOA as characterised in the UOA descriptor. It recognises and welcomes, however, the increasingly interdisciplinary nature of research, and expects that submissions may contain work that contributes to this UOA and other cognate disciplines.

Unit of Assessment 10: Mathematical Sciences

80. The UOA includes pure and applied mathematics, statistics and operational research, including the development and application of these areas in the study of biological, physical and social sciences, commerce, engineering, finance, government, health, industry, information science, medicine and elsewhere.

81. It therefore includes: algebra; analysis; category theory; combinatorics; complexity theory; continuum mechanics and magnetohydrodynamics; differential equations; dynamical systems and ergodic theory; environmental, financial, geophysical and industrial mathematics; geometry; integrable systems; mathematical biology; mathematical logic; mathematical methods; mathematical aspects of operational research, including optimisation and stochastic modelling; mathematical physics; number theory; numerical analysis and scientific computing; operator theory and operator algebras; probability; statistics such as experimental design, mathematical statistics, statistical computing and contributions to data science; and applications such as biostatistics, environmental and social statistics; topology. This list is necessarily incomplete, and any research in which the primary contribution is mathematical may be considered in this UOA, including experimental, theoretical or computational investigations related to mathematical or statistical models applied in other subject areas.

82. The sub-panel expects submissions in this UOA from all areas of mathematical sciences, as defined above, and expects that the majority of the research activity submitted will have made a direct contribution to the UOA as characterised in the UOA descriptor. The sub-panel welcomes the submission of innovative interdisciplinary research that incorporates mathematical, statistical or operational research content, irrespective of the primary research focus of the medium in which the output is disseminated. It also expects to receive some outputs on the history of mathematical sciences when they incorporate insights into mathematics or statistics.

83. The sub-panel will receive outputs describing purely pedagogic research within higher education and where advice is required from Sub-panel 23 (Education), outputs will be cross-referred. Operational research that is focused on business and management should not normally be submitted in this UOA.

Unit of Assessment 11: Computer Science and Informatics

84. The UOA includes the study and evaluation of methods for acquiring, storing, processing, communicating and reasoning about information and interactivity in natural and engineered systems, as characterised by the Association for Computing Machinery (ACM) Computing Classification System, 2012 Revision <https://www.acm.org/publications/class-2012>. The sub-panel expects submissions in this UOA to include contributions from ACM categories hardware, computer systems organisation, networks, software and its engineering, theory of computation, mathematics of computing, information systems, security and privacy, human-centered computing, computing methodologies, and applied computing. The field is characterised by strong theoretical foundations and systematic application of analysis, design, experimentation and evaluation.

85. The sub-panel expects that the majority of the research activity submitted will have made a direct contribution to the UOA as characterised above, either by contributing new methods and knowledge or through innovative applications of state-of-the-art methods to challenging problems in other disciplines. Consequently, the sub-panel welcomes submissions containing interdisciplinary outputs that make contributions to other areas as well as computer science and informatics, though outputs that apply routine computational methods may be better returned elsewhere.

Unit of Assessment 12: Engineering

86. The UOA includes all areas of: aeronautical, mechanical and manufacturing engineering; bio-engineering; chemical engineering; civil and construction engineering; electrical and electronic engineering; metallurgy, materials science and engineering; and general engineering. It includes, but is not limited to, research carried out in: additive manufacturing; aerodynamics; aerospace engineering; amorphous materials and glasses; antennae and radar; architectural engineering; artificial intelligence and its applications; automotive engineering; avionics; battery technology; biochemical engineering; bioengineering; biomaterials; biomedical engineering; building engineering and physics; ceramics; climate change; combustion; communications and networks; composites; computational methods; computer and software engineering; computer vision; construction and infrastructure; construction management; construction materials; control and systems; corrosion engineering; cryptography; data engineering; digital manufacturing; dynamics; earthquake engineering; electrical power systems, machines and drives; electromagnetics and its applications; electrochemical engineering; electronic devices; electronic materials; electronic systems and circuits; energy and power engineering; energy harvesting and scavenging; engineering biology; engineering design; engineering ethics; engineering management; environmental engineering; extreme events; fire engineering; fluid mechanics; fluid power; fluid structure interactions; fluidics; food process engineering; fuel technology; functional materials; geomatics and surveying; geospatial engineering; geotechnical engineering; health and safety; healthcare technologies; human factors and ergonomics; hybrid materials; hydraulics and hydrology; information engineering; innovation management and policy; instrumentation and measurement; intelligent and adaptive systems; life cycle analysis; machine learning; manufacturing technology,

processes and systems; maritime engineering; materials engineering; materials for energy applications; materials characterisation; materials modelling; materials processing; mechanics; mechatronics; metals; metrology; microelectromechanical systems; mineral and mining engineering; modelling and simulation; multimedia; music technology; nanoelectronics; nanomaterials; nanotechnology; natural materials; naval architecture; new materials; non-destructive testing and structural health assessment; nuclear engineering; offshore and coastal engineering; particle technology; photonics and its applications; polymer and large area electronics; polymers; power electronics; process and product engineering; product design and verification; project management; quantum technologies; radio frequency techniques; railway engineering; recycling and green technologies; renewable energy; risk, reliability and resilience; robotics and automation; sensors and actuators; signal and image processing; solar cells and systems; solid mechanics; space engineering; speech and language technology; structural dynamics; structural materials; structures; surfaces and interfaces; sustainability engineering; systems engineering; systems modelling and identification; technology and operations management; textiles; thermodynamics and heat transfer; tissue engineering; transportation engineering; tribology and wear; turbo-machinery and propulsion; vibration and acoustics; water and waste water engineering; wind engineering; and wireless networks. It also includes pedagogic research in engineering.

87. The sub-panel expects submissions in this UOA from all areas of engineering, as defined above, and expects that the majority of the research activity submitted will have made a direct contribution to the UOA as characterised in the UOA descriptor. It recognises and welcomes, however, the increasingly interdisciplinary nature of research in this area, and expects that submissions may contain outputs that not only make contributions to this UOA and other cognate disciplines but also to UOAs that extend beyond traditional cognate disciplines.

Main Panel C: UOAs 13–24

Introduction

88. The sub-panels of Main Panel C cover a diverse range of content, disciplines and methodologies. The sub-panels anticipate receiving research outputs, impact case studies, and impact and environment templates which reflect that rich diversity, and have no pre-conceptions about where excellent research will be found.

89. Each sub-panel expects to receive submissions whose primary research focus falls within the stated remit of its UOA. Submitting units are encouraged to submit their strongest work, including interdisciplinary work, in the UOA where it is most appropriate.

90. Criminology is a multi-disciplinary subject concerned with crime, criminals and criminal justice. This could be submitted into various sub-panels. For the avoidance of doubt, it is recognised that much criminological research may fall within the boundaries of Sub-panels 18 (Law), 20 (Social Work and Social Policy) and 21 (Sociology). All three sub-panels welcome such work, which will be assessed in accordance with the arrangements noted above, in particular making use of calibration exercises, joint assessors and cross-referral as deemed appropriate by the sub-panels. Following the assessment, the relevant sub-panels will review the health of UK criminological research, and will report on this in a discrete section of the panel overview reports.

Unit of assessment descriptors and boundaries

Unit of Assessment 13: Architecture, Built Environment and Planning

91. **Descriptor:** The UOA covers all forms of historical, theoretical, technical, policy, applied and practice-based research relevant to the planning, design, creation, functionality, use, conservation, interpretation, assessment, management and governance of the built environment in both rural and urban areas. This includes: architecture and related arts, building engineering, building surveying, building sciences, climate change and disaster resilience, communities, construction, construction management, economic development, environment, health and well-being, housing, landscape, manufacture, natural resources and ecosystem services, real estate, regeneration, spatial analysis, sustainability, transport, urban and regional planning and urbanism. It covers the social, economic, legal, financial, environmental, technological, historic and cultural aspects of the built environment. The UOA also covers any other research in which the built environment forms a major field for application or provides the context for such research. It expects submissions in this UOA from a broad range of disciplines, research methodologies and forms of output, across the spectrum of fundamental, applied, pedagogical, policy and practice-based research. The submitted research may span disciplinary and methodological boundaries.

92. **Boundaries:** The sub-panel expects submissions in this UOA from all areas outlined in the UOA descriptor, but anticipates submissions that may span the boundaries between two or more UOAs. Submitting units are encouraged to submit outputs that are of interdisciplinary nature, even if the research is at the boundaries of the UOA.

Unit of Assessment 14: Geography and Environmental Studies

93. **Descriptor:** The UOA covers all aspects of research – conceptual, methodological, substantive and applied – conducted within the disciplines of Geography and Environmental Studies, as broadly defined, and contributing to their interdisciplinary collaborations. This research embraces a wide range of enquiries into natural, environmental and human phenomena, and their interrelationships in particular systems, contexts, periods and places, both in the UK and internationally.

94. In Geography, submitted research may include work from all fields of physical and human geography (for example, biogeography and ecosystem science; climatology; environmental processes; environmental and climate change; forensic, geomorphology, glaciology, hydrology, ocean and water science; Quaternary science; soil science; environmental geography, risks and hazards; cultural, development, economic, health, heritage, historical, legal, political, population, rural, social, transport, and urban geographies; geohumanities; and geographical information sciences and Earth observation); work that combines any of these fields (for example, in socio-ecological systems and natural resource governance); and work that uses a wide range of available methods, from science-based to humanistic and participatory, including numerical, theoretical, experimental, modelling, archival and field-based.

95. In Environmental Studies, submitted research may include work in any area of the field, including those also present in environmental geography (for example, ecosystem services and natural capital, environmental economics, politics, policy and practice, sustainable development); some aspects of environmental science (for example, conservation, ecology, environmental pollution and resource management); and environmental assessment and decision support systems.

96. **Boundaries:** Given the breadth of the subject matter of UOA 14, it is inevitable that the exemplification above is not exhaustive and that there will be some overlaps with other UOAs, located both in Main Panel C and in other main panels and that submission may include work that is close to the boundaries of the UOA. In areas where there is significant overlap between UOA 14 and another UOA, it is expected that whole submissions will be made in the UOA appropriate to the academic context and research environment in which the research was undertaken, and with the most appropriate range of expertise for the body of work as a whole.

Unit of Assessment 15: Archaeology

97. **Descriptor:** In Archaeology, submitted research may cover all fields of the subject for example, including but not limited to: archaeological theory and historiography; archaeological science and archaeological methods; the archaeology of human origins and evolution, and prehistoric and historic societies worldwide; early civilisations (including classical archaeology and related historical and textual studies), medieval and post-medieval to contemporary archaeology; colonial, industrial and maritime archaeology; landscape and environmental archaeology; archaeological aspects of heritage; heritage science; museum studies; archaeological conservation; and forensic archaeology.

98. **Boundaries:** Submitting units are encouraged to submit their strongest work irrespective of the form of output or the extent of its interdisciplinary nature, even if the research is at the boundaries of the UOA. There could be overlaps with any UOA, particularly UOA 1 (Clinical Medicine), UOA 5 (Biological Sciences) in Main Panel A; UOA 7 (Earth Systems and Environmental Sciences) in Main Panel B; UOA 14 (Geography and Environmental Studies) and UOA 22 (Anthropology and Development Studies) in Main Panel C; and UOA 28 (History), UOA 29 (Classics) and UOA 34 (Communication, Cultural and Media Studies, Library and Information Management) in Main Panel D.

Unit of Assessment 16: Economics and Econometrics

99. **Descriptor:** The UOA is fully inclusive of all areas of economics and econometrics including economic history. Research of all types – empirical or theoretical, applied, or policy-focused – will be considered of equal standing.

100. **Boundaries:** Units are encouraged to submit their strongest work irrespective of the form of output or the extent of its interdisciplinary nature, even if the research is at the boundaries of the UOA. There could be overlaps with any UOA, including the other UOAs within Main Panel C, particularly UOA 17 (Business and Management Studies). These parts of submissions will normally be cross-referred, following advice from the cross-UOA members, to Sub-panel 17. In common with any cross-referred work Sub-panel 16 (as the sub-panel for the UOA in which the work was submitted for assessment) will retain responsibility for recommending the quality profile.

Unit of Assessment 17: Business and Management Studies

101. **Descriptor:** The UOA includes (but is not restricted to) the areas of: accounting; banking; business analytics; business and industrial economics; business ethics; business history; consumer behaviour; corporate governance; corporate social responsibility; critical management studies; employment relations; entrepreneurship; finance; human resource management; information systems management; innovation management; international business; leadership; management education; management science; marketing; operations

management; organisational psychology; organisational studies; project management; public policy; public sector management; risk management; service management; small firms; strategic management; supply chain management; sustainability; technology management; third sector management; and any other field or sub-field aligned to business and management.

102. **Boundaries:** Institutions are encouraged to submit their strongest work, irrespective of the form of output. A variety of methodologies and interdisciplinary contributions is welcome. The sub-panel anticipates that some of the work submitted in this UOA may overlap with the remits of UOA 10 (Mathematical Sciences), UOA 14 (Geography and Environmental Studies) and UOA 16 (Economics and Econometrics).

103. The main panel's preferred approach is that the majority of work submitted in a UOA is assessed by that sub-panel. However, significant aspects of submissions in UOA 17 (Business and Management Studies) are expected to fall within the remit of UOA 16 (Economics and Econometrics). These parts of submissions, following advice from the cross-UOA member(s) will normally be cross-referred to Sub-panel 16. In common with any cross-referred work, Sub-panel 17 (as the sub-panel for the UOA in which the work was submitted for assessment) will retain responsibility for recommending the quality profile.

Unit of Assessment 18: Law

104. **Descriptor:** The UOA includes all doctrinal, theoretical, empirical, comparative, critical, historical or other studies of law and legal phenomena including criminology, and socio-legal studies. The sub-panel would also expect research on legal education to be submitted in this UOA.

105. **Boundaries:** All areas of law as described above fall within the boundaries of the UOA. Law is a hybrid, multi-disciplinary subject which draws on disciplines in both the social sciences and the humanities. Research in law may intersect with or draw upon a variety of disciplines and methodologies. The sub-panel has been constituted with a broad spread of relevant expertise to ensure informed assessment of all submissions, and encourages units to submit their strongest work including research which is at the boundaries of the UOA.

106. For the avoidance of doubt, it is recognised that much criminological research may fall within the boundaries of Sub-panels 18 (Law), 20 (Social Work and Social Policy) and 21 (Sociology). All three sub-panels welcome such work, which will be assessed in accordance with the arrangements noted above, making use of calibration, joint assessors and cross-referral as deemed appropriate by the sub-panels.

Unit of Assessment 19: Politics and International Studies

107. **Descriptor:** Politics and international studies has a broad spectrum, including: comparative politics; area studies, international development, national and sub-national and grassroots politics; studies of political institutions, public administration, policy and governance; the examination of power, authority and legitimacy; political behaviour, political sociology and political economy; and political theory and philosophy, including histories of political and international thought. It also includes international relations theory; security studies including strategic, war and peace studies; conflict research; international history; international political economy; and foreign policy analysis. The sub-panel will welcome work from across this spectrum, including work that draws on a wide range of theoretical approaches, among them feminist, postcolonial and queer perspectives, and on diverse

methods in political and international studies, among them quantitative, qualitative and multimethod work as well as formal analysis and conceptual research. Outputs on pedagogic research in politics and international studies will also be welcome.

108. **Boundaries:** The sub-panel expects to receive submissions in the UOA from all areas of the discipline. It recognises that the boundaries of politics and international studies are not fixed and welcomes work that is interdisciplinary, multidisciplinary and transdisciplinary in nature. The sub-panel expects to read most of the material 'in-house'. However, it will draw on the expertise of other sub-panels where appropriate.

Unit of Assessment 20: Social Work and Social Policy

109. **Descriptor:** The UOA covers all forms of research in social work, social policy and administration, and criminology/criminal justice policy, gerontology, and substantive issues in these studies. Research includes, but is not restricted to:

- a. theory, methodology, empirical research, reviews/syntheses, analyses of documents, records and statistics, ethics and values, and pedagogy as these areas apply to social work, social care, social policy, criminology and criminal justice policy, gerontology and substantive issues in these areas of study
- b. research that defines and seeks to understand social problems and their impact
- c. comparative research and research into international institutions and all forms of welfare politics, policy and practice and conceptions of crime and criminal justice
- d. research that uses a range of disciplinary and interdisciplinary approaches including (but not limited to): business and management, demography, development studies, economics, education, geography, health studies, housing and urban studies, history, law, philosophy, politics, public policy, psychology, social anthropology and sociology
- e. policy-making processes, practice, governance and management, service design, delivery and use, criminal justice design, and inter-professional relationships
- f. research that includes links – and co-production – with, a variety of stakeholders (public and private), professionals, volunteers, service users/participants and carers
- g. research that analyses, evaluates and provides critical insights into the intersection of the areas listed in a–e with key dimensions of representation and identity – particularly marginal and/or excluded groups and communities – for example: social class, gender, sexuality, 'race'/ethnicity, disability, age and migration/citizenship status.

110. **Boundaries:** Social work, social policy and administration, and criminology/criminal justice are subjects closely related to a number of other disciplines within and outside the social sciences. Political science, education, law, geography, social anthropology, developmental and social psychology, are clearly areas the boundaries of which overlap with this UOA – but certain types of historical research and the 'social aspects' of, inter alia, environment studies, genetics/biomedicine, and engineering are also areas from which the sub-panel could expect to receive work.

111. Work submitted to this sub-panel may overlap significantly with the remit of Sub-panel 21 (Sociology). It is anticipated that the use of joint assessors and cross-referral

of parts of submissions may be required in order to ensure an appropriate assessment process, in accordance with the arrangements in Part 5, paragraphs 399 to 404.

112. For the avoidance of doubt, it is recognised that much criminological research may fall within the boundaries of sub-panels, in particular Sub-panels 18 (Law), 20 (Social Work and Social Policy) and 21 (Sociology). All three sub-panels welcome such work, which will be assessed in accordance with the arrangements noted above, making use of calibration, joint assessors and cross-referral as deemed appropriate by the sub-panels.

Unit of Assessment 21: Sociology

113. **Descriptor:** Sociology is a social science with a diversity of areas and approaches to the study of social life and society. It includes empirical, critical and theoretical study of social structures, power, cultures and everyday practices, including styles and material standards of living, opinions, values and institutions. It includes analysis of and attention to social inequalities, divisions, justice and solidarities at the micro, meso and macro levels. It covers all areas of social theory, historical and comparative studies, and social research methodology, philosophy of social science, and research on pedagogy in sociology. Sociology embraces a wide range of methodologies including quantitative, qualitative and visual; and of all forms of data. The sub-panel also expects to consider sociological research in such interdisciplinary fields as criminology and socio-legal studies, media and cultural studies, social policy, gender and women's studies, demography, socio-linguistics, social psychology, psychosocial studies, social studies of science and technology, and lesbian, gay, bisexual, transgender, queer and intersex studies.

114. The sub-panel expects submissions in this UOA from all fields of sociological enquiry including, but not restricted to, research on cultures, economies and politics; class, race, ethnicity, gender, sexuality, disability, and age, and their intersections; religion, education, health and medicine, family, media, welfare institutions, and work and employment; environment, technology and the digital; and climate change; the body, interpersonal and inter-group relations, violence; urban and rural issues; language and social interaction; political sociology, public policy and social movements; political economy, globalisation, development, migration and diaspora; comparative studies of societies of all kinds, including work on transnational structures and agencies, Europe world systems.

115. As in previous research assessment exercises, work in interdisciplinary women's and gender studies may be submitted in this UOA, or may be cross-referred by other sub-panels to Sub-panel 21 (Sociology).

116. Work submitted in this UOA may overlap significantly with the remit of UOA 20 (Social Work and Social Policy). It is anticipated that the use of calibration, joint assessors and cross-referral of parts of submissions may be required in order to ensure an appropriate assessment, in accordance with the arrangements in Part 5, paragraphs 399 to 404.

117. For the avoidance of doubt, it is recognised that much criminological research may fall within the boundaries of Sub-panels 18 (Law), 20 (Social Work and Social Policy) and 21 (Sociology). All three sub-panels welcome such work, which will be assessed in accordance with the arrangements noted above, making use of calibration, joint assessors and cross-referral as deemed appropriate by the sub-panels.

118. **Boundaries:** Sub-panel 21 (Sociology) acknowledge that the UOA does not specify boundaries as per many other sub-panels. This is balanced through the descriptor outlining processes for managing submissions, to a greater detail than other sub-panels. The sub-panel consider issues of boundaries to have been addressed.

Unit of Assessment 22: Anthropology and Development Studies

119. **Descriptor:** The UOA covers all aspects of research within Anthropology and Development Studies, including research that is conceptual, theoretical, empirical, applied, strategic and practice-based, and that draws on a broad range of methodologies that includes the qualitative, quantitative, field-based, ethnographic, laboratory-based, experimental, participatory, evaluative, visual and comparative.

120. **Anthropology** is understood to include the broad fields of biological anthropology, palaeoanthropology, and social and cultural anthropology. Social and cultural anthropology includes, but is not limited to, economic and political anthropology; kinship, gender and relatedness; religion; cognition; medical anthropology; psychological anthropology; environment, conservation and biodiversity; the anthropology of development; visual anthropology; ethnomusicology and performance; material culture; and digital anthropology. Biological anthropology includes, but is not limited to, human and non-human primate evolution and adaptation; palaeoanthropology; behaviour, growth and development; health and disease; ecology; conservation; genetics; demography; and for forensic applications.

121. **Development Studies** involves the analysis of global, national and local processes of change, including social, economic, political, demographic, cultural, environmental and technological. These may be studied from micro- to macro-scale and from local to global levels, with particular attention to the relations between these. Attention is often paid to contexts characterised by poverty, inequalities, environmental vulnerability and socio-political conflict and fragility. Research is often issue-driven and involves critical interrogation of development and humanitarian theories, structures, processes, policies and practices. Its focus can include, for example, poverty reduction, equalities, empowerment, peace and reduction of violence, and food security. It can be multidisciplinary or interdisciplinary and may combine social science with other disciplines.

Unit of Assessment 23: Education

122. **Descriptor:** All outputs in submissions under UOA 23 should have an educational focus or orientation. Research in education is closely related to a range of other disciplines with which it shares common interests, methods and approaches. This diversity of content and methodology requires the sub-panel to be flexible in setting out the boundaries of work relevant to the REF.

123. The UOA may be broadly described as being concerned with research in the areas identified in the following illustrative lists:

- Research which addresses education systems, issues, processes, provision and outcomes in relation to sectors, **such as:** early years, primary, secondary, further, higher, medical, workplace, adult and continuing education. It also includes teacher, healthcare and other forms of professional education, vocational education and training; and informal, community and lifelong learning.
- Research which addresses substantive areas, **such as:** curriculum, pedagogy, assessment, language, teaching and learning; children, young people, student and adult learners; parents, families and communities; culture, economy and society; teacher training, professionalism and continuing professional development (CPD); special and inclusive education; participation, rights and equity issues; technology-enhanced learning; education policy; the organisation, governance, management, effectiveness and improvement of educational institutions;

education, training, workplaces, industry and the labour market; comparative, international and development education.

- Research which employs a range of theoretical frameworks and methodologies drawn from disciplinary traditions, **including, but not limited to:** anthropology, applied linguistics, economics, geography, history, humanities, mathematics, statistics, philosophy, political science, psychology, science and sociology. Research in the field of education deploys a range of qualitative and quantitative methodologies with structured, exploratory and participatory research designs. These **include, but are not limited to:** surveys, experiments and controlled trials; ethnography, interview and narrative enquiry; action research and case study; evaluation research; critical theory and documentary analysis; analytic synthesis; and systematic review.

124. The sub-panel accepts submissions in pedagogical research in higher education (whether or not this is generated in education departments or similar units) and in professional education (including healthcare), while recognising that such work may instead be submitted in another relevant UOA. The sub-panel will consider submissions in counselling and neuroscience. However, submissions in these areas may be referred to another sub-panel for advice.

Unit of Assessment 24: Sport and Exercise Sciences, Leisure and Tourism

125. **Descriptor:** Research in the UOA stems from the natural sciences, social sciences and the humanities. The sub-panel expects to receive submissions from a wide range of disciplines and subject areas that contribute to research in sport and exercise sciences, leisure and tourism. This could include (in alphabetical order): adapted physical activity, anthropology, behaviour change, biochemistry, biomechanics, business management and marketing, coaching, culture and media studies, development studies, economics, education and pedagogy, engineering and technology, festivals and events, geography, history, hospitality, law, medicine, molecular biology, motor learning and control, nutrition, outdoor and adventure education, philosophy, physical education, physical activity and health/public health, physiology, policy studies, politics, psychology, sociology, sports injury and rehabilitation, and strength and conditioning. Research in sport and exercise sciences, leisure and tourism is therefore derived from diverse disciplines and subject areas, and can also be multidisciplinary and interdisciplinary.

126. **Boundaries:** The sub-panel expects submissions in this UOA of research of all types, and it expects to consider research informed by a variety of research epistemologies, methodologies and methods. The sub-panel will consider research defined as empirical, theoretical, strategic, applied, or policy-focused as having equal standing.

Main Panel D: UOAs 25–34

Introduction

127. The main panel is charged with identifying excellence in the rich diversity of research covered by the UOAs described below. It welcomes all outputs arising from this research, in whatever genre, medium or location, that can be demonstrated to meet the definition of research for the REF, as outlined in Annex C of the 'Guidance on submissions' and that have entered the public domain during the publication period. The sub-panels are committed to applying criteria and working methods that reflect the distinctive character, methodologies and full breadth of these disciplines (including interdisciplinary research), and that facilitate

the formation of a balanced range of judgements, without privileging or disadvantaging any particular form of research output, research methodology or type of research environment.

128. The main panel and its sub-panels will operate according to the following principles:

- Panels will assess submissions in the form that HEIs have chosen to present their research, within the REF framework.
- Panels will aim to identify excellence wherever they can find it.

Unit of assessment descriptors and boundaries

Unit of Assessment 25: Area Studies

129. Taking an inclusive view of Area Studies as a dynamic field, the sub-panel understands Area Studies broadly to include the study of all regions of the world, across any period of time (ancient, medieval and modern) however defined, and the communities associated with them. As well as in terms of national territories, regions may be delineated in various ways, including by traditional geographical designations (e.g. African Studies, American and Anglophone Studies (Canada and the United States); Asian Studies including Central Asian, North East Asian Studies (including China and Japan), South Asian and South East Asian Studies; Latin American and Caribbean Studies; Australian, New Zealand and Pacific Studies; European Studies, including Russian and East European Studies; Middle Eastern Studies (including Jewish and Islamic Studies)); by ecological (e.g. Circumpolar Studies), geopolitical (e.g. Post-Soviet Studies) or institutional (e.g. European Union Studies) criteria; or in terms of themes, processes or networks (e.g. Diaspora Studies, Post-Colonial Studies, Gender Studies, Intercultural Studies etc.).

130. The sub-panel has expertise across the humanities and social sciences and welcomes work in any language from any single-disciplinary, interdisciplinary, multidisciplinary, empirical or theoretical perspective. It will assess submissions covering all, but not limited to, aspects of anthropology, law, history, heritages, languages and linguistics, cultures, literatures, religions, philosophy, media, society, economics, human geography, sociology, politics and international relations, and translation, as well as inter-regional and globalisation studies. It welcomes ground-breaking or novel approaches and seeks to reward innovation and excellence in both traditional and non-traditional formats, including applied, practice-based and pedagogical research. The sub-panel comprises specialists in humanities and social sciences and particularly welcomes work that crosses the arts and humanities/social sciences boundary.

131. The sub-panel has expertise to assess a wide range of work and takes an inclusive view of the subject areas within its scope. Given the broad range of its descriptor, it recognises that submissions may be made in this UOA that include work in languages, literatures, cultures and societies falling wholly or partially outside its members' expertise. The sub-panel anticipates it will work closely with, as appropriate, other sub-panels e.g. UOA 26 (Modern Languages and Linguistics) and UOA 19 (Politics and International Studies). The sub-panel is also mindful of the likely need to appoint further panel members for the assessment stage of the REF.

132. The sub-panel recognises the overlapping boundaries in the sub-panel descriptors, and that aspects of research are naturally interdisciplinary or multi-disciplinary or span the boundaries between individual UOAs. The sub-panel welcomes the submission of research that may equally be submitted to other sub-panels. Where judged necessary by the panels, expertise will be augmented by additional assessors, or work will be cross-referred to relevant panels, according to the process detailed in Part 5, paragraphs 399 to 404.

Unit of Assessment 26: Modern Languages and Linguistics

133. The UOA includes research on the languages, literatures, cultures and societies of all regions, countries and communities where Celtic, Germanic, Romance or Slavonic languages or other languages of Europe and Latin America are, or were, used. This includes areas where European languages have interacted with other cultures and languages. The UOA also includes all areas of general, historical, theoretical, descriptive and applied linguistics, phonetics, and translation and interpreting studies, regardless of the methodology used or the language to which the studies are applied. The sub-panel will take a broad view of what constitutes modern language studies. This will include, but not be limited to: literature and thought; cultural studies; theatre studies; film and media studies; visual cultures; language studies; translation and interpreting studies; political, social and historical studies; editorial scholarship, bibliography, textual criticism and theory and history of the book; philosophy and critical theory; world literature and comparative literature; literature in relation to the other arts; and applied, practice-based and pedagogical research, including translation and creative writing. The sub-panel welcomes the submission of interdisciplinary research, including work on language and literature in relation to science, medicine and technology, digital humanities, or creative technologies, and will ensure that such work is assessed with appropriate expertise.

134. The sub-panel has expertise to assess a wide range of work and takes an inclusive view of the subject areas within its scope. Given the broad range of its descriptor, it recognises that submissions may be made in this UOA that include work on languages, literatures, cultures and societies falling wholly or partially outside its members' expertise. The sub-panel consequently expects some degree of overlap with UOA 25 (Area Studies). It anticipates that the two sub-panels will work together closely and as appropriate before and during the assessment period.

135. The sub-panel recognises the overlapping boundaries in the sub-panel descriptors, and that aspects of research are naturally interdisciplinary or multidisciplinary or span the boundaries between individual UOAs. The sub-panel welcomes the submission of research that may equally be submitted to other sub-panels. Where judged necessary by the panels, expertise will be augmented by additional assessors, or work will be cross-referred to relevant panels, according to the process detailed in Part 5, paragraphs 399 to 404.

Unit of Assessment 27: English Language and Literature

136. The UOA includes all aspects of language studies, including all areas of linguistics and of applied linguistics, with primary reference to any variety of English or Scots; the history of English or Scots; Old Norse/Icelandic (language, literature and linguistic studies); English literature from the early Middle Ages to the present day; North American literature; comparative literature; world literatures in English; colonial and postcolonial literatures and languages; literatures translated into English; women's writing; creative writing and practice; life writing; children's literature; creative non-fiction and/or creative critical writing; critical and cultural theory; cultural history; gender and sexuality studies; editorial scholarship, bibliography, textual criticism and theory, and history of the book; Irish literature in English; Scottish literature in English and Scots; Welsh literature in English; and applied, practice-based and pedagogical research in English.

137. The sub-panel will take a broad view of what constitutes English literature and language. It recognises the overlapping boundaries in the sub-panel descriptors, and that aspects of research are naturally interdisciplinary or multi-disciplinary or span the

boundaries between individual UOAs. The sub-panel aims to be inclusive, and welcomes the submission of research that may equally be submitted to other sub-panels. This may include areas such as theatre and performance studies; cultural studies; film, television and digital media studies; popular music; history; art history; philosophy; the linguistics of languages other than those mentioned above; translation studies; language and literature in relation to science, technology and medicine; medical and health humanities; digital humanities; or creative technologies.

138. The sub-panel will ensure that such work is assessed with appropriate expertise. Where judged necessary by the panels, expertise will be augmented by additional assessors, or work will be cross-referred to relevant panels, according to the process detailed in Part 5, paragraphs 399 to 404. Specialist members of the relevant sub-panels will liaise to ensure that broad, cross-disciplinary subject areas such as linguistics are appropriately assessed.

Unit of Assessment 28: History

139. The UOA includes all aspects of the study of the past.

140. The sub-panel expects submissions in this UOA from all areas of history. The following list (in alphabetical order) is illustrative rather than exhaustive; it does not reflect any judgements about the relative significance of the subject areas, nor does it specify 'fields': agricultural histories; biographical histories; business histories; contemporary histories; cultural histories; ecclesiastical histories; economic histories; histories of education; environmental histories; gender histories; global histories; heritage; historiography; history and memory; histories of Britain, Ireland and Continental Europe (late Roman to the present); histories of ethnicity; histories of ideas; histories of North America, South America, Africa, Asia and Australasia; histories of race; histories of science, technology and medicine; histories of sexuality; histories of the book; indigenous histories; imperial/colonial histories; international histories; labour histories; local and regional histories; manuscript studies; material culture; media histories; military histories; oral histories; political histories; public histories; religious histories; rural histories; social histories; theories of history; transnational histories; urban histories; women's histories; and world histories.

141. All ancient history outputs will be automatically cross-referred to Sub-panel 29 (Classics). Byzantine history outputs will also be cross-referred where it seems more appropriate for Sub-panel 29 to consider the output.

142. The sub-panel recognises the overlapping boundaries in the sub-panel descriptors, and that aspects of research are naturally interdisciplinary or multi-disciplinary or span the boundaries between individual UOAs. The sub-panel welcomes the submission of research that may equally be submitted to other sub-panels. Where judged necessary by the panels, expertise will be augmented by additional assessors, or work will be cross-referred to relevant panels, according to the process detailed in Part 5, paragraphs 399 to 404.

Unit of Assessment 29: Classics

143. The UOA includes the language, literature, history, culture, art, archaeology and thought (including ancient science and philosophy) of Greece and Rome from the earliest times to late antiquity; Latin language and literature of the Middle Ages and subsequent periods; Ancient Egypt and the ancient Near East, Byzantine studies; modern Greek language, literature, history and culture; the classical tradition; and the reception of these periods and subjects.

144. Within the boundaries are the following: the Greek world from the Bronze Age to the fall of the Byzantine Empire; the Roman world from the Bronze Age to late antiquity; Greek lands, including the Diaspora, from the medieval period to the present; the philology and linguistics of Latin and Greek and of related and neighbouring languages; comparative literature and such literature, literary theory, philosophy, political thought, material culture, art, film, television, digital media, creative practices, music, and such political, archaeological and other cultural activity as exploits in any way the history or cultural products of the Greek, Roman and Byzantine worlds, including translation and performance of classical works; the pedagogy associated with learning and teaching in the subjects listed here.

145. The list above is illustrative rather than exhaustive. It does not reflect any judgements about the relative significance of the subject areas, nor does it specify 'fields'.

146. The sub-panel recognises the overlapping boundaries in the sub-panel descriptors, and that aspects of research are naturally interdisciplinary or multi-disciplinary or span the boundaries between individual UOAs. The sub-panel welcomes the submission of research that may equally be submitted to other sub-panels. Where judged necessary by the panels, expertise will be augmented by additional assessors, or work will be cross-referred to relevant panels, according to the process detailed in Part 5, paragraphs 399 to 404.

Unit of Assessment 30: Philosophy

147. The UOA includes all areas and styles of, and approaches to, philosophy. The sub-panel expects to receive submissions from all areas of philosophy, and considers the following subjects (listed alphabetically), among others, to be within the remit of the UOA: 19th to 21st century European philosophy including phenomenology, existentialism, critical theory, hermeneutics, and deconstruction; aesthetics; applied philosophy; environmental philosophy; epistemology; ethics, including applied ethics and meta-ethics; feminist philosophy; history of philosophy including ancient, medieval, modern and recent; logic; metaphysics; non-Western philosophy; philosophy and history of mathematics; philosophy and history of science, technology and medicine; philosophy of education; philosophy of language; philosophy of law; philosophy of mind; philosophy of race; philosophy of religion; political and social philosophy. The areas mentioned are illustrative rather than exhaustive, and do not reflect any judgement about the relative significance of the subject areas.

148. Because philosophy engages with conceptual and foundational issues raised by other disciplines, it spans boundaries with a number of other UOAs, including but not limited to all the other UOAs within Main Panel D and the following UOAs within other main panels: UOA 1 (Clinical Medicine), for example philosophy of biological sciences; UOA 2 (Public Health, Health Services and Primary Care), for example medical ethics; UOA 4 (Psychology, Psychiatry and Neuroscience), for example cognitive science; UOA 5 (Biological Sciences), for example philosophy of biological sciences; UOA 9 (Physics), for example the philosophy of physics; UOA 10 (Mathematical Sciences), for example mathematical logic; UOA 16 (Economics and Econometrics), for example social choice theory and game theory; UOA 18 (Law), for example jurisprudence; UOA 19 (Politics and International Studies), for example political theory; UOA 21 (Sociology), for example social theory.

149. In accord with the Philosophy sub-panel's aim to be inclusive, it covers all types of applied philosophy relating to practical issues both within and outside academia. The remit also covers work concerned with philosophical questions raised by other disciplines, for example work concerned with the foundations, methods, epistemic status, or interpretation

of findings or theories in the other disciplines. The sub-panel may consider that work that merely references philosophical ideas without engaging with them philosophically will have its excellence best assessed by another sub-panel, and will consider cross-referral accordingly.

150. The sub-panel recognises the overlapping boundaries in the sub-panel descriptors, and that aspects of research are naturally interdisciplinary or multi-disciplinary or span the boundaries between individual UOAs. The sub-panel welcomes the submission of research that may equally be submitted to other sub-panels. Where judged necessary by the panels, expertise will be augmented by additional assessors, or work will be cross-referred to relevant panels, according to the process detailed in Part 5, paragraphs 399 to 404.

Unit of Assessment 31: Theology and Religious Studies

151. The UOA encompasses all research in theology and religion, and is inclusive of all disciplinary approaches adopted in the field, including philosophical, theological, historical, philological, literary, phenomenological, psychological, sociological and anthropological methodologies. It is also inclusive of research into the nature of theology and/or religious studies as disciplines, and of the methodologies they employ.

152. It encompasses the study and interpretation of religious institutions, movements, texts, laws, practices, ethics, beliefs, symbols, media, social relations, material objects, spaces and flows, both historical and contemporary in local and/or global contexts. It includes all religious traditions, spiritualities and sacralised forms of commitment and their expression in different cultural media – for example film, art, music and literature, in whatever genre or medium. The study of varieties of secularism, secularity and non-belief which reference religion explicitly or implicitly is also included. It also covers work concerned with theological and religious questions raised by other disciplines, including being able to review work relating to the context, assumptions and content of religious education in different settings.

153. Theology and Religious Studies is an inherently multi- and cross-disciplinary subject, and religion intersects with many other aspects of society, politics and culture. In recognition of this, the sub-panel will welcome submissions which overlap with the remit of other UOAs; or for which UOA 31 is not the only appropriate one; or from those undertaking relevant research in academic units not classified as theology, divinity or religious studies; or from academic units which specialise in only one area of the field.

154. Given the multi-disciplinary reach of UOA 31, it is anticipated that a substantial portion of submissions received will overlap with other UOAs, for example with UOA 14 (Geography and Environmental Studies), UOA 18 (Law), UOA 19 (Politics and International Studies), UOA 21 (Sociology), UOA 22 (Anthropology and Development Studies), UOA 23 (Education) and the UOAs within Main Panel D. Sub-panel 31 contains considerable linguistic, methodological and cross-disciplinary expertise, but will apply the arrangements set out in Part 5, paragraphs 399 to 404, where expertise needs to be augmented. Sub-panel 31 continues to welcome innovative and cross-disciplinary approaches to the study of religion as well as more traditional methods.

155. The sub-panel recognises the overlapping boundaries in the sub-panel descriptors, and that aspects of research are naturally interdisciplinary or multi-disciplinary or span the boundaries between individual UOAs. The sub-panel welcomes the submission of research that may equally be submitted to other sub-panels. Where judged necessary by the panels,

expertise will be augmented by additional assessors, or work will be cross-referred to relevant panels, according to the process detailed in Part 5, paragraphs 399 to 404.

Unit of Assessment 32: Art and Design: History, Practice and Theory

156. The sub-panel will assess research from all aspects of the history, theory and practice of art and design, and disciplines where these relate to visual, material and spatial cultures. The sub-panel will consider outputs, in whatever genre or medium, that meet the definition of research (as outlined in 'Guidance on submissions', Annex C). The sub-panel acknowledges and welcomes a diverse range of methods and approaches to research, and therefore adopts an inclusive definition of its remit.

157. It is anticipated that outputs will span a range of texts, edited publications and creative practices, as well as artefacts, events and curatorial outputs. The sub-panel expects to evaluate research that encompasses analytical, applied, ethnographical, experimental, historical, pedagogical, scientific, technological and theoretical approaches to the widest domains of the history, theory and practice of art and design, and covers the broadest understanding of the subject disciplines within any cultural, geographical or historical context.

158. The sub-panel is committed to applying criteria and working methods that are appropriate to all submitting units, whatever their size or structure, without privileging any particular form of research output or environment.

159. The sub-panel recognises the overlapping boundaries in the sub-panel descriptors, and that aspects of research are naturally interdisciplinary or multi-disciplinary or span the boundaries between individual UOAs. The sub-panel welcomes the submission of research that may equally be submitted to other sub-panels. Where judged necessary by the panels, expertise will be augmented by additional assessors, or work will be cross-referred to relevant panels, according to the process detailed in Part 5, paragraphs 399 to 404.

Unit of Assessment 33: Music, Drama, Dance, Performing Arts, Film and Screen Studies

160. The sub-panel will assess research from all areas of music, drama, dance, theatre, performance, live and sonic art, film, television and screen studies. It anticipates that outputs will span a range of artefacts, creative practices, curatorial outputs, edited publications, recordings and writings. The sub-panel expects to evaluate research that encompasses analytical, applied, critical, ethnographical, historical, interdisciplinary, pedagogical, practice-based, scientific, technological and theoretical approaches to all of the subject areas indicated above. It covers the broadest understanding of the subject disciplines within, between and across any cultural, geographical or historical contexts.

161. The sub-panel recognises the overlapping boundaries in the sub-panel descriptors, and that aspects of research are naturally interdisciplinary or multi-disciplinary or span the boundaries between individual UOAs. The sub-panel welcomes the submission of research that may equally be submitted to other sub-panels. Where judged necessary by the panels, expertise will be augmented by additional assessors, or work will be cross-referred to relevant panels, according to the process detailed in Part 5, paragraphs 399 to 404.

Unit of Assessment 34: Communication, Cultural and Media Studies, Library and Information Management

162. The sub-panel recognises the rich diversity of research across the Arts, Humanities and Social Sciences in communication, cultural and media studies, library and information

management, and welcomes all outputs arising from this research, in whatever genre or medium, that can be demonstrated to meet the definition of research for the REF (as outlined in 'Guidance on submissions', Annex C). In setting out its remit, the sub-panel recognises that the UOA descriptor covers two broad fields of research which are often distinct both organisationally and academically, and welcomes submissions that reflect this. It also recognises that the activities covered by its remit, even within its two broad fields of coverage, are often rooted in quite distinct research traditions or infrastructures. It will assess research on its merits, with no penalty for research which is plainly within a distinct tradition within the sub-panel's remit. It will nonetheless welcome research which seeks to engage with questions and concerns, such as the 'information society', heritage (both cultural and museum aspects), networks or convergence, which may transcend field boundaries.

163. The UOA includes research that addresses or deploys theory, history, institutional, policy, textual, critical and/or empirical analysis, or practice within communication, culture, media, journalism, film, television and screen studies. Within UK higher education much, but not all, of this work is likely to emanate from units or departments in communication studies, cultural studies, media studies, journalism, or film and screen/television studies. This work will include research on online and screen-based media (such as film, television, games and other digital forms), print media, computer-mediated communication, digital infrastructure and platform studies focused on data and society, diverse information and communication technologies, cultural policy, the creative industries and popular culture, which will be variably titled and organised. The sub-panel will assess research as defined above which addresses (but is not confined to): policy for regulation of culture and the media and communication industries; the organisation, institutions, political economy and practice of cultural production; media and cultural texts, forms and practices; media and cultural audiences, consumption and reception; the role of changing technology, including emergent digital technologies, in media production, content manipulation, distribution, access and participation. It is recognised that this will include work which explores questions of power, identity and difference in relation to media, communication and cultural studies which may sit at the intersections of (among others) gender and sexuality studies, race and postcolonial studies, and disability studies.

164. The UOA also includes research concerned with the management of information and knowledge in all formats, namely librarianship and information science, archives and records management, and information systems. This concerns research on the generation, organisation, dissemination and publication, exploitation, protection, and evaluation of information and knowledge, and the impacts of such activities. It may include, for example, research that focuses on digital humanities; digital participation; information behaviour and use; information ethics; information literacy; information media; information policy; information retrieval; information security; information seeking; the information society; knowledge management systems; preservation and conservation; systems thinking; systems development; and the cultural, economic, ethical, historical, philosophical, and societal aspects of the disciplines and their associated professions.

165. The sub-panel recognises the overlapping boundaries in the sub-panel descriptors, and that aspects of research are naturally interdisciplinary or multi-disciplinary or span the boundaries between individual UOAs. The sub-panel welcomes the submission of research that may equally be submitted to other sub-panels. Where judged necessary by the panels, expertise will be augmented by additional assessors, or work will be cross-referred to relevant panels, according to the process detailed in Part 5, paragraphs 399 to 404.

Part 3: Assessment criteria

Section 1: Submissions

Interdisciplinary research

166. The REF main and sub-panels welcome the submission of interdisciplinary research, as defined in paragraph 390, in any relevant UOA.

167. The arrangements for assessing interdisciplinary research – including through the guidance provided by the interdisciplinary advisers on the main and sub-panels, the interdisciplinary research identifier, and the appointment of additional members and assessors – are set out in the working methods (see paragraphs 390 to 398).

168. The interdisciplinary research identifier for outputs allows HEIs to identify in the submission those outputs which it considers to be interdisciplinary, and to draw this to the panels' attention. This is intended to give greater confidence to HEIs to submit interdisciplinary research, and will allow panels, working with their IDR advisers, to consider the most appropriate means of assessing the output. It is recognised that submissions may cover a broad range of disciplines, or may not have an identifiable disciplinary focus. The sub-panels therefore encourage HEIs to identify in submissions all outputs they consider meet the definition of interdisciplinary research (set out in paragraph 390) where they wish to draw this to the panels' attention. The sub-panels recognise that outputs flagged as interdisciplinary may incorporate research crossing main panel areas, may span disciplines across the sub-panels within a main panel, or may incorporate research areas covered within a sub-panel – particularly where UOAs cover a broad range of disciplines.

169. There will be no advantage or disadvantage in the assessment in identifying outputs as interdisciplinary. The main and sub-panels will apply the standards of excellence defined by the starred quality levels equally to research in interdisciplinary areas and to research within distinct disciplines. The main and sub-panels consider that all such research is capable of displaying the highest standards of quality.

Work on the boundaries between UOAs

170. The REF main and sub-panels recognise the diverse nature of the disciplines that they cover, that UOAs do not have firm or rigidly definable boundaries, and that aspects of research span the boundaries between individual UOAs, whether within a main panel or across main panels. They also recognise that there are research areas which may be undertaken in a range of different contexts, and some of these therefore occur in the descriptors of a number of UOAs. The main and sub-panels welcome the submission of such research, in any relevant UOA.

171. The arrangements for assessing submissions that span UOA boundaries – including the cross-referral process – are set out in the working methods (see paragraphs 399 to 404). The UOA descriptors indicate where the panels might expect work submitted in their UOA to cross boundaries with other UOAs, but recognise that there may be other overlaps.

172. Panels will assess, on an equal basis, submissions that reflect the work of administrative units such as departments, and submissions that do not map neatly onto departmental or other administrative structures within HEIs. In either case, institutions will not be penalised if submissions contain some work that overlaps UOA boundaries. The main and sub-panels will apply the standards of excellence defined by the starred quality

levels equally to research that spans UOA boundaries and to research solely within the remit of one UOA. The main and sub-panels consider that all such research is capable of displaying the highest standards of quality.

Pedagogic research

Main Panel A criteria – pedagogic research

173. It is expected that research on pedagogy or medical or veterinary education will be submitted in UOA 23 (Education) and research on medical ethics will be submitted in UOA 30 (Philosophy). Research on the philosophical and ethical aspects of healthcare and on education relevant to its disciplines may be submitted in UOA 3 (Allied Health Professions, Dentistry, Nursing and Pharmacy) and any such outputs are expected to be assessed by that panel.

Main Panel B criteria – pedagogic research

174. Research on pedagogy and educational issues **within higher education** that relate to the disciplines covered by Main Panel B may be submitted in the UOA to which it relates rather than to UOA 23 (Education). Such research will be assessed by the sub-panel for the UOA in which it is submitted and where advice is required from Sub-panel 23 (Education), outputs will be cross-referred.

175. Bodies of research into teaching in **other education sectors** or on general educational issues should be submitted in UOA 23 (Education). Individual outputs on these issues received by the sub-panels in Main Panel B will normally be cross-referred to Sub-panel 23 (Education) as appropriate.

Main Panel C criteria – pedagogic research

176. Research on pedagogy and educational issues within higher education that relate to the disciplines covered by Main Panel C may be submitted in the UOA to which it relates or in UOA 23 (Education), as deemed appropriate by submitting HEIs.

Main Panel D criteria – pedagogic research

177. Research on pedagogy and educational issues that relate to the disciplines covered by Main Panel D may be submitted in the UOA to which it relates or in UOA 23 (Education), as deemed appropriate by submitting HEIs. Main Panel D anticipates that individual sub-panels will normally assess such research where it relates to education in the sub-panel's discipline area.

Multiple submissions

178. 'Guidance on submissions' (paragraphs 73 to 77) sets out the arrangements whereby institutions may exceptionally, and only with prior permission from the REF director, make more than one submission (multiple submissions) in the same UOA. These exceptions are:

- a. Where an institution involved in a joint submission wishes to make an additional individual submission in the same UOA.
- b. Multiple submissions to Sub-panel 26 (Modern Languages and Linguistics) will be permitted where one submission is in Celtic Studies and the other in Modern

Languages and Linguistics. This has been agreed in recognition of the special cultural significance of Celtic Studies in parts of the UK, and the particular legal status of the Welsh language in Wales. For other types of multiple submissions in UOA 26, see paragraph 185.

- c. Where HEIs merged after 1 July 2018, they may seek permission to make two separate submissions in all of the UOAs in which they wish to submit, if, for example, they anticipate difficulty in achieving academic cohesion between the merger date and the submission date. Permission is unlikely to be granted to such HEIs to make separate submissions only in some of the UOAs in which they wish to submit. In the event that HEIs merged prior to 1 July 2018, the merged HEI should normally make one submission only to each UOA.
- d. Where a sub-panel considers there is a case for multiple submissions in its UOA, given the nature of the disciplines covered, the institution may request a multiple submission. The panels' expectations are set out in paragraphs 180 to 186.

179. Each submission will be awarded a single overall quality profile. Where a single submission includes distinct organisational units or areas of research and where the REF sub-panel considers it appropriate, the sub-panel will provide feedback to the head of institution relating to the distinct units or areas of research.

Main Panel A supplementary criteria – multiple submissions

180. Sub-panels in Main Panel A do not consider that there is a case for multiple submissions in their UOAs, based on the nature of the disciplines covered, and do not expect to receive requests for multiple submissions in these UOAs (other than for the reasons stated in paragraph 178 a.-c.).

181. Sub-panel 3 (Allied Health Professions, Dentistry, Nursing and Pharmacy) recognises that institutions may wish to receive output sub-profiles for distinct areas covered in their submission and will provide output sub-profiles against the following areas to the head of institution where requested: Nursing, Dentistry, Pharmacy, Allied Health Professions and Biomedical Sciences. If institutions wish to receive output sub-profiles, they should assign each output in their submission to one of the above categories. Sub-profiles will not be provided for outputs which have not been tagged. The normal expectation is that output sub-profiles will not be provided where there is a small number of staff associated with those outputs (typically less than five FTE). Output sub-profiles will be provided confidentially to the head of the institution concerned

Main Panel B supplementary criteria – multiple submissions

182. Sub-panels in Main Panel B do not consider that there is a case for multiple submissions in their UOAs, based on the nature of the disciplines covered, and do not expect to receive requests for multiple submissions in these UOAs (other than for the reasons stated in paragraph 178 a.-c.).

183. Sub-panel 12 (Engineering) recognises that institutions may wish to receive output sub-profiles for distinct areas of engineering covered in their submission and will provide output sub-profiles against the following areas to the head of institution where requested: Aeronautical, Mechanical and Manufacturing Engineering; Bio-engineering;

Civil and Construction Engineering; Chemical Engineering; Electrical and Electronic Engineering; General Engineering; Metallurgy and Materials. If institutions wish to receive output sub-profiles, they should assign each output in their submission to one of the above categories. Sub-profiles will not be provided for outputs which have not been tagged. If a 'combined' sub-profile is required for all remaining outputs (as different from the overall output profile) then institutions should assign all remaining outputs to general engineering. The normal expectation is that output sub-profiles will not be provided where there is a small number of staff associated with those outputs (typically less than five FTE). Output sub-profiles will be provided confidentially to the head of the institution concerned.

Main Panel C supplementary criteria – multiple submissions

184. In Sub-panel 22 (Anthropology and Development Studies) requests for multiple submissions where institutions have separate Anthropology and Development Studies (or International Development) departments would normally fulfil the criteria. The remainder of sub-panels in Main Panel C do not consider that there is a case for multiple submissions in their UOAs, based on the nature of the disciplines covered, and do not expect to receive requests for multiple submissions (other than for the reasons stated in paragraph 178 a.-c.).

Main Panel D supplementary criteria – multiple submissions

185. The following sub-panels in Main Panel D consider that there is a case, based on the nature of the disciplines covered by their UOAs, for multiple submissions in these UOAs and would expect to receive requests for:

- Sub-panel 25 (Area Studies)
- Sub-panel 26 (Modern Languages and Linguistics)
- Sub-panel 32 (Art and Design: History, Practice and Theory)
- Sub-panel 33 (Music, Drama, Dance, Performing Arts, Film and Screen Studies)
- Sub-panel 34 (Communication, Cultural and Media Studies, Library and Information Management)

186. Requests for multiple submissions may be made in other UOAs within Main Panel D but are expected to be a rare occurrence. All such requests will be considered according to the criteria and procedures in paragraphs 73 to 77 of 'Guidance on submissions'.

Section 2: Staff

Independent researchers

187. 'Guidance on submissions' (paragraph 128) sets out that staff employed on 'research only' contracts must be independent researchers to meet the definition of Category A eligible. For the purposes of the REF, an independent researcher is defined as an individual who undertakes self-directed research, rather than carrying out another individual's research programme.

188. Possible indicators of independence are listed below. Institutions should note that each indicator may not individually demonstrate independence and, where appropriate, multiple factors may need to be considered. Across all main panels, the following indicators would normally identify research independence:

- leading or acting as principal investigator or equivalent on an externally funded research project
- holding an independently won, competitively awarded fellowship where research independence is a requirement. An illustrative, but not exhaustive, list of independent fellowships can be found at www.ref.ac.uk, under Guidance
- leading a research group or a substantial or specialised work package.

Main Panels C and D supplementary criteria – independent researchers

189. In addition to the generic criteria specified in the 'Guidance on submissions', Main Panels C and D also consider that the following attributes may generally indicate research independence in their disciplines:

- Being named as a Co-I on an externally funded research grant/award.
- Having significant input into the design, conduct and interpretation of the research.

Section 3: Outputs

Criteria and level definitions

190. This section provides a descriptive account of how the sub-panels will interpret and apply the generic criteria for assessing outputs and the starred quality levels. This descriptive account expands on and complements the generic criteria and definitions in Annex A of 'Guidance on submissions', but does not replace them.

191. **Originality** will be understood as the extent to which the output makes an important and innovative contribution to understanding and knowledge in the field. Research outputs that demonstrate originality may do one or more of the following: produce and interpret new empirical findings or new material; engage with new and/or complex problems; develop innovative research methods, methodologies and analytical techniques; show imaginative and creative scope; provide new arguments and/or new forms of expression, formal innovations, interpretations and/or insights; collect and engage with novel types of data; and/or advance theory or the analysis of doctrine, policy or practice, and new forms of expression.

192. **Significance** will be understood as the extent to which the work has influenced, or has the capacity to influence, knowledge and scholarly thought, or the development and understanding of policy and/or practice.

193. **Rigour** will be understood as the extent to which the work demonstrates intellectual coherence and integrity, and adopts robust and appropriate concepts, analyses, sources, theories and/or methodologies.

194. The generic definitions of the starred quality levels in the overall quality profile in each of the three sub-profiles – outputs, impact and environment – are in Annex A of ‘Guidance on submissions’. The panels would like to emphasise that ‘world-leading’, ‘internationally’ and ‘nationally’ in this context refer to quality standards. They do not refer to the nature or geographical scope of particular subjects, nor to the locus of research, nor its place of dissemination.

195. The main panels have set out below a descriptive account of the starred level definitions for outputs, as they apply in each main panel. These are provided to inform their subject communities about how the panels will apply the definitions in making their judgements. Variations in terminology reflect disciplinary norms but do not indicate a difference in the quality standards themselves. These descriptive accounts should be read alongside, but do not replace, the generic definitions.

Interdisciplinary research

196. Interdisciplinary outputs will be assessed against the generic criteria of originality, significance and rigour. In assessing interdisciplinary outputs, the sub-panels will make use of guidance provided by the Interdisciplinary Research Advisory Panel (IDAP) that originality and significance can be identified in one, some or all of the constituent parts brought together in the work, or in their integration; they do not need to be demonstrated across all contributing areas/fields. This guidance will work in parallel with – rather than replace – the generic criteria of originality, significance and rigour.

Main Panel A supplementary criteria – level definitions

197. In assessing outputs, the sub-panels will look for evidence of the quality of the output in terms of its originality, significance and rigour, and will apply the generic definitions of the starred quality levels.

198. The sub-panels will look for evidence of some of the following types of characteristics of quality, as appropriate to each of the starred quality levels:

- scientific rigour and excellence, with regard to design, method, execution and analysis
- significant addition to knowledge and to the conceptual framework of the field
- actual significance of the research
- the scale, challenge and logistical difficulty posed by the research
- the logical coherence of argument
- contribution to theory-building
- significance of work to advance knowledge, skills, understanding and scholarship in theory, practice, education, management and/or policy

- applicability and significance to the relevant service users and research users
- potential applicability for policy in, for example, health, healthcare, public health, food security, animal health or welfare.

199. Unless there is sufficient evidence of at least one of the above, or the definition of research used for the REF is not met, research outputs will be graded as 'unclassified'.

200. The sub-panels welcome research practice that supports reproducible science and the application of best practice. Examples include registered reports, pre-registration, publication of data sets, experimental materials, analytic code, and use of reporting checklists for publication purposes and those relating to the use of animals in research. These contribute to the evaluation of rigour for submitted outputs. Replication studies may be submitted as outputs and will be evaluated on the extent to which they contribute significant new knowledge, improved methods, or advance theory or practice¹.

201. The sub-panels will use citation information, where appropriate and available, as part of the indication of academic significance to inform their assessment of output quality. Further details on the use of citation data are provided in paragraphs 274 to 276.

Main Panel B supplementary criteria – level definitions

202. In assessing outputs, the sub-panels will look for evidence of originality, significance and rigour and apply the generic definitions of the starred quality levels as follows:

a. In assessing work as being four star (quality that is world-leading in terms of originality, significance and rigour), sub-panels will expect to see evidence of, or potential for, some of the following types of characteristics:

- agenda-setting
- research that is leading or at the forefront of the research area
- great novelty in developing new thinking, new techniques or novel results
- major influence on a research theme or field
- developing new paradigms or fundamental new concepts for research
- major changes in policy or practice
- major influence on processes, production and management
- major influence on user engagement.

b. In assessing work as being **three star** (quality that is internationally excellent in terms of originality, significance and rigour but which falls short of the highest standards

¹Institutions may find it useful to refer to international guidelines such as the following:

ARRIVE	https://www.nc3rs.org.uk/arrive-guidelines
CONSORT	http://www.consort-statement.org/
PRISMA	http://www.prisma-statement.org/
COPE	http://publicationethics.org/
ICMJE	http://www.icmje.org/
ITHENTICATE	http://www.ithenticate.com/

of excellence), sub-panels will expect to see evidence of, or potential for, some of the following types of characteristics:

- makes important contributions to the field at an international standard
- contributes important knowledge, ideas and techniques which are likely to have a lasting influence, but are not necessarily leading to fundamental new concepts
- significant changes to policies or practices
- significant influence on processes, production and management
- significant influence on user engagement.

c. In assessing work as being **two star** (quality that is recognised internationally in terms of originality, significance and rigour), sub-panels will expect to see evidence of, or potential for, some of the following types of characteristics:

- provides useful knowledge and influences the field
- involves incremental advances, which might include new knowledge which conforms with existing ideas and paradigms, or model calculations using established techniques or approaches
- influence on policy or practice
- influence on processes, production and management
- influence on user engagement.

d. In assessing work as being **one star** (quality that is recognised nationally in terms of originality, significance and rigour), sub-panels will expect to see evidence of, or potential for, some of the following types of characteristics:

- useful but unlikely to have more than a minor influence in the field
- minor influence on policy or practice
- minor influence on processes, production and management
- minor influence on user engagement.

e. Research will be graded as '**unclassified**' if it falls below the quality levels described above or does not meet the definition of research used for the REF.

Main Panel C supplementary criteria – level definitions

203. In assessing outputs, the sub-panels will look for evidence of originality, significance and rigour, and apply the generic definitions of the starred quality levels as follows:

a. In assessing work as being **four star** (quality that is world-leading in terms of originality, significance and rigour), sub-panels will expect to see some of the following characteristics:

- outstandingly novel in developing concepts, paradigms, techniques or outcomes
- a primary or essential point of reference
- a formative influence on the intellectual agenda

- application of exceptionally rigorous research design and techniques of investigation and analysis
 - generation of an exceptionally significant data set or research resource.
- b. In assessing work as being **three star** (quality that is internationally excellent in terms of originality, significance and rigour but which falls short of the highest standards of excellence), sub-panels will expect to see some of the following characteristics:
- novel in developing concepts, paradigms, techniques or outcomes
 - an important point of reference
 - contributing very important knowledge, ideas and techniques which are likely to have a lasting influence on the intellectual agenda
 - application of robust and appropriate research design and techniques of investigation and analysis
 - generation of a substantial data set or research resource.
- c. In assessing work as being **two star** (quality that is recognised internationally in terms of originality, significance and rigour), sub-panels will expect to see some of the following characteristics:
- providing important knowledge and the application of such knowledge
 - contributing to incremental and cumulative advances in knowledge
 - thorough and professional application of appropriate research design and techniques of investigation and analysis.
- d. In assessing work as being **one star** (quality that is recognised nationally in terms of originality, significance and rigour), sub-panels will expect to see some of the following characteristics:
- providing useful knowledge, but unlikely to have more than a minor influence
 - an identifiable contribution to understanding, but largely framed by existing paradigms or traditions of enquiry
 - competent application of appropriate research design and techniques of investigation and analysis.
- e. Research will be graded as 'unclassified' if it falls below the quality levels described above or does not meet the definition of research used for the REF.

Main Panel D supplementary criteria – level definitions

Interpretation of generic level definitions

204. The terms 'world-leading', 'international' and 'national' will be taken as quality benchmarks within the generic definitions of the quality levels. They will relate to the actual, likely or deserved influence of the work, whether in the UK, a particular country or region outside the UK, or on international audiences more broadly. There will be no assumption of any necessary international exposure in terms of publication or reception, or any necessary research content in terms of topic or approach. Nor will there be an assumption that work published in a language other than English or Welsh

is necessarily of a quality that is or is not internationally benchmarked.

205. In assessing outputs, the sub-panels will look for evidence of originality, significance and rigour and apply the generic definitions of the starred quality levels as follows:

a. In assessing work as being **four star** (quality that is world-leading in terms of originality, significance and rigour), sub-panels will expect to see evidence of, or potential for, some of the following types of characteristics across and possibly beyond its area/field:

- a primary or essential point of reference
- of profound influence
- instrumental in developing new thinking, practices, paradigms, policies or audiences
- a major expansion of the range and the depth of research and its application
- outstandingly novel, innovative and/or creative.

b. In assessing work as being **three star** (quality that is internationally excellent in terms of originality, significance and rigour but which falls short of the highest standards of excellence), sub-panels will expect to see evidence of, or potential for, some of the following types of characteristics across and possibly beyond its area/field:

- an important point of reference
- of considerable influence
- a catalyst for, or important contribution to, new thinking, practices, paradigms, policies or audiences
- a significant expansion of the range and the depth of research and its application
- significantly novel or innovative or creative.

c. In assessing work as being **two star** (quality that is recognised internationally in terms of originality, significance and rigour), sub-panels will expect to see evidence of, or potential for, some of the following types of characteristics across and possibly beyond its area/field:

- a recognised point of reference
- of some influence
- an incremental and cumulative advance on thinking, practices, paradigms, policies or audiences
- a useful contribution to the range or depth of research and its application.

d. In assessing work as being **one star** (quality that is recognised nationally in terms of originality, significance and rigour), sub-panels will expect to see evidence of the following characteristics within its area/field:

- an identifiable contribution to understanding without advancing existing paradigms of enquiry or practice

- of minor influence.
- e. A research output will be graded **'unclassified'** if it is either:
 - below the quality threshold for one star; **or**
 - does not meet the definition of research used for the REF. (See 'Guidance on submissions', Annex C).

Output types

206. The main panels welcome all forms of research output that fulfil the eligibility criteria for the REF (set out in Part 3, Section 2 of 'Guidance on submissions'). All forms of output, in any language, will be considered equitably, with no distinction being made between the type of research or form of output submitted. The sub-panels will neither advantage nor disadvantage any type of research or form of output. The main panels encourage submitting institutions to refer to the glossary of output types for information on the categories under which outputs may be submitted for assessment (see 'Guidance on submissions', Annex K).

207. No sub-panel will use journal impact factors or any hierarchy of journals in their assessment of outputs. No output will be privileged or disadvantaged on the basis of the publisher, where it is published or the medium of its publication.

208. Reviews, textbooks and edited works (including editions of texts) and translations may be included if they embody research as defined in 'Guidance on submissions', Annex C. Editorships of journals and other activities associated with the dissemination of research findings should not be listed as an output on REF2.

209. Each submitted output needs to have a single classification selected from the list of eligible output types (see 'Guidance on submissions', Annex K). The purpose of the classification is to assist in the management of the collection and distribution of outputs, the allocation of outputs to expert reviewers, and a post-submission analysis of types of outputs submitted. The sub-panel will assess the research content of the material submitted regardless of the classification.

Main Panel D supplementary criteria – output types

210. It is not unusual for an output submitted to the sub-panels in Main Panel D to encompass a number of different output types, such as a 'design' output which includes a journal article and a patent application; or an 'artefact' or prototype that has been the subject of an exhibition; or a data set or database which includes critical insight or analysis; or a 'composition' that has also been a performance or recording; or an exhibition where the research may be curatorial (or involve or support co-curation) and/or evident in the development of the interpretative strategy, exhibition text/narrative or catalogue. Submitting institutions should select a single output type, and the panel will judge the research content of the material submitted regardless of the classification.

211. An additional classification of 'Translation' has been added to the list of output types, for the submission of works of translation of literary or scholarly texts or other cultural documents that constitute original, significant and rigorous research. Translations that meet the definition of research will often exhibit a deep insight into the

source material, while drawing on and reflecting specialist knowledge of its historical, political, social and cultural contexts, and will also rely on a detailed engagement with style in both the source and target languages. Research may, as a result, be reflected in the critical apparatus associated with a translated text but will also be inherent in the translation process itself. Such outputs will often contribute to the development and maintenance of intellectual infrastructure of subjects and disciplines. They may demonstrate research practice that is critical and/or creative, and may also serve as substantial interventions in intellectual and cultural life in their own right.

212. It is also anticipated that commentaries will be submitted, if they embody research as defined for the purposes of REF. Like some translations, commentaries often include research that encompasses work with original manuscripts, textual criticism, the historical, political, social and cultural context of a text, its history of reception and influence, and issues in its contemporary interpretation. Commentaries should be submitted under the “output type” (listed in ‘Guidance on submissions’, Annex K) which fits their form of publication, most commonly “authored book”.

213. For indicative guidance on what material to include in the submission, please refer to the table of output types in Annex C and the summary of ‘Additional Information’ in Annex B.

Outputs with significant material in common

214. As stated in ‘Guidance on submissions’ (paragraph 220), where two or more research outputs within a submission include significant material in common, the sub-panels will assess each output taking account of the common material only once. Where a sub-panel judges that they do not contain sufficiently distinct material and should be treated as a single output, an unclassified score would be given to the ‘missing’ output.

215. Where a submitted output includes significant material in common with an output submitted to REF 2014, as stated in ‘Guidance on submissions’ (paragraph 259), submissions should explain how far the earlier work was revised to incorporate new material (maximum 100 words).

Co-authored outputs

216. As set out in the ‘Guidance on submissions’, for co-authored outputs:

- The number of other authors will be required.
- Where two or more co-authors or co-producers of an output are returned in different submissions (whether from the same HEI or different HEIs), the output may be listed in any or all of these submissions.
- In exceptional cases, co-authored outputs may be submitted up to two times within a submission. This applies only to submissions made to Main Panel D (paragraphs 233 to 235).
- Where there are substantial pieces of co-authored work, reflecting large-scale or intensive collaborative research within the same submitting unit, and a double-weighting request has been submitted for the output, institutions may attribute the output to a maximum of two members of staff returned within the same submission. This output may be counted as the required minimum of one for

each staff member. The inclusion of any reserve outputs in this instance must be in accordance with the minima and maxima requirements where the panel does not accept the request for double-weighting.

217. Institutions may only attribute co-authored outputs to individual members of staff who made a substantial research contribution to the output. The main panels set out below their requirements for information about the author's contribution.

218. Where information is requested and a sub-panel judges that the staff member to whom the output is attributed has not made a substantial research contribution to a co-authored output, the sub-panel will grade that occurrence of the output as 'unclassified'.

219. Information may also be requested through an audit to verify that an author made a substantial research contribution to the output. Where this cannot be verified the output will be graded as 'unclassified'.

220. Once a sub-panel has determined that each co-author's contribution to the research content of the output is distinct and substantial, it will assess the quality of the output as a whole, taking no further regard of each individual co-author's contribution.

Main Panel A supplementary criteria – co-authored outputs

221. An output may only be submitted once in a UOA submission by any given HEI. Where co-authors represent different UOAs within an HEI, the output can be submitted to each UOA. Where co-authors come from different institutions the output can be submitted by each HEI.

Information required about the author's contribution

222. No additional information is required in form REF2 about the author's contribution to co-authored outputs where either:

- there are 15 authors or fewer; **or**
- there are more than 15 authors but the submitted member of staff to whom the output is attributed is identified as either lead or corresponding author (regardless of the number of authors).

223. Whether first author, last author, alphabetical or some other order, Main Panel A considers that the lead and corresponding authors should be easily identifiable within the submitted output. Provided the submitted member of staff is clearly identifiable within the output as lead or corresponding author, including any instances of where that role may be shared, no additional information is required.

224. For each submitted co-authored output where there are more than 15 authors and where the submitted member of staff is not identified as the lead or corresponding author, institutions are required to affirm the substantial contribution to the research by the submitted member of staff. This should be done by entering the following statements in REF2, including at least one element from each of a and b:

- a. The author made a substantial contribution either to the conception and design of the study; or to the organisation of the conduct of the study; or to carrying out the study; or to analysis and interpretation of study data.

And

- b. The author helped draft the output; or critique the output for important intellectual content.

225. Where the author contribution has been included in the output acknowledgements, this will take precedence to the statement on co-authored outputs. Statements on author contribution will be subject to audit.

Main Panel B supplementary criteria – co-author contribution

226. An output may only be submitted once in a UOA submission by any given HEI. Where co-authors represent different UOAs within an HEI, the output can be submitted to each UOA. Where co-authors come from different institutions the output can be submitted by each HEI.

Additional requirement for information on co-authored outputs

Sub-panels 7, 8, 10, 11 and 12

227. The sub-panels do not require the submission of information about the individual co-author's contribution to a co-authored output and, if received, will take no account of such statements.

Sub-panel 9 only

228. No additional information is required in form REF2 about the author's contribution to co-authored outputs where either:

- there are 15 authors or fewer; **or**
- there are more than 15 authors but the submitted member of staff to whom the output is attributed is identified as either lead or corresponding author (regardless of the number of authors).

229. Whether first author, last author, alphabetical or some other order, Sub-panel 9 considers that the lead and corresponding authors should be easily identifiable within the submitted output. Provided the submitted member of staff is clearly identifiable within the output as lead or corresponding author, including any instances of where that role may be shared, no additional information is required.

230. For each submitted co-authored output where there are more than 15 authors and where the submitted member of staff is not identified as the lead or corresponding author, institutions are required to affirm the substantial contribution to the research by the submitted member of staff. This should be done by entering up to 100 words in which the author contribution is articulated.

231. Where the author contribution has been included in the output acknowledgements, this will take precedence to the statement on co-authored outputs. Statements on author contribution may be subject to audit.

Main Panel C supplementary criteria – co-authored outputs

231. An output may only be submitted once in a UOA submission by any given HEI. Where co-authors represent different UOAs within an HEI, the output can be submitted to each UOA. Where co-authors come from different institutions the output can be submitted by each HEI.

Additional requirement for information on co-authored outputs

232. The sub-panels in Main Panel C do not require the submission of information about the individual co-author's contribution to a co-authored output and, if received, will take no account of such statements. The sub-panels may seek to verify a contribution via audit in accordance with paragraph 219.

Main Panel D supplementary criteria – co-author contribution

233. Exceptionally, the sub-panels in Main Panel D will accept the inclusion of the same co-authored output up to two times in a submission. This provision is in recognition of the constraints to the size of the output pool as a result of a combination of factors, including publication patterns in Main Panel D; that many submissions will be from small departments; and that a number of UOAs in Main Panel D are comprised of a broad spectrum of sub-disciplines, many of which will be in separate departments in submitting HEIs.

234. Such outputs should not account for more than five per cent of the outputs (or one output, whichever is the greater) within a submission. Alternatively, where such outputs satisfy the requirements for double-weighting, submitting HEIs should use the provision outlined in the final bullet point in paragraph 216 instead – no quota applies in that case. These two provisions cannot be used in combination.

235. Consequently, a co-authored output can be submitted:

- once as a single output; or
- twice, attributed to two of the authors when it satisfies the criteria for double-weighting (see paragraph 216); or
- twice, attributed to two of the authors, within the quota of five per cent or one output (whichever is the greater), when it does not meet the double-weighting criteria.

Additional requirement for information on co-authored outputs

236. The sub-panels in Main Panel D do not require the submission of information about the individual co-author's contribution to a co-authored output and, if received, will take no account of such statements. The sub-panels may seek to verify a contribution via audit in accordance with paragraph 219.

Double-weighted outputs

237. The main and sub-panels recognise that there will be cases where the scale of academic investment in the research activity and/or the intellectual scope of the research output is considerable. The main and sub-panels want to recognise and double-weight

such outputs in the assessment, so that they will count as two outputs both in a submission and in the calculation of the outputs sub-profile. The main panels have set out below their expectations in relation to receiving requests for double-weighting.

238. Institutions' requests for double-weighting must be accompanied by a statement of up to 100 words explaining how the output satisfies the criteria.

239. As set out in the 'Guidance on submissions' (paragraphs 282 to 283), a reserve output may be submitted where a request for double-weighting is made. The reserve output may be attributed to any submitted member of staff, providing that it is in accordance with the minima and maxima requirements for attributing outputs to staff.

240. Sub-panels will double-weight an output only if a request is made by the submitting institution, and the case is accepted by the sub-panel. Sub-panels will not double-weight any output for which a request has not been made by the institution.

241. Sub-panels will assess the claim for double-weighting separately from assessing the quality of the output, and there is no presumption that double-weighted outputs will be assessed at higher-quality grades. When assessing claims for double-weighting, the sub-panel will not privilege or disadvantage any particular form of research or type of output.

Main Panels A and B supplementary criteria – double-weighting

242. The sub-panels anticipate that they will double-weight outputs only where they derive from substantial academic endeavour by the member of staff against whom the output is listed in the submission. Such endeavour might be understood in terms of (but is not limited to) the ambition of the project.

243. Considering the patterns of publication across Main Panel A and B's areas of activity, the sub-panels expect that such requests will occur only exceptionally. In particular, the sub-panels anticipate that outputs published as journal articles and conference papers will not normally embody work of this nature, and they therefore do not normally expect to receive requests for double-weighting these types of outputs.

Main Panels C and D supplementary criteria – double-weighting

244. The sub-panels strongly encourage submission of outputs of extended scale and scope for consideration as double-weighted outputs.

245. The submission of a statement to evidence the claim for double-weighting is required and should briefly outline the reasons for the request, addressing the characteristics below.

246. The sub-panels in Main Panels C and D have identified the following characteristics which might apply (individually or in combination) to the research effort associated with a double-weighted output:

- the production of a longer-form output (e.g. book, long-duration creative work or multi-component output) demonstrating sustained research effort
- the generation of an extended or complex piece of research
- the collection and analysis of a large body of material
- the use of primary sources which were extended, complex or difficult to access

- the presentation of a critical insight or argument which was dependent upon the completion of a lengthy period of data collection or investigation of materials
- the undertaking of a complex, extended and/or multi-layered process of creative investigation (individual or collective)
- the investigation of a given theme in considerable depth, from different perspectives, and/or in relation to different contexts.

It is recognised that in some instances the characteristics listed in paragraph 246 may apply to short-form outputs such as journal articles, book chapters and short-duration creative work and justify the double-weighting of such items.

247. It is expected that most books, monographs, novels or longer-form outputs warrant double-weighting, although claims will not automatically be accepted.

Additional information for outputs

248. The requirements for additional supporting information for each main panel are set out below. A summary of additional information for outputs required by the main panels is set out in Annex B.

249. HEIs are instructed to ensure that additional supporting information for outputs is succinct, verifiable, and externally referenced where appropriate. No other information should be included, and sub-panels will take no account of any such information if submitted.

250. Where additional information is accepted, the information provided must not include citation data or journal impact factors. Any panels that make use of citation data will be provided with the data by the REF team. Sub-panels will take no account of any citation data provided directly by the HEI. No sub-panel will use journal impact factors or any hierarchy of journals in their assessment of outputs.

251. For research outputs in languages other than English (see 'Guidance on submissions', paragraphs 285 to 287) submitted to all sub-panels, a short abstract (up to 100 words) in English should be provided to describe the content and nature of the work. This abstract does not form part of the assessment of the submitted output. See below for an exception applying to Sub-panel 26 (Modern Languages and Linguistics).

Main Panel A supplementary criteria – additional information for outputs

Information about the research process and/or content

252. For non-text, or practice-based outputs (including patents, software and standards documents), all sub-panels welcome the submission of a description in REF2 of the research process and research content, where this is not evident within the output (maximum 300 words), as described in 'Guidance on submissions' (paragraph 284.a.).

Factual information about significance

253. The sub-panels do not wish to receive additional information about the significance of outputs ('Guidance on submissions', paragraph 284.b.) and, if received, will take no account of any statement beyond those that have been requested by Main Panel A, as summarised in Annex B.

Main Panel B supplementary criteria – additional information for outputs

Information about the research process and/or content (Sub-panels 7 to 12)

254. For non-text, or practice-based outputs (including patents, software and standards documents) all sub-panels require the submission of a description of the research process and content, where this is not evident within the output (maximum 300 words).

255. For reviews, sub-panels welcome the identification of the original research or new insights reported, to assist with the assessment of research quality (maximum 300 words).

Factual information about significance – Sub-panels 11 and 12 only

256. Sub-panels 11 and 12 consider that the nature of their disciplines is such that the significance of an output may not be fully evident within the output itself. They therefore invite factual information to be provided (maximum 100 words) that could include, for example, additional evidence about how an output has gained recognition, impacted the state of the art, led to further developments, or has been applied.

257. HEIs are instructed to ensure that such evidence is succinct, verifiable, and externally referenced where appropriate. Where claims are made relating to the industrial significance of the output, the name and contact details of a senior industrialist must be given to allow verification of claims. Information provided should not comprise a synopsis of the output, a volunteered opinion as to the quality of the output or citation data, and information provided that is of this nature will be disregarded. It is expected that, in most cases, sufficient information will be provided in significantly fewer words than the 100-word limit.

Allocation of outputs for assessment

258. The following sub-panels request information to assist in allocating outputs to appropriate readers during the assessment phase in 2021. The information will not be used for any other purpose:

- Sub-panels 7, 11 and 12 will provide subject-specific taxonomies. Submitting units will be asked to identify the topics relevant to submitted outputs using the chosen taxonomy.
- Sub-panel 10 will request up to two keywords which will categorise the topic(s) covered by the output. The keywords may be taken from the MSC2020 taxonomy where appropriate or may be provided by the submitting UoA. Submitting units are asked to be as consistent as possible in use of their chosen keywords within their submission.

Main Panel C supplementary criteria – additional information for outputs

Information about the research process and/or content

259. For **any** submitted outputs where the research content and/or process is not evident from the output, such as non-text outputs or teaching materials, submissions should include a statement which identifies the research questions, methodology and means of dissemination (maximum 300 words).

Submission of practice-based outputs

260. To ensure that practice-based outputs are assessed on an equal basis with other

outputs, submissions should include an explanatory presentation of the building, design or intervention in an easily-handled paper-based format (for example, a PDF which could include photographs, figures or diagrams) sufficient to allow the panel both to understand the output without visiting it, and to make a judgement of its research contribution.

261. For software and data sets, a full written description should be provided in a paper-based format in order to avoid accessibility problems, including details of how and where the data set or software can be accessed. Such access should preserve the anonymity of the reviewer.

262. Where the form of an output makes this essential, the paper-based submission may be supplemented by limited visual material in an accessible format such as a video file.

Main Panel D supplementary criteria – additional information for outputs

Submission of research outputs to Main Panel D

263. The table attached in Annex C indicates the classification of output types and Main Panel D's guidance on the content of submissions relating to each output type.

264. In all cases where the role of the researcher, or the research process, is not evident within the submitted output, submitting units are strongly encouraged to submit a statement of up to 300 words.

265. For outputs where the role of the researcher or the research process is not evident in the submitted output, submitting units have the following options in choosing how best to present the output (irrespective of the classification):

- As a single item, with a 300-word supporting statement.
- As a multi-component output, with a 300-word supporting statement.
- As a single item, supported by contextual information (previously called a 'portfolio'). Both the item and the contextual information may include moving image, sonic, visual or other digital media or written text, as appropriate, to enable the panel to access the research dimensions of the work and to assess its significance, originality and rigour. The 300-word statement should be used to indicate what is the output and what is the contextual information.
- As a multi-component output, supported by contextual information (previously called a 'portfolio'). Both the output and the contextual information may include moving image, sonic, visual or other digital media or written text, as appropriate, to enable the panel to access the research dimensions of the work and to assess its significance, originality and rigour. The 300-word statement should be used to indicate what is the output and what is the contextual information.

266. The entirety of the material submitted (the output and the 300-word statement where provided) should provide the panel with coherent evidence of the research dimensions of the work in terms of:

- the research process – the question and/or issues being explored, the process of discovery, methods and/or methodologies, the creative and/or intellectual context or literature review upon which the work draws, or challenges or critiques
- the research insights – the findings, discoveries or creative outcomes of that process
- the dissemination – how and where the insights or discoveries were ‘effectively shared’. This needs to satisfy the REF requirements around the dates at which work first entered the public domain (‘Guidance on submissions’, paragraph 205.b.). The principle that no output will be privileged or disadvantaged on the basis of the publisher, where it is published or the medium of its publication (paragraph 217), will also apply in relation to the broad range of modes through which practice outputs enter the public domain.

267. The bullet points above are derived from the REF definition of research as set out in the ‘Guidance on submissions’, Annex C. They are intended to assist HEIs by providing a flexible framework for the succinct and coherent presentation of the output. The objective is to enable panels to assess the originality, significance and rigour of the research. The sub-panels will ignore any additional material that includes evaluative commentary on the perceived quality of a research output.

268. The format for the presentation of outputs (irrespective of their classification) is flexible, within the requirement to limit the format **either** to an electronic submission which is submitted via the REF submission system either as a URL, Digital Object Identifier (DOI), or by uploading a PDF; or as physical material which is sent to the REF team, and which may include digital/electronic material on a media storage device e.g. USB, CD. An individual output cannot be submitted both electronically via the REF submission system and as a physical output.

269. There will be many outputs that will meet the REF definition of research as “a process of investigation, leading to new insights effectively shared” without the need for additional information, and these may include examples of creative practice. Where the research process is not self-evident, the guidance in paragraphs 264 to 267 should be followed.

Statement on research contribution

270. Sub-panels expect to receive anthologies, edited books, special issues of journals and curatorial projects where the researcher has made a demonstrable contribution to the research published (in addition to any chapter published in the same work). Where such a research contribution is part or all of the output to be assessed, the whole work should be submitted. Submitting units may provide a statement (of up to 300 words) to clarify the nature of the individual’s research contribution.

Statement on rationale for grouping short items

271. Substantial dictionary or encyclopaedia entries and groups of short items including for example portfolios of creative writing, or related critical works (where such work embodies research as defined for the purposes of the REF in ‘Guidance on submissions’), may be submitted as a single output, along with an explanation of the rationale for grouping such items (of up to 300 words).

Information for outputs in languages other than English

272. For research outputs in languages other than English ('Guidance on submissions', paragraphs 285 to 287), a short abstract (of up to 100 words) in English should be provided to describe the content and nature of the work. This abstract does not form part of the assessment of the submitted output. This requirement is waived for outputs submitted in UOA 26 (Modern Languages and Linguistics) if the output is produced in any of the languages within the remit of that UOA: that is, all Celtic, Slavonic, Germanic and Romance languages.

Allocation of outputs for assessment

273. The following sub-panels request information to assist in allocating outputs to appropriate readers during the assessment phase in 2021. The information will not be used for any other purpose:

- Sub-panels 26, 27, 28, 29, 33 and 34 will provide subject-specific taxonomies. Submitting units will be asked to identify the topics relevant to submitted outputs using the chosen taxonomy.

Citation data

274. The main panels set out below which of the sub-panels will use citation data. Where sub-panels use citation data, the following criteria apply:

- a. Where available and appropriate, citation data will be considered as an indicator of the academic significance of the research output. This will only be one element to inform peer-review judgements about the quality of the output, and will not be used as a primary tool in the assessment.
- b. The absence of citation data for an output will not be taken to mean an absence of academic significance.
- c. The sub-panels recognise that the citation count is sometimes, but not always, a reliable indicator. They are also aware that such data may not always be available, and the level of citations can vary across disciplines and across UOAs. Sub-panels will be mindful that citation data may be an unreliable indicator for some forms of output (for example, relating to applied research), and the limitations of such data for outputs in languages other than English and for recent outputs. Sub-panels will take due regard of the potential equalities implications of using citation data, as outlined in the 'Equality briefing for REF panels' (2018/05).
- d. Sub-panels will use citation data only where provided by the REF team, and will not refer to any additional sources of bibliometric analysis, including in particular journal impact factors and other journal rankings.

275. Those panels using citation data will do so within the framework set out in 'Guidance on submissions' (paragraphs 288 to 292). Panels will continue to rely on expert review as the primary means of assessing outputs, in order to reach rounded judgements about the full range of assessment criteria ('originality, significance and rigour'). They will also recognise the significance of outputs beyond academia wherever appropriate, and will assess all outputs on an equal basis, regardless of whether or not citation data is available for them.

276. The panels using citation data will receive guidance from the Forum for Responsible Research Metrics to ensure that they are used appropriately.

Main Panel A supplementary criteria – citation data

277. All sub-panels in Main Panel A will use citation data, where appropriate and available, as a potential indicator of academic significance to inform the assessment of output quality.

Main Panel B supplementary criteria – citation data

278. Sub-panels 7, 8, 9 and 11 acknowledge that citation data are widely used and consider that they are well understood in the disciplines covered in their UOAs. These sub-panels will receive citation data, where available, and may make use of the data as part of the indication of academic significance to inform their assessment of output quality.

279. Sub-panels 10 and 12 believe that citation data in their disciplines cannot be used to provide sufficient added value to inform the assessment of output quality. They therefore will not receive nor make use of citation data.

Main Panel C supplementary criteria – citation data

280. Sub-panel 16 (Economics and Econometrics) will receive citation data, where available, and will make use of the data supplied by the REF team where it is considered appropriate as an additional piece of supplementary evidence to support the initial assessment of outputs, not as a determining factor. Sub-panel 16 will take account of the well-known limitations of citations, including equality, diversity and inclusion issues.

281. The remaining sub-panels within Main Panel C will neither receive nor make use of citation data.

Main Panel D supplementary criteria – citation data

282. The sub-panels in Main Panel D will neither receive nor make use of citation data.

Section 4: Impact

Introduction

283. This section should be read alongside 'Guidance on submissions' Part 3, Section 3, which sets out the generic definition of impact for the REF, the requirements for submitting impact case studies, the associated eligibility guidelines, and the generic assessment criteria and level definitions. The sub-panels will assess impact in accordance with this framework.

284. The main and sub-panels have determined that no one model or relationship will be considered intrinsically preferable, and each impact case study will be assessed on its own merits.

285. In drawing up their assessment criteria and the advice to submitting institutions, the main panels strongly advise institutions that the guidance provided here, particularly regarding examples of impacts and evidence and/or indicators for those impacts, **should not be read as exhaustive, prescriptive or limiting** either for institutions or panels. They also recognise that the examples provided in Table 1 (Annex A) may fit under headings other than those to which they have been presented. The main panels wish to encourage the

submission of a broad range of types of impact, as evidence of the strength and diversity of the impact of research across all disciplines, and anticipate that extremely strong impact case studies will be submitted which do not relate to any of the examples provided in the guidance. The examples are offered to assist institutions, not to constrain them.

286. The panels also acknowledge that there are multiple and diverse pathways through which research achieves impact. Impact may be the result of individual or collective research (or a combination of these) within or between a range of organisations, within HE and beyond, including collaboration beyond the UK. The associated impact may be achieved by a variety of possible models: from individuals, to inter-institutional groups, to groups including both academic and non-academic participants. The relationship between research and impact can be indirect or non-linear. The impact of research may be foreseen or unforeseen. It can emerge as an end product, but can also be demonstrated during the research process. Impact takes place through a wide variety of mechanisms. It may effect change or enrichment for local, national or international communities, groups or individuals. Consequently, public engagement may be an important feature of many case studies, as the mechanism by which the impact claimed has been achieved.

Impact criteria

287. The sub-panels will assess the 'reach and significance' of impacts on the economy, society and/or culture that were underpinned by excellent research conducted in the submitted unit, according to the generic criteria and level definitions. This section provides a descriptive account of how the sub-panels will interpret and apply the generic criteria for assessing impact.

288. **Reach** will be understood as the extent and/or diversity of the beneficiaries of the impact, as relevant to the nature of the impact. Reach will be assessed in terms of the extent to which the potential constituencies, number or groups of beneficiaries have been reached; it will not be assessed in purely geographic terms, nor in terms of absolute numbers of beneficiaries. The criteria will be applied wherever the impact occurred, regardless of geography or location, and whether in the UK or abroad.

289. **Significance** will be understood as the degree to which the impact has enabled, enriched, influenced, informed or changed the performance, policies, practices, products, services, understanding, awareness or wellbeing of the beneficiaries.

290. The sub-panels will make an overall judgement about the reach and significance of impacts, rather than assessing each criterion separately. While case studies need to demonstrate both reach and significance, the balance between them may vary at all quality levels. The sub-panels will exercise their judgement without privileging or disadvantaging either reach or significance.

291. HEIs may submit case studies describing impacts at any stage of development or maturity. However, the assessment will be solely on the impact achieved during the assessment period, regardless of its stage of maturity. No account will be taken of anticipated or future potential impact, nor of impact that occurred outside the assessment period (1 August 2013 to 31 July 2020).

Continued impact case studies

292. As set out in the 'Guidance on submissions' (paragraphs 314 to 317), case studies continued from examples submitted in 2014 will be eligible for submission in REF 2021. All

impact case studies submitted in REF 2021 must meet the same eligibility criteria, including the length of the window for underpinning research (1 January 2000 to 31 December 2020) and the assessment period (1 August 2013 to 31 July 2020) for the impact described. The main panels set out below their expectations in relation to receiving continued case studies in the assessment.

293. The panels encourage submitting units to submit their strongest case studies irrespective of whether they are new examples or represent continuing impact from those submitted in REF 2014.

Main Panel A supplementary criteria – continued case studies

294. Main Panel A will assess each case study on merit and wishes to receive information on how any continued case study relates to that submitted in REF 2014. Panel members will have access to the REF 2014 database² and may refer to this to understand the context of the 2021 case study.

Main Panels B, C and D supplementary criteria – continued case studies

295. The sub-panels will assess each case study on merit and do not wish to receive information on how any continued case study relates to that submitted to REF 2014. If any such information is provided, the sub-panels will not take it into account during the assessment process.

Range of impacts

296. The main panels welcome case studies that describe any type(s) of impact which fulfil the definition of impact for REF (see 'Guidance on submissions', paragraphs 297 to 302). They acknowledge that impact may take many forms and occur in a wide range of spheres. They welcome case studies which describe impacts that have provided benefits to one or more areas of the economy, society, culture, public policy and services, health, production, environment, international development or quality of life. The panels will also welcome impacts that describe changes or benefits resulting from research that leads to a decision **not** to undertake a particular course of action. Sub-panels recognise the value of co-produced impact and expect institutions to ensure case studies of this nature clearly acknowledge the work of partner organisations.

297. Impacts can be manifested in a wide variety of ways including, but not limited to: the many types of beneficiary (individuals, organisations, communities, industry, regions and other entities); impacts on products, processes, behaviours, policies, practices and understanding; and avoidance of harm or the waste of resources in the widest sense. Impact of any type may be local, regional, national or international, in any part of the world.

298. Research may underpin impact which provides benefits in more than one area. An impact case study may therefore describe more than one type of impact arising from such bodies of work; for example, a new drug can generate both health and economic impact, a new energy technology can generate both environmental and economic impact, and a new exhibition or performance can generate cultural, economic and social benefits.

² <https://impact.ref.ac.uk>

299. Engaging the public with the submitting unit's research (for example, through citizen science, patient and public involvement in health, or through public and community engagement), is an activity that may lead to impact. Sub-panels will welcome, and assess equitably, case studies describing impacts achieved through public engagement, either as the main impact described or as one facet of a wider range of impacts. Panels expect that case studies based on public engagement will demonstrate both reach (for example, through audience or participant figures and demographics) and significance, and will take both into account when assessing the impacts. Examples of impacts arising from public engagement can be found as part of Table 1 (Annex A).

300. Examples are provided in Table 1 (Annex A) as a guide to the range of potential impacts that may be eligible as case studies. The list is not exhaustive or exclusive, and does not rank examples in any way. In making use of this to assist with the preparation of submissions, HEIs should note that:

- a. The list of types and examples of impacts is not intended to be exhaustive, and some examples are relevant to more than one type of impact. Sub-panels wish to encourage HEIs to submit case studies describing any impacts that meet the generic definition in 'Guidance on submissions', paragraphs 297 to 302.
- b. HEIs are **not** required to align submitted case studies specifically with the particular types of impact defined in the list.

301. Impacts on or through teaching within and beyond the submitting institution may be submitted, and examples are included in Table 1 (Annex A). Where impact on teaching within the submitting unit's own institution is included in a case study, sub-panels will give consideration to the following:

- the *reach* of the impact, that is the extent or diversity of the communities affected by the change to teaching practice
- the *significance* of the impact, that is, the extent to which teaching practice was enriched, influenced or changed at the organisation(s) involved and/or the extent to which individuals experiencing changed teaching practice were enriched, influenced or changed.

302. Sub-panels expect that impact on teaching within the submitting unit's own institution may most convincingly form a component of a wider case study that also includes impacts beyond the institution.

303. The panels acknowledge that there may be impacts arising from research which take forms such as holding public or private bodies to account or subjecting proposed changes in society, public policy, business practices, and so on to public scrutiny. Such holding to account or public scrutiny may have had the effect of a proposed change not taking place; there may be circumstances in which this of itself is claimed as an impact. There may also be examples of research findings having been communicated to, but not necessarily acted upon, by the intended audience, but which nevertheless make a contribution to critical public debate around policy, social or business issues. The panels also recognise that research findings may generate critique or dissent, which itself leads to impact(s). For example, research may find that a government approach to a particular social, health, food-/biosecurity or economic issue is not delivering its objectives, which leads to the approach being questioned or modified.

Evidence of impact

304. Each case study must provide a clear and coherent narrative that includes an account of who or what audiences, constituencies, groups, organisations, places, publics, sectors and so on, have benefited, been influenced, or acted upon. The sub-panels will use their expert judgement regarding the integrity, coherence and clarity of the narrative of each case study, but will expect the key claims made in the narrative to be supported by evidence and indicators.

305. In assessing impact case studies, sub-panels will consider both the evidence linking excellent research and bodies of work within the submitting unit to the impact(s) claimed, recognising that this relationship can be indirect or non-linear, and the evidence of the reach and significance of the impact. Within their narrative account in the case study, submitting units should provide the indicators and evidence most appropriate to support the impact(s) claimed. Where using quantitative indicators, institutions should follow the guidance on their standardised presentation, available at www.ref.ac.uk, under Guidance.

306. Submitting units should focus on providing evidence of the impacts achieved, as distinct from evidence of dissemination and uptake, in order to demonstrate both the reach and significance of the impact(s) claimed (see paragraph 290). For example, attendance figures at an event may illustrate the pathway to a change in understanding or awareness and provide an indication of the reach of the impact. However, on their own, they would not serve as evidence of the significance of the impact, which might be demonstrated, for example, through participant feedback or critical reviews.

307. Submitting units should ensure that, so far as possible, any evidence cited is independently verifiable. Verifiable sources for key evidence and indicators should be provided in Section 5 of the impact case study template and the relevant evidence provided to the REF team as set out in the 'Guidance on submissions' Part 3, Section 3.

308. The main panels recognise that some evidence in case studies may be of a confidential or sensitive nature. The arrangements for submitting and assessing case studies that include such material are set out in 'Guidance on submissions', paragraphs 307 to 308.

309. The panels anticipate that impact case studies will refer to a wide range of types of evidence, including qualitative, quantitative and tangible or material evidence, as appropriate. Individual case studies may draw on a variety of forms of evidence and indicators. The panels do not wish to pre-judge forms of evidence. They encourage submitting units to use evidence most appropriate to the impact claimed. A diversity of evidence is welcome, and no type of evidence is inherently preferred over another. Cited evidence should provide a convincing and verifiable link between the underpinning research or bodies of work and the impact claimed, as well as convincing and verifiable evidence of the reach and significance of the impact.

310. Testimonials should draw on statements of fact and relate specifically to the impact(s) claimed. There may be occasions where opinion-based testimonials are appropriate (for example, where the impact is on public understanding of an issue). Where such testimonials are cited as evidence in impact case studies, sub-panels will consider the extent to which the testimonial citation evidences the significance of the claims. Sub-panels recognise the varying degrees to which evidence and indicator information may be available to HEIs. Where testimony is cited, it should be made clear whether the source is a participant in the

process of impact delivery (and the degree to which this is the case), or is a reporter on the process.

311. Where corroborating evidence is reviewed as a consequence of audit, it will be used solely to verify the claims made about the impact. Additional information included in such evidence will not be used to supplement or strengthen the impact case study narrative.

312. The examples in Table 1 (Annex A) provide a guide to potential types of evidence or indicators that may be most relevant to each of the broad areas of impact described in Table 1. However, institutions should note that:

- This is not intended to be exhaustive.
- Some indicators may be relevant to more than one type of impact.
- Sub-panels will consider any relevant, verifiable evidence.

Underpinning research

313. Sub-panels need to be assured that the impact claimed is based on research at least equivalent to two star, as defined in 'Guidance on submissions', Annex A. Submitting units are required to identify the underpinning research and provide in Section 3 up to six key references to research produced by the submitting unit in the period 1 January 2000 to 31 December 2020 that underpins the impact described in the case study. The sub-panels will not expect each referenced item to meet the quality threshold, but will wish to be satisfied that the research as a whole was of at least two-star quality.

314. Underpinning research may be a body of work produced over a number of years, within the REF timeframe (1 January 2000 to 31 December 2020) or may be the output(s) of a particular project. It may be produced by one or more individuals. Underpinning research outputs may include the full range of types listed in the output glossary ('Guidance on submissions', Annex K) and are not limited to printed academic work. They may include, but are not limited to: new materials, devices, images, artefacts, products and buildings; confidential or technical reports; intellectual property, whether in patents or other forms; performances, exhibits or events; and work published in non-print media. All forms of output cited as underpinning research will be considered on an equal basis, with no distinction being made between the types of output referenced.

315. Provided the sub-panel is satisfied that the quality threshold has been met, the quality of the underpinning research will not be taken into consideration as part of the assessment of the reach and significance of the claimed impact.

316. Underpinning research referenced in a case study may also be included in a submission as an output (listed in REF2), without disadvantage. In these situations, the assessment of the impact case study will have no bearing on the assessment of the quality of the output. The assessment of the quality of the output may inform the assessment of the case study, only in terms of assuring the threshold for underpinning research quality.

317. The institution submitting a case study must have produced research which has made a distinct and material contribution to the impact described in the case study. Sub-panels will expect to see clear narrative evidence of this in the case study. The panels recognise that several groups, institutions or organisations may have made distinct research contributions to a given impact, and strongly advise submitting institutions to ensure that both their own contribution is specified clearly and that the contributions of others are acknowledged.

318. There will be many cases where a researcher has moved to a different institution during the period in which a body of research underpinning a case study was produced. Where this is the case, the submitting institution should make clear that the research undertaken during the period the researcher spent at that institution made a material and distinct contribution to the impact claimed.

Main Panels A and B supplementary criteria – indicators of quality for underpinning research

319. Case studies must include references to one or more key research outputs that identify the research produced by the submitted unit that underpinned the impact, and must provide evidence of the quality of the research. Case studies should include references to any REF-eligible output(s) as defined in the output glossary that will best enable the panels to determine that the two-star threshold has been met. They should include additional indicators, as appropriate, of the quality of the underpinning research. The sub-panels will use the information provided in case studies, and may review research and outputs referenced in Section 3, in order to be assured that the quality threshold has been met.

Main Panels C and D supplementary criteria – indicators of quality for underpinning research

320. Submitting units must ensure that each case study fulfils the threshold criterion on research quality (see 'Guidance on submissions', paragraph 319.b). A sample of the research should be cited that is sufficient to identify clearly the body of work, or individual project that underpins the claimed impact.

321. Main Panels C and D wish to emphasise that the term 'underpinning' does not imply a specific temporal or directly causal relationship to the associated impact and recognise that in some cases the research associated with the impact may be carried out at the same time as the impact, and that the nature of the relationship between the research and the impact may be complex and non-linear.

322. Sub-panels do not expect to read the underpinning research output(s) as a matter of course to establish that the threshold has been met. The submitting institution should aim, where possible, to provide evidence of this quality level. Some of the indicators of such quality might be (but are not restricted to):

- research outputs which have been through a rigorous peer-review process
- evidence of peer-reviewed funding
- reviews of outputs from authoritative sources
- prizes or awards made to individual research outputs cited in the underpinning research
- evidence that an output is a reference point for further research beyond the original institution.

323. Not all indicators of quality will apply to all forms of research output. If no such indicators are available then the sub-panel will review the item in question to satisfy itself that this meets the quality threshold.

Preparing impact case studies

324. The sub-panels recommend that institutions refer to the following list of characteristics when preparing case studies:

- All the material required to make a judgement should be included in the case study template (REF3) – no further reading should be required. URLs should only be included for the purpose of verifying or corroborating claims made in the submission. Panels will not follow URLs to access additional evidence or information to supplement the submission.
- There should be a clear definition of the beneficiaries, and what has changed as a result of the research.
- The narrative should be coherent, clearly explaining the relationship between the researchers, the underpinning research, the impact, and the nature of the changes or benefits arising (noting that narratives differ according to the areas of impact claimed).
- Indicators used should be relevant, contextualised and precise in support of the case study, and the evidence should be verifiable, focused and concise.
- There should be a brief explanation of what is original or distinctive about the research insights that contributed to the impact.
- Specific and appropriate sources of corroborating information, independent of the submitting HEI, should be supplied. Extracts from corroborating statements may be included within the case studies, where appropriate.
- Where the research was carried out in collaboration with other HEIs, or was part of a wider body of research, this should be acknowledged and the specific contribution to the impact of the submitting unit's research clearly described. In such cases, units (whether within or across HEIs) may provide common descriptions of the impact arising, where they so wish.

Section 5: Environment

Environment criteria

325. The sub-panels will assess the environment according to the generic criteria and level definitions in 'Guidance on submissions', Annex A. The main panels have set out below how the criteria will be understood by their sub-panels.

326. **Vitality** will be understood as the extent to which a unit supports a thriving and inclusive research culture for all staff and research students, that is based on a clearly articulated strategy for research and enabling its impact, is engaged with the national and international research and user communities and is able to attract excellent postgraduate and postdoctoral researchers.

327. **Sustainability** will be understood as the extent to which the research environment ensures the future health, diversity, wellbeing and wider contribution of the unit and the discipline(s), including investment in people and in infrastructure.

328. In assessing the environment element of submissions, panels will assess vitality and sustainability in terms appropriate to the scale and diversity of the research activity the

submitting unit supports, and as appropriate for its subject area(s). They will assess vitality and sustainability in terms of both the research environment within the submitting unit, and its participation in and contribution to its subject discipline, academic community and wider society.

329. In forming the environment sub-profiles, the sub-panels will attach weightings to each of the four sections of the unit-level environment template (REF5b), as set out below:

- unit context and structure, research and impact strategy
- people
- income, infrastructure and facilities
- collaboration and contribution to the research base, economy and society.

The assessment will take account of the environment data as stated in paragraphs 362 to 363 and the information provided in the institutional-level statement (REF5a) as stated in paragraph 333.

Main Panels A, B and C supplementary criteria – section weightings for the environment template (REF5b)

330. The sub-panels in Main Panels A, B and C will attach equal weighting to each of the four sections of the unit-level environment template (REF5b).

Main Panel D supplementary criteria – section weightings for the environment template (REF5b)

331. In view of the primary role that people play as the key resource in the arts and humanities, the sub-panels in Main Panel D will attach differential weight to each of the components of the environment template as follows:

Unit context and structure, research and impact strategy	25%
People	30%
Income, infrastructure and facilities	20%
Collaboration and contribution to the research base, economy and society	25%

Institutional-level environment template (REF5a)

332. The following information is required in the institutional-level environment statement (REF5a):

- a. Context and mission: an overview of the size, structure and mission of the institution.
- b. Strategy: the institution's strategy for research and enabling impact (including integrity, open research, considerations of equality and diversity, and structures to support interdisciplinary research, where applicable) in the assessment period and for the next five-year period.

- c. People: the institution's staffing strategy, support and training of research students, and building on the information provided in codes of practice, evidence about how equality and diversity in research careers is supported and promoted across the institution.
- d. Income, infrastructure and facilities: the institutional-level resources and facilities available to support research. This should include mechanisms for supporting the reproducibility of research as appropriate to the research focus of the HEI, and to facilitate its impact.

333. The sub-panels will use the information provided in the institutional-level statement to inform and contextualise their assessment of the relevant sections of the unit-level template. The institutional-level statement will not be separately assessed or separately scored by the sub-panels. Units should not repeat material covered in REF5a in REF5b and should cross-refer between the statements, where appropriate.

334. As set out in 'Guidance on submissions' (paragraph 362), the REF5a statements will be reviewed by a pilot assessment panel. The pilot exercise will consider the standalone assessment of a discrete institutional-level environment element in future exercises, and will run concurrently to the REF 2021 assessment.

335. Small and specialist institutions that will make a submission in one UOA only are encouraged to submit a REF5a statement but are not required to do so. Where an HEI does not provide a REF5a statement, the pilot panel will review the submitted REF5b template. In such cases, institutions should ensure that sufficient information is provided in the REF5b template about the institution's context and should be guided by the supplementary guidance to be provided by the pilot assessment panel in summer 2019. Additionally, where there is any distinction between the research and impact strategies, policies, facilities and resources between the institution and the submitting unit, this should be clearly identified in the REF5b template.

Unit-level environment template (REF5b)

336. The main panels believe that excellent research can be undertaken in a wide variety of research structures and environments, and outstanding impacts achieved from within a wide variety of research contexts and resulting from a wide diversity of approaches. The main panels consider that the health of the disciplines represented within the sub-panels is well served by this variety. The main panels have no pre-formed view of the ideal size or organisational structure for a research environment, or of the ideal context or approach for enabling impact, and will judge each submission on its merits, contextualised appropriately to the nature of institution. Panels will assess, on an equal basis, submissions that reflect the work of administrative units such as departments, and submissions that do not map neatly onto departmental or other administrative structures within HEIs.

337. Given that there is no expectation that the environment element of submissions relates to a single coherent organisational unit, submissions should explain any distinct groups or units covered, particularly where discrete organisational units form part of a single submission.

338. Neither the existence of research groups, nor their absence, is, in itself, considered significant by the sub-panels.

Use of indicators

339. As indicated in paragraph 362, all sub-panels will receive information on doctoral degrees awarded and research income. In the main panel supplementary criteria set out for the different sections of the REF5b template, the panels indicate where additional data should be provided in the template.

340. Further quantitative indicators may be included in REF5b, where appropriate, to support claims made in the narrative. In identifying additional indicators for inclusion, submitting units are strongly advised to refer to the advice and examples based on work carried out by the Forum for Responsible Research Metrics, available at www.ref.ac.uk, under Guidance. However, the main panels wish to make it clear that the examples should not be regarded as mandatory nor a 'check-list' of additional requirements.

341. In assessing the environment template, sub-panels will take a holistic view of each section, taking into account both the narrative and any supporting evidence provided. Where appropriate, panels will consider data in the context of size and type of institution in order to enable judgements to be made on an equitable basis.

Template requirements

342. The main and sub-panels expect to see the unit's approach to equality and diversity reflected and evidenced as appropriate throughout the template below.

343. All the material required to make a judgement should be included in the environment template – no further reading should be required. URLs should only be included for the purpose of verifying or corroborating claims made in the submission. Panels will not follow URLs to access additional evidence or information to supplement the submission.

344. Submitting institutions are reminded that the word limits for REF5a and REF5b (set out in Annex F of the 'Guidance on submissions') are upper limits, not a minimum requirement.

345. The following information is requested for each of the sections in the environment template (REF5b):

REF5b, Section 1: Unit context and structure, research and impact strategy

346. This section should provide evidence of the achievement of strategic aims for research and impact during the assessment period, and details of future strategic aims and goals for research and impact; how these relate to the structure of the unit, and how they will be taken forward. Note that there is no expectation that this section refers to a single department or coherent organisational unit. Evidence may include (but is not limited to):

- How research is structured across the submitted unit (including research groups or sub-units), to provide context for assessing the submission.
- The submitting unit's research objectives during the assessment period and over the next five years, including a review of the submitting unit's research plans described in REF 2014.
- How the unit has sought to enable and/or facilitate the achievement of impact arising from their research and how they are shaping and adapting their plans to ensure that they continue to support the vitality and sustainability of the unit's impact in the future. The submitting unit should describe how the selected case studies relate to their approach to achieving impact.

- The submitting unit's approach to supporting interdisciplinary research, where applicable, in the context of the unit's research strategy. The sub-panels will give due credit where these arrangements have enhanced the vitality and sustainability of the research environment. Units where this is not applicable will not be disadvantaged in the assessment.
- Within the context of the institution's strategy, how the submitting unit is progressing towards an open research environment, including where this goes above and beyond the REF open access policy requirements, and wider activity to encourage the effective sharing and management of research data, as appropriate to the discipline. Consideration of reproducibility should also be included where relevant to the discipline.
- Within the context of the institution's approach, how the unit supports a culture of research integrity, and ensures that research is conducted according to appropriate ethical, legal and professional frameworks, obligations and standards.

Main Panel D supplementary criteria – REF5b: Unit context and structure, research and impact strategy

347. Main Panel D is aware that the development of an open research environment poses specific issues for the disciplines covered by its sub-panels. In this context, evidence of an open research environment could include, but is not limited to:

- any contribution from the unit to open access debates, processes and structures within the subjects covered by the Main Panel
- any contribution from the unit to the development of an open research culture within the subjects covered by the Main Panel, especially where these reflect on the distinctive nature of research and research data as generated by the relevant subject communities (e.g. IP and licensing constraints/issues). This could include, for example, a range of mechanisms to share research and research data openly, as appropriate to the discipline.

REF5b, Section 2: People

348. This section should provide evidence about: staffing strategy and staff development within the submitted unit, including evidence of how the staffing strategy relates to the unit's research and impact strategy and physical infrastructure; support for early career researchers and career development at all stages in research careers; support mechanisms for, and evidence of the training and supervision of, postgraduate research (PGR) students; and evidence of how the submitting unit supports and promotes equality and diversity. Particular attention will be paid to how submitting units address all relevant aspects of support for equality and diversity (which should be taken to refer to all protected characteristics) within their submissions. There should be synergy between the strategies and structures set out in this section and the institution's code of practice, which the panels will be able to access on request.

Staffing strategy and staff development

349. This may include (but is not limited to):

- staff development strategy for all staff pursuing a career in research at all stages of their careers, including the use of mentoring, probation and appraisal and training, and the unit's implementation of the Concordat to Support the Career Development of Researchers
- the unit's staffing and recruitment policy and evidence of its effectiveness, including the pattern of staff recruitment over the assessment period, the balance between short-term and long-term contracts among Category A eligible staff, and how the demographic profile of the unit affects current and future management of research activity, including succession planning
- evidence of how individuals at the beginning of their research careers are being supported and integrated into the research culture of the submitting unit, including the contribution of postdoctoral researchers to the unit (where appropriate)
- the policy for research, impact leave/sabbatical leave for all staff at all stages of their careers (including fixed-term and part-time staff)
- evidence of procedures to stimulate and facilitate exchanges between academia and business, industry or public or third sector bodies, for example, through the recruitment or secondment of research staff
- how the unit recognises and rewards staff for carrying out research and for achieving impact, and how the unit specifically supports and enables staff to achieve impact from their research.

Research students

350. Submitting units are invited to provide evidence of the quality of training and supervision of PGR students and how the unit has developed a research culture into which research students are fully integrated and prepared for further research activity. This may include (but is not limited to):

- the approach to recruitment of doctoral research students, including those with protected characteristics
- evidence of studentships from major funding bodies (the sub-panels recognise the challenges of recruiting doctoral students in the current funding environment)
- details of monitoring and support mechanisms linked to evidence of progress and of successful completions
- details of the support provided to research students in terms of skills development and preparation for their future career.

Equality and diversity

351. Submitting units are invited to provide evidence of their commitment to equality and diversity in the recruitment and support of staff with significant responsibility for research and research students, including the strategies, activities and collaborations that support equality and diversity and enable staff and research students drawn from a wide cross-section of society to engage in research. All relevant protected characteristics should be considered, and the submitting unit may wish to include (but is not limited to) evidence of:

- study leave arrangements (including supporting data where relevant)
- arrangements for supporting flexible and/or remote working
- the career pathways for part-time and fixed-term staff
- how conference attendance or other necessary travel to support research is facilitated for staff and research students with caring responsibilities, ill health etc.
- how equality and diversity considerations are taken into account with regard to support for submission of funding applications, access to internal funds, research-related promotion and reward procedures, recruitment for research-related leadership roles, conference attendance, sabbaticals and training
- support for staff and research students returning from periods of leave (including parental leave) or ill health, managing long-term illness, or with caring responsibilities
- support for staff with protected characteristics (e.g. disabilities) to enable them to research productively
- the submitting unit's approach to supporting the wellbeing of its staff and research students.

352. The submitting unit should also demonstrate how it has paid due regard to equality and diversity issues in the construction of its REF submission, including the selection of the output portfolio, and how data on the distribution of outputs across staff relate to the unit's approach to supporting equality and diversity. Units should explain how this approach relates to the processes set out in their institution's code of practice.

Main Panel A supplementary criteria – REF5b: People

353. Where relevant, submitting units may also wish to include details of:

- effective integration of clinical academics and NHS-employed active researchers
- research career development of both non-clinical and clinical researchers
- role of clinical researchers.

Main Panel C supplementary criteria – REF5b: People

354. All sub-panels in Main Panel C recognise the role of professional and other doctoral qualifications and their contribution to the vitality of the research environment. To obtain a clear understanding of the nature of the research environment, units submitting in UOAs in Main Panel C are asked to disaggregate the total number of doctoral degrees awarded as reported in REF4a for each year in the assessment period into PhDs and research-based professional doctorates. This information should be included as part of the 'People: research students' section of the REF5b template. The disaggregated data should be presented in tabular format, reported in academic years according to the standard data in section REF4a. The total disaggregated data should sum to the totals reported in REF4a.

REF5b, Section 3: Income, infrastructure and facilities

355. This section should provide information about the income, infrastructure and facilities pertaining to research and research impact, including but not limited to:

- research funding and strategies for generating research income, including that allocated as part of larger research consortia, links between research funding and high-quality research output or impact, and major and prestigious grant awards made by external bodies on a competitive basis. Allowance will be made for disciplines that find it more difficult to attract research funding because of the nature of the research, and where more early career researchers are involved
- organisational infrastructure supporting research and impact, for example, evidence of areas where there has been significant investment, or through the development of research clusters that focus on distinctive areas of work, which may include the delivery of highly impactful research
- operational and scholarly infrastructure supporting research and impact within the submitting unit, including technical and support staff, estate and facilities, advanced equipment, IT resources or significant archives and collections
- how any relevant equality and diversity issues have been addressed, for example in relation to support for acquiring research funding, or support for accessing scholarly or operational infrastructure
- how infrastructure, facilities and expertise are utilised in relation to impact activities
- the nature, quality, provision and operation of specialist research infrastructure and facilities
- evidence of cross-HEI shared or collaborative use of research infrastructure including the use of major research facilities both in the UK and overseas
- significance of major benefits-in-kind (including, for example, donated items of equipment, sponsorships secured, or other arrangements directly related to research).

Main Panel B supplementary criteria – REF5b: Income, infrastructure and facilities

356. For Sub-panels 8 and 9 only: data should be provided on usage within the assessment period (1 August 2013 to 31 July 2020) of major national and international facilities not supported by the Research Councils which was awarded to an investigator in the submitted unit after competitive review by a panel of internationally recognised experts. The information should be provided for each facility in terms of the time awarded together with the total cost, where available.

Main Panel D supplementary criteria – REF5b: Income, infrastructure and facilities

357. Submissions should, where possible, detail funding that has been received through sources not reported in Higher Education Statistics Agency (HESA) returns, such as commissions from artistic organisations and other sources, including from overseas, and how these relate to the research activities, outputs and/or impact of the submitting unit.

REF5b, Section 4: Collaboration and contribution to the research base, economy and society

358. This section should provide information about collaboration and contribution, including:

- the arrangements, support in place for and effectiveness of research collaborations, networks and partnerships, including joint research projects with academic colleagues in other institutions, locally, nationally or internationally and indicators of their success
- evidence of how staff interacted with, engaged with or developed relationships with key research users, beneficiaries or audiences in the period 2014 to 2020 to develop impact from the research carried out in the unit and how these collaborations have enriched the research environment
- wider contributions to the economy and society, including evidence of the wider activities and impact of research carried out in the unit that is not captured in the impact case studies
- how the unit engages with diverse communities and publics through its research
- evidence of the unit's contribution to the sustainability of the discipline, support for and exemplars of interdisciplinary research, and responsiveness to national and international priorities and initiatives
- indicators of wider influence, contributions to and recognition by the research base including, but not limited to:
 - o journal editorship
 - o participation on grants committees
 - o fellowships
 - o prizes
 - o membership of Research Council or similar national and international committees
 - o invited keynotes, lectures and/or performances, or conference chair roles
 - o refereeing academic publications or research proposals
 - o co-operation and collaborative arrangements for PGR training, including whether these have received formal recognition nationally or internationally.

Main Panel A supplementary criteria – REF5b: Collaboration and contribution to the research base, economy and society

359. Where applicable, submitting units should identify the number of staff meeting the definition of Category C staff ('Guidance on submissions', paragraphs 374 to 376) on the census date, 31 July 2020, and describe their contribution to the research environment and, where relevant, the unit's submission.

360. Submitting units should also provide evidence of:

- the approach to encouraging and developing best practice in undertaking

research that is reproducible, including any papers that are reproducing key papers in the field

- the extent of collaboration or integration with external organisations such as health or social care services (e.g. NHS and social care structures) and/or with industry or government bodies, where appropriate.

Main Panel D supplementary criteria – REF5b: Collaboration and contribution to the research base, economy and society

361. Main Panel D would prefer to see Section 4 of the template constructed as a narrative rather than a series of lists.

Environment data (REF4a/b/c)

362. 'Guidance on submissions' (Part 3, Section 4) sets out quantitative data relating to the research environment to be included in all submissions (REF4a/b/c). Sub-panels will use the data in the context of the information provided in the environment template (REF5b) to inform their assessment. Data on research doctoral degrees awarded (REF4a) will be used to inform the sub-panels' assessment in relation to 'research students' (Section 2: People). Data on research income (REF4b/c) will be used to inform the sub-panels' assessment in relation to 'Section 3: Income, infrastructure and facilities'.

363. Data on both doctoral degrees awarded and research income will be considered in the context of the narrative provided in the REF5b template, and taking account of the size of the submitting unit, its areas of specialism, its research groups, research strategy and different levels of research funding available in different fields.

364. The sub-panels do not require quantitative data provided by institutions in REF4a/b/c to be reported by research group.

Part 4: Panel procedures

Panel competence to do business

365. Each main and sub-panel will consider, confirm and document its competence to do business at the start of each assessment meeting, taking into consideration the range of expertise as well as the numbers of panel members present.

366. Where there is a foreseen absence of a sub-panel chair at a main panel meeting, the main panel chair will consider whether it requires the attendance of the deputy sub-panel chair in order to be competent to do business. Attendance of the deputy sub-panel chair at main panel meetings will only be allowed in this case, and at the discretion of the main panel chair.

Dealing with absences of the chair

367. Each main and sub-panel will elect a deputy chair for planned and unforeseen absences of the chair, and in cases where there is a major conflict of interest for the chair. In the absence of the chair, the deputy will chair meetings of the panel. Where both the chair and deputy declare a conflict of interest in the same institution, the panel will nominate one of the remaining members to officiate in that instance.

Conflicts of interest

368. All REF main and sub-panel chairs, members, assessors, observers, secretaries and advisers will observe the arrangements for managing potential conflicts of interest set out in Annex D.

Confidentiality arrangements

369. All REF main and sub-panel chairs, members, assessors, secretaries, advisers and observers are bound by the terms of the REF confidentiality arrangements as detailed in Annex E. These arrangements have been put in place to enable the effective management and operation of the REF, and for the protection of panel members.

Data protection

370. All REF main and sub-panel chairs, members, assessors, secretaries, advisers and observers shall ensure that personal data are kept securely, maintained confidentially and used only for the purposes set out in the Guidance on Submissions and the Panel Criteria and Working Methods. All personal data are subject to the provisions of the Data Protection Act 2018 (DPA2018) and the General Data Protection Regulation (GDPR), and all persons storing, handling or processing personal data for the REF shall adhere to the principles and requirements set out in the DPA2018 and the GDPR.

Part 5: Panel working methods

Main panel working methods

371. Each main panel has worked with its sub-panels to review and define common assessment criteria, as set out above. Main panels will work with their sub-panels throughout the assessment process to ensure that the published procedures are followed and that the overall assessment standards are applied consistently. Each main panel will also be responsible for deciding on the quality profile to be awarded to each submission in each of the UOAs in its remit, after recommendations have been made by the sub-panels.

372. Each main panel will work with its sub-panels as follows:

- a. **Main panel meetings.** The main panels will meet regularly throughout the planning and assessment phases to ensure close working and communication between sub-panels, to identify issues for early action, seek advice on handling specific cases, resolve emerging differences, share developing good practice and provide assurance on the procedures being followed. Sub-panel chairs will report to the main panel meetings on general progress and on the implementation of working methods, particularly on issues where cross-panel consistency is significant, including:
 - interdisciplinary research outputs
 - cross-referrals
 - the range of output types
 - impact case studies
 - double-weighted outputs.
- b. **Main panel member attendance at sub-panel meetings.** The chair and members of the main panel will attend some meetings of sub-panels, to provide assurance that practices are consistent across the group of sub-panels:
 - The members of the main panel advising on interdisciplinary research will in particular be engaged in calibration processes relating to interdisciplinary research outputs, supporting the interdisciplinary advisers on the sub-panels, and advising on the consistency of assessment standards for interdisciplinary research.
 - The international members of the main panel will, in particular, be engaged in sub-panel calibration processes and in the formation of quality profiles, to ensure consistency with international standards.
 - Main panel user members will, in particular, be engaged in briefing and calibration among sub-panel user members and assessors, providing support and focus for them, and advising on consistency of method and efficient use of expertise and knowledge in assessing impact case studies.
 - The main panel chair and main panel members will attend a sample of sub-panel meetings as agreed with the main panel, especially at an early stage in the assessment process.

- c. **Advice and support to panels.** A group of panel advisers and panel secretaries will be appointed to support the work of each main panel and its sub-panels. The secretariat will be briefed and trained in providing advice and guidance to their group of panels on the assessment procedures. Each member of the panel secretariat will work with several sub-panels within a main panel, providing consistent support and advice across them and providing feedback to the main panel chairs as appropriate.
- d. **Cross-panel appointments.** Individual academic members and assessors, and individual user members or assessors, may be appointed to work with more than one sub-panel, particularly where there are substantial overlaps between UOAs, to contribute to consistency in the assessment of work on the boundaries. In considering the selection and appointment of further members and assessors, the main panel will identify where such boundaries could benefit from joint appointments.
- e. **Calibration exercises.** Each main panel and its sub-panels will undertake calibration exercises at an early stage in the assessment to develop a common understanding of the assessment standards and the application of the quality levels. International and user members of the main panel will participate in these exercises to assist in benchmarking judgements. The main panel chair and members of the main panel will attend a selection of the sub-panel meetings that deal with calibration exercises, and main panels will receive and discuss reports from sub-panel chairs on these exercises.
- f. **Reviewing emerging assessment outcomes.** The main panels will review the emerging assessments at UOA level from their sub-panels during the course of the assessment phase, to support the consistent application of assessment standards. To facilitate this review, the group of sub-panels within each main panel will adopt a common process for the formation of each of the three sub-profiles and a common sequence in which each sub-profile will be formed. In considering the emerging assessment outcomes from sub-panels, the main panels will seek advice from the international members about the application of internationally referenced standards, and from the user members about the assessment of impact.
- g. **Deciding on the outcomes.** When considering the quality profiles recommended by its sub-panels, each main panel will confirm that the published assessment procedures and criteria have been applied by the sub-panels, and that the sub-panels have consistently applied the overall standards of assessment. The main panels recognise that there may be a range of overall profiles across their respective UOAs reflecting the relative strength of the disciplines in the UK. Each main panel will require that any substantial differences in the overall profiles for each UOA are investigated and understood before approving the quality profiles recommended by its sub-panels. Where the recommendations of a given sub-panel for the overall results for that UOA are at substantial variance from the other sub-panels, the sub-panel chair will need to justify this to the main panel with reference to external evidence where available.

373. In addition to the main panels' approaches to ensuring consistency within each group of sub-panels, to support appropriate consistency across the four main panels:

- a. Generic assessment criteria and working methods across all main and sub-panels have been developed, as set out in 'Guidance on submissions' and throughout this document. These include standard weightings for each of the elements of the assessment (outputs, impact and environment), generic criteria for assessing each element, a consistent approach to staff circumstances, and consistent working methods and procedures.
- b. The four main panel chairs, the REF director and the panel advisers will meet regularly throughout the assessment phase to discuss progress, identify issues for early action and inform the work of the main panels. This will include planning and reporting on calibration exercises, including cross-main panel calibration, and reviewing emerging and final outcomes across the four main panels. Specific actions will be identified to support consistency across those sub-panels in different main panels that have a significant overlap (for example, sharing of some of the material used in calibration exercises, and identifying opportunities for appointing assessors to work across those sub-panels).

Sub-panel working methods

374. Each sub-panel will be responsible for assessing submissions in its UOA, applying the published criteria and working methods, and recommending the outcomes to the main panel. This section sets out how the sub-panels will undertake their work at each stage of the assessment process.

Appointing the full assessment phase sub-panel

375. In early 2020, the sub-panels will examine institutions' submission intentions and identify their requirements for further members and assessors to ensure the sub-panel has the breadth and depth of expertise required to carry out the assessment. These members and assessors will be appointed prior to the start of the assessment to ensure that sub-panels have access to appropriate expertise to reach robust and valid judgements with regard to the material anticipated in submissions. The procedures for appointing members and assessors are described in paragraphs 27 to 36.

376. Sub-panels will consider the breadth of work in actual submissions early in the assessment phase in 2021 in order to confirm that the sub-panel collectively has the breadth and depth of expertise to assess the work submitted. Where necessary, sub-panels may recommend the appointment of further additional assessors or, exceptionally, request that specific parts of submissions should be cross-referred to another sub-panel (as described in paragraphs 399 to 404 and indicated, where appropriate, in the UOA descriptors).

377. Each sub-panel will include research user members and impact assessors, with appropriate expertise to contribute fully to the assessment of the impact element of submissions, alongside academic members of the sub-panels. The research user members and impact assessors will be appropriately briefed (for example, with respect to the details of the REF process and key issues, including equality and diversity) alongside the sub-panel members and output assessors.

Allocating work

378. The sub-panel chair, consulting with the deputy chair, interdisciplinary adviser(s) and sub-panel members, as appropriate, will allocate work to members and assessors

with appropriate expertise, taking account of any conflicts of interest and the sub-panel's approach to identifying outputs with significant material in common (see paragraphs 214 to 215). This allocation may be at the level of individual or groups of outputs, individual or groups of impact case studies, and whole environment templates.

379. Each member and assessor on a sub-panel will be allocated a significant volume of material to assess, so that each member and assessor makes a significant contribution to the sub-panel's overall recommendations.

380. Each impact case study will be allocated to at least one academic member and one user member or assessor, wherever practicable. User assessors will be allocated impact case studies, and may be allocated relevant parts of the environment template. User members may – in addition to impact case studies – be allocated whole environment templates and/or outputs in particular areas where they are willing and have appropriate expertise to assess them.

381. Where a sub-panel cross-refers parts of a submission to another sub-panel for advice, the procedures in paragraphs 399 to 404 will be followed. Where a sub-panel refers outputs in a language other than English to external specialist advisers, the procedures in 'Guidance on submissions' paragraphs 285 to 287 will be followed.

Calibration of assessment standards

382. Sub-panels will undertake early calibration exercises with respect to outputs, impact and environment, to ensure sub-panel members and assessors develop a common understanding of the quality levels. The calibration exercises will be based on samples of a range of outputs (whether submitted to the REF or sourced from elsewhere by panel members), on samples of submitted impact case studies and environment templates.

383. In addition to sub-panel members, the assessors who will subsequently be involved in assessing either outputs or impact will take part in the relevant calibration exercises.

384. After these initial calibration exercises, the sub-panels will continue to discuss the application of the quality levels and will keep under review the scoring patterns of members and assessors, to ensure consistency in the sub-panel's standards of assessment.

Assessing submissions

385. Sub-panels will assess all of the components of submissions: research outputs, impact and the research environment. This reflects an underpinning principle that sub-panels will assess each submission in the round. They will not make collective judgements about the contributions of individual researchers. Sub-panels will make collective judgements about the range of submitted information in order to develop the sub-profiles and recommend the overall quality profile, for each unit being assessed.

386. All the outputs listed in submissions will (unless prevented by reasons beyond a sub-panel's control) be examined by panel members and/or assessors. They will be examined with a level of detail sufficient to contribute to the formation of a robust sub-profile for all the outputs in that submission. In doing so panels will take into account additional information where relevant (as described above), but expert review of the outputs will remain the primary means of assessing them.

387. Sub-panels will examine all the submitted case studies, and all the information submitted in the environment template together with the standard data analysis.

388. Sub-panels will meet during the course of the assessment phase to discuss their assessment of each element of submissions. Assessors will attend those meetings at which the relevant element of submissions is being discussed, so that they contribute fully and on an equal basis with members, to the development of the relevant sub-profile.

389. During the course of the assessment, the sub-panels will be asked to draw attention to any data they would like the REF team to verify through an audit. These data will be investigated by the REF team (in addition to the REF team auditing a proportion of submitted information from each institution, as described in 'Guidance on submissions', paragraphs 91 to 97).

Assessing interdisciplinary work

390. For the purposes of the REF, interdisciplinary research is understood to achieve outcomes (including new approaches) that could not be achieved within the framework of a single discipline. Interdisciplinary research features significant interaction between two or more disciplines and/or moves beyond established disciplinary foundations in applying or integrating research approaches from other disciplines.

391. Submitting HEIs should identify those outputs that they consider meet the definition of interdisciplinary research, as set out in 'Guidance on submissions' (paragraph 273) and repeated in this document in paragraph 390, to draw this to the attention of the sub-panel. Outputs flagged as interdisciplinary will be assessed on a fair and equal basis and will be neither advantaged nor disadvantaged in the assessment. Sub-panels may identify outputs as interdisciplinary that have not been flagged as such by the submitting HEI, to enable consideration of the most appropriate means of assessing the output. Additionally, there will be no disadvantage in the assessment where a sub-panel considers that a flagged output does not meet the definition of interdisciplinary research and the output will be assessed on a fair and equal basis with other submitted outputs. In assessing interdisciplinary outputs, sub-panels will make use of the criteria referred to in paragraph 196.

392. The interdisciplinary identifier will allow panels, working with their IDR advisers, to consider the most appropriate means of assessing the output. It is distinct from the cross-referral process, which is set out below in paragraphs 399 to 404. Flagging an output as interdisciplinary will not trigger cross-referral of the output; cross-referral may be one of the assessment routes followed. The panels do not anticipate that all interdisciplinary outputs will require cross-referral and, conversely, expect that cross-referred outputs will not all necessarily meet the REF definition of interdisciplinary research.

393. Given the anticipated diversity of both the interdisciplinary submissions and the sub-panels, it is not appropriate to prescribe a single approach to assessing interdisciplinary outputs. The processes will be developed by the individual sub-panels and will be tailored to the submissions they receive. However, there are a number of mechanisms in place to ensure that interdisciplinary outputs are assessed consistently across the panels, as set out in paragraphs 396 to 398.

394. Each sub-panel will have members who have experience of interdisciplinary work. Where appropriate, this expertise will be augmented with the appointment of additional members and assessors. Sub-panels are confident that they can assess such work, and the appointment of the full membership for the assessment phase will seek to ensure that sub-panels have access to appropriate expertise to reach robust and valid judgements with regard to submitted material.

395. All sub-panels will have at least two members appointed as interdisciplinary advisers. The interdisciplinary advisers will offer guidance to the sub-panels in their assessment of interdisciplinary outputs to enable their robust and valid assessment. This may include advising on the allocation of outputs and the calibration and moderation of scoring. Interdisciplinary advisers will not necessarily be expected to assess all interdisciplinary outputs submitted to their panel.

396. The interdisciplinary advisers will work in a network with their counterparts on other sub-panels (across all four main panels) to review outcomes from the initial calibration of interdisciplinary outputs and may be involved in the joint consideration of outputs with other advisers from the relevant sub-panels, as required during the assessment process. The network of interdisciplinary advisers will meet at key points during the assessment phase, which will provide a forum for reviewing joint working arrangements and identifying wider expertise requirements. IDAP will provide advice and support to the network on these aspects during the calibration and assessment phases.

397. The sub-panels' approach to assessing outputs identified as interdisciplinary will be reviewed across the main panels, to ensure an appropriate consistency of approach. Analysis of the emerging and final scores for the group of outputs identified as interdisciplinary will be conducted by IDAP during and upon completion of the assessment process.

398. IDAP will have a role in overseeing the assessment of interdisciplinary work to ensure that agreed principles and process for assessment are applied and that there is consistency in approach across panels. IDAP will not advise on the assessment of individual outputs, but will advise on process, and provide advice and support for cross-panel calibration. The main panel interdisciplinary leads will join the membership of IDAP during the assessment phase.

Cross-referral of parts of submissions

399. The sub-panels' preferred approach is to assess work within the sub-panel to which it was submitted and, informed by the survey of submission intentions, to appoint further members and assessors where required to enable this. In cases where, in the sub-panel's opinion, the sub-panel and its appointed assessors do not have the required expertise to assess specific parts of submissions, those parts of submissions may be cross-referred to other sub-panels for advice.

400. The submitting HEI may request that specific parts of submissions should be cross-referred to another sub-panel for advice. The sub-panels will consider such requests and decide upon the most appropriate means of assessing the material in question:

- a. Where the sub-panel considers there is sufficient expertise within the sub-panel to reach a robust judgement, the work will be assessed within the sub-panel. The sub-panels expect that this will normally be the case, except where the UOA descriptors indicate specific arrangements for cross-referral.
- b. In those instances where the sub-panel does not consider it contains the appropriate expertise, it may cross-refer the work to an appropriate sub-panel for advice (whether within or outside the same main panel). The REF director will work with the main panels to ensure consistency of approach in cross-referring work across the sub-panels.

401. In addition to considering requests made by institutions, sub-panels may identify specific parts of submissions that it considers should be cross-referred to another sub-panel, and request that such work should be cross-referred.

402. The sub-panels' approach to cross-referral will be discussed within the main panels, to ensure an appropriate consistency of approach.

403. Entire submissions may not be cross-referred. Specific outputs may be cross-referred. The original sub-panel will specify the scope of advice that it is seeking. This will be limited to advice relating to the quality of outputs. It may not include advice on other matters such as the contribution of a co-author or double-weighting of outputs. In exceptional cases, sub-panels may cross-refer impact case studies for advice (including advice related to the quality threshold for the underpinning research).

404. Where parts of submissions are cross-referred, advice will be sought and given on the basis of any specific assessment criteria and procedures (including, for example, use or not of citation data) for the UOA in which the work was originally submitted; cross-referred parts of submissions will be assessed on the same basis as work which is not cross-referred. The original sub-panel will retain responsibility for recommending the quality profile for all work that was submitted in its UOA.

Developing and recommending quality profiles

405. Sub-panels will develop a sub-profile for each of the three elements – outputs, impact and environment – of each submission.

406. **Outputs sub-profile.** Each output listed in a submission will be assessed against the quality levels: 4*, 3*, 2*, 1* or 'unclassified'. The outputs sub-profile will be formed by calculating the percentage of outputs listed in a submission that are assigned at each quality level, with each output contributing an equal proportion to the sub-profile. The following exceptions and rules apply:

- a. Any submitted output that is found to be ineligible will be entered into the outputs sub-profile as 'unclassified'.
- b. Where a submitted member of staff is found to be ineligible, that member of staff and the outputs attributed to them will be removed from the submission; those outputs will not contribute to the outputs sub-profile (see 'Guidance on submissions', paragraphs 136 to 137).
- c. Any outputs that are 'missing' from a submission (that is, where fewer outputs have been submitted than the number required, as specified in paragraph 205 of 'Guidance on submissions', and where no staff circumstances apply), will be graded as 'unclassified'.
- d. Where a request to double-weight an output has been accepted by the sub-panel, the quality level assigned to the output will be entered twice into the outputs sub-profile. Where a request to double-weight an output is not accepted by the sub-panel the reserve output will be assessed. If no reserve output has been submitted, the output will contribute to the sub-profile as a single output and one instance of 'unclassified' will be entered into the outputs sub-profile ('Guidance on submissions', paragraph 281).
- e. Where the sub-panel determines that the submitted member of staff against whom a co-authored output is listed did not make a substantial contribution to the output, the output will be entered into the outputs sub-profile as 'unclassified' (paragraph 219).
- f. Where a sub-panel judges that two outputs within a submission do not contain sufficiently distinct material and should be treated as a single output, an unclassified score will be given to the 'missing' output (paragraph 214).

407. **Impact sub-profile.** Each case study included in a submission will be assessed according to the definitions of the starred levels in 'Guidance on submissions' (Annex A). Any case studies that are 'missing' from a submission (that is, where fewer case studies have been submitted than the number required, as specified in paragraphs 309 to 310 of 'Guidance on submissions') will be graded as 'unclassified'. The impact sub-profile will be formed by calculating the percentage of impact case studies listed in a submission that are assigned at each quality level, with each impact case study contributing an equal proportion to the sub-profile.

408. **Environment sub-profile:** Sub-panels will assess the information provided in the environment template (REF5b), and consider the environment data within the context of that information. Sub-panels will build up a graduated sub-profile by assessing the range of elements in each submission, using the starred levels defined in 'Guidance on submissions' (Annex A). In the environment criteria definitions, the main panels indicate the weighting that the sub-panels will attach to each component of the environment template.

409. The three sub-profiles will be combined into an overall quality profile, using the weightings and method described in 'Guidance on submissions' (Annex B).

410. In recommending the overall quality profile for each submission to its main panel:

- a. Each sub-panel will reach a collective decision, within the framework of the exercise and in accordance with the published statement of criteria and working methods. Each sub-panel will debate the reasoning behind the quality profiles in sufficient detail to reach collective conclusions, and will make recommendations to the main panel on the basis of its collective judgement. Each sub-panel will seek to achieve a consensus on all the overall quality profiles to be recommended to its main panel. If a consensus cannot be achieved after reasonable effort, decisions will be taken by majority vote, with the chair holding a casting vote.
- b. Each sub-panel will confirm to the main panel that each submission has been assessed against the published criteria for that UOA (including in cases where parts of submissions have been cross-referred to other sub-panels for advice) and according to the published procedures.
- c. Each sub-panel will confirm that each submission has been examined in sufficient detail to form robust judgements, and that appropriate expertise has been deployed in assessing submissions.

Recording panel decisions

411. The panel secretariat will minute details of the procedures followed by panels, and these will be published after the conclusion of the exercise. Panels will not make or record collective judgements about individuals' contributions to submissions. The panel secretariat will record the panels' collective judgements about the sub-profiles and overall quality profiles in respect of each submission.

Annex A

Examples of impacts and indicators

1. Table 1 is intended to illustrate the wide variety of areas in which impact from research across the panels may be found to have a positive influence on the quality of life of individuals and communities locally, nationally and internationally. These are indicative only, and in practice much of the impact will cross boundaries between them or go beyond them. Case studies are not expected to be classified in this way by submitting units. A searchable database of impact case studies submitted to REF 2014 can be found here: <http://impact.ref.ac.uk/CaseStudies/Search1.aspx>.
2. The 'indicators' are listed independently of the 'types of impact' and are not intended to link to a specific impact example listed. The list provides illustrative examples of indicators of both reach and significance. The panels set out their approach to assessing impact against these criteria in Part 3, Section 3, paragraphs 287 to 324.
3. Examples of impact achieved through public engagement are integrated into the different areas of impact in Table 1. More detailed advice on achieving and evidencing impact through public engagement can be found on the website of the National Coordinating Centre for Public Engagement: <http://www.publicengagement.ac.uk/>.
4. Examples are also provided of impact evaluation frameworks used outside higher education. Impact partners may also have their own evaluation frameworks that could be drawn upon to evidence impact.

Areas of impact	Types of impacts	Indicators of reach and significance
<p>Impacts on the health and wellbeing of people, and animal welfare</p> <p>Impacts where the beneficiaries are individuals and groups (both human and animals) whose health outcomes have been improved, whose quality of life has been enhanced (or potential harm mitigated) or whose rights or interests have been protected or advocated through the application of enhanced policy and practice for individuals or public health activities.</p>	<ul style="list-style-type: none"> • Outcomes for patients/users or related groups have improved. • Public health or wellbeing has improved. • Quality of life in a developing country has been improved by new products or processes. • A new clinical or lifestyle intervention (e.g. drug, diet, treatment or therapy) has been developed, trialled with patients/users, related or other groups (e.g. community samples), and definitive (positive or negative) outcome demonstrated. • Patient health outcomes have improved through, for example, the availability of new drug, treatment or therapy, diagnostic or medical technology, changes to patient care practices, or changes to clinical or healthcare guidelines. • A new diagnostic or clinical technology has been adopted. • Disease prevention or markers of health have been enhanced by research. • Misleading health claims identified by research are not included in food packaging. • Care and educational practices have changed. • Clinical, dietary, health or social care guidelines have changed. • Health or social care training guidelines have changed. • Decisions by a health service or regulatory authority (to take, or not to take action) have been informed by research. • Public health and quality of life has been enhanced through, for example, enhanced public awareness of a health risk, enhanced disease prevention or, in developing countries, improved water quality or access to health and social care. 	<ul style="list-style-type: none"> • Measures of improved clinical outcomes, public behaviour or health services (lives saved, reduced infection rates). • Measures of improved wellbeing. • Evidence from clinical trials. • Measures of improved patient/user outcomes, public health or health services. • Documented changes to clinical and/or public health guidelines (documented references to research evidence in guidelines). • Evidence of enhancement of patient/user experience. • Evidence of take-up and use of new or improved products and processes that improve quality of life or animal welfare in any given context, e.g. developing countries. • Evidence of the number of animals no longer used in research or a specific sector (e.g. per test, drug, laboratory, or leisure industry). • Documented changes to animal welfare codes or guidelines.

	<ul style="list-style-type: none"> • The user experience has improved. • Increased patient/user involvement in shaping and implementing policy and practice. • Public awareness of a health risk or benefit has been raised. • The control of diseases has changed in developing countries. • Development or adoption of new indicators of health and wellbeing. • Development of policy and practice with regard to medical ethics, health services or social care provision. • Influence on CPD and training standards. • Influence or shaping of relevant legislation. • Influencing policy or practice leading to improved take-up or use of services. • Improved provision or access to services. • Animal health and welfare has been enhanced by research. • Use of animals in research has been reduced, refined or replaced. 	
<p>Impacts on creativity, culture and society</p> <p>Impacts where the beneficiaries may include individuals, groups of individuals, organisations or communities whose behaviours, creative practices, rights, duties and other activity have been influenced.</p>	<ul style="list-style-type: none"> • Collaboration with museum professionals results in enhancements to (cultural) heritage preservation and interpretation, including museum and gallery exhibitions. • Co-production of new cultural artefacts, including for example, films, novels and TV programmes. • Generating new ways of thinking that influence creative practice, its artistic quality or its audience reach. • Inspiring, co-creating and supporting new forms of artistic, literary, linguistic, social, economic, religious, and other expression. 	<p>Arts Council England offer guidance and toolkits for evaluating impact:</p> <ul style="list-style-type: none"> • https://www.artscouncil.org.uk/quality-metrics/quality-principles • https://www.artscouncil.org.uk/quality-metrics/quality-metrics • https://www.artscouncil.org.uk/measuring-outcomes/generic-learning-outcomes

Areas of impact	Types of impacts	Indicators of reach and significance
	<ul style="list-style-type: none"> • Collaboration with public arts venues, artists and programming professionals to produce new forms of artistic expression. • Research-led engagement with marginalised, under-engaged and/or diverse audiences leads to increased cultural participation. • Developing stimuli to cultural tourism and contributing to the quality of the tourist experience. • Improvements to legal and other frameworks for securing intellectual property rights. • Increased understanding of local traditions leads to enhanced cultural preservation in any given context, for example developing countries. • New forms of artistic expression resulting in enhancement of quality of life. 	<ul style="list-style-type: none"> • https://www.artscouncil.org.uk/measuring-outcomes/generic-social-outcomes • Testimonials from creative practitioners, curators, media professionals. • Publication and sales figures both in the UK and overseas, audience or attendance figures (including demographic data where relevant), broadcasting data and other forms of media, download figures, or database and website hits over a sustained period. • Evaluative reviews in the media. • Citations in reviews outside academic literature. Independent citations in the media, including in online documents. • Tourism data, including audience figures and visitor numbers at exhibitions, events, performances. • Professional evaluations of exhibitions, performances or other outputs. • Audience/visitor/participant feedback (e.g. through surveys, interviews or focus groups).
Impact on social welfare Impacts where the beneficiaries include individuals, groups of individuals, organisations	<ul style="list-style-type: none"> • Improved social welfare, equality, social inclusion; improved access to justice and other opportunities (including employment and education). • Engagement with research has enhanced policy and practice for securing poverty alleviation. 	<p>A beginner's guide to evaluating social return on investment (SROI) can be found here: http://www.socialvalueuk.org/resource/guidance-on-starting-out-on-sroi-2/.</p> <ul style="list-style-type: none"> • Documented evidence of changes to social policy.

<p>or communities whose rights, duties, behaviours, opportunities, inclusion, quality of life and other activity have been influenced.</p>	<ul style="list-style-type: none"> • Influential contributions to campaigns for social, economic, political and/or legal change through engagement with civil society groups. • Changes to social policy have been informed by research. • Changes to social policy have led to improved social welfare, equality or social inclusion. • Research has contributed to community regeneration or development. • Improved social and educational inclusion of marginalised groups in any given context, for example developing countries. • More effective integration of refugees into host communities. • Enhanced understanding of victims' needs in reconciliation processes in post-conflict states. 	<ul style="list-style-type: none"> • Measures of improved social equality, welfare or inclusion. • Citations in campaign literature (e.g. leaflets). • Evidence of public debate in the media or other fora being influenced by the research. • Documented evidence of increased social inclusion (e.g. participation figures). • Testimonials from civil society groups and policymakers.
<p>Impacts on commerce and the economy</p> <p>Impacts where the beneficiaries may include businesses, either new or established, the NHS, private health and social care, agriculture or other types of organisation which undertake activity that may create wealth.</p>	<ul style="list-style-type: none"> • A spin-out or new business has been created, established its viability, or generated revenue or profits. • Contributing to innovation and entrepreneurial activity through the design and delivery of new products or services. • Decisions are made not to introduce a new process or product as a result of research. • Social enterprise initiatives have been created. • The costs of treatment, health or social care have changed as a result of research-led changes in practice. • Policies have been introduced which have had an impact on economic growth or incentivising productivity. • Gains in productivity have been realised as a result of research-led changes in practice. 	<ul style="list-style-type: none"> • Evidence of improved cost-effectiveness. • Evidence of service change. • Sales of new products/services. • Business performance measures (e.g. turnover/profits, trends in key technical performance measures underlying economic performance). • Employment figures. • Licences awarded and brought to market; market authorisation. • Demonstrable collaborations with industry (including knowledge transfer partnerships, and contracts). • Commercial adoption of a new

Areas of impact	Types of impacts	Indicators of reach and significance
	<ul style="list-style-type: none"> • Research helps to stimulate foreign direct investment (FDI). • The performance of an existing business has been improved through the introduction of new, or the improvement of existing, products, processes or services; the adoption of new, updated or enhanced technical standards and/or protocols; or the enhancement of strategy, operations or management practices. • Contributing to economic prosperity via the creative sector including publishing, music, theatre, museums and galleries, film and television, fashion, tourism, and computer games. • Performance has been improved, or new or changed technologies or processes adopted, in companies or other organisations through highly skilled people having taken up specialist roles that draw on their research, or through the provision of consultancy or training that draws on their research. • Potential future losses have been mitigated by improved methods of risk assessment and management in safety- or security-critical situations. • The strategy, operations or workplace practices of a business have changed. • Improved support for the development of 'small scale' technologies. • Improvements in legal frameworks, regulatory environment or governance of business entities. • Better access to finance opportunities. • Enhanced corporate social responsibility policies. • More effective dispute resolution. • Alternative economic models (such as fair trade) have been developed and adopted. 	<p>technology, process, knowledge or concept.</p> <ul style="list-style-type: none"> • Business performance measures, for example sales, turnover, profits or employment associated with new or improved products, processes or services. • Jobs created or protected. • Investment funding raised from UK and/or non-UK agencies (venture capital/ Business Angel, and so on) for start-up businesses and new activities of existing businesses. • Priority shifts in expenditure profiles or quantifiable reallocation of corporate, non-profit or public budgets. • Evidence of critical impact on particular projects, products and processes confirmed by independent authoritative evidence, which should be financial where possible. • Evidence of research leading to avoidance of negative outcomes. • Quantitative data relating, for example, to cost-effectiveness or organisational performance. • Tourism data, including audience figures and visitor numbers at exhibitions, events, performances. • Evidence of closing identified skills gaps.

<p>Impacts on public policy, law and services</p> <p>Impacts where the beneficiaries are usually government, non-governmental organisations (NGOs), charities and public sector organisations and society, either as a whole or groups of individuals in society, through the implementation or non-implementation of policies, systems or reforms.</p>	<ul style="list-style-type: none"> • Policy debate has been stimulated or informed by research evidence, which may have led to confirmation of policy, change in policy direction, implementation or withdrawal of policy. • Policy decisions or changes to legislation, regulations or guidelines have been informed by research evidence. • A policy has been implemented (including those realised through changes to legislation) or the delivery of a public service has changed. • In delivering a public service, a new technology or process has been adopted or an existing technology or process improved. • The quality, accessibility, acceptability or cost-effectiveness of a public service has been improved. • (Sections of) the public have benefited from public service improvements. • Risks to the security of nation states have been reduced. • The work of an NGO, charitable or other organisation has been influenced by the research. • Legislative change, development of legal principle or effect on legal practice. • Research is used by parliamentarians to develop proposals for new legislation through Private Members' Bills, or to assist scrutiny of legislation and inform amendments to other bills such as those introduced by government. • Research recommendations are taken up by policymakers through membership of a government advisory committee. • Policymakers make use of research-based critical evidence synthesis in developing policy. • Government analysts adopt innovative methodological or 	<ul style="list-style-type: none"> • Documented evidence of use in policy debate (e.g. at a parliamentary Select Committee, material produced by NGOs). • Citation in a public discussion, consultation document or judgement. • Evidence of citation in policy, regulatory, strategy, practice or other documents. • Direct citations of research in parliamentary publications such as Hansard, committee reports, evidence submissions, or briefings. • Acknowledgements to researchers on webpages, in reports or briefings. • Evidence of influence on a debate in public policy and practice through membership of or distinctive contributions to expert panels and policy committees or advice to government (at local, national or international level). • Quantitative indicators or statistics on the numbers of attendees or participants at a research event, or website analytics for online briefings. • Qualitative feedback from participants or attendees at research events. • Data to show close working relationships with members or staff. For example, the number of meetings held, minutes from these meetings, membership of working groups, co-authoring of publications. • Testimonials from members, committees or officials, where available.
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Areas of impact	Types of impacts	Indicators of reach and significance
	<p>approach-based advice from researchers.</p> <ul style="list-style-type: none"> • Forms of regulation, dispute resolution or access to justice have been influenced. • Research is used to change current processes or services, or identify new services to be provided. • Research into the languages and cultures of minority linguistic, ethnic, religious, immigrant, cultures and communities used by government, NGOs, charities or private sector to understand and respond to their needs. • Research helps to highlight issues of concern to parliamentarians and contributes to new analysis of existing issues. • Research helps parliamentarians and staff to identify inquiry topics, shape the focus of inquiries, inform questioning of witnesses, and underpin recommendations. • Research equips parliamentarians, their staff, and legislative staff with new analytical or technical skills, or refreshes existing ones. • International policy development has been influenced by research. • Allocation and/or distribution of Official Development Assistance (ODA) has been influenced by research. • Policy and practice of international agencies or institutions have been influenced by research. • Research stimulates critical public debate that leads to the non-adoption of policy. 	<ul style="list-style-type: none"> • Documented evidence of influence on guidelines, legislation, regulation, policy or standards. • Documented evidence of changes to public policy, legislation, regulations or guidelines. • Analysis by third-party organisations of parliamentary proceedings or processes, for example studies of the passage of particular pieces of legislation. • Documented evidence of changes to international development policies. • Evidence of use of process/technology. • Measures of improved public services, including, where appropriate, quantitative information; such information may relate, for example, to the quality, accessibility or cost-effectiveness of public services. • Measures of improved inclusion, welfare or equality. • Satisfaction measures (e.g. with services). • Formal partnership agreements or research collaboration with major institutions, NGOs and public bodies. • Consultancies to public or other bodies that utilise research expertise. • Evidence of engagement with campaign and pressure groups and other civil organisations (including membership and activities of those organisations and

		<p>campaigns) as a result of research.</p> <ul style="list-style-type: none"> • Documented evidence of changes to international development policies. • Measures of improved international equality, food security, welfare or inclusion.
<p>Impacts on production</p> <p>Impacts where the beneficiaries are individuals (including groups of individuals) whose production has been enhanced.</p>	<ul style="list-style-type: none"> • Production, yields or quality have been enhanced or level of waste has been reduced. • Research helps to create routes to international innovation and market impact. • Research leads to improvement in productivity and resource-use efficiency. • Decisions by regulatory authorities have been influenced by research. • More efficient production, including food production, for example where costs have been reduced. • Animal husbandry methods have changed. • Management practices in production businesses have changed. 	<ul style="list-style-type: none"> • A new product has been recommended for use or adopted. • Development of a new plant variety or crop protection product which has entered the appropriate national or international regulatory testing system. • Evidence of improved sustainability. • Documented changes to working guidelines. • Documented evidence of improved working practices and/or level of production.
<p>Impacts on practitioners and delivery of professional services, enhanced performance or ethical practice</p> <p>Impacts where beneficiaries may include organisations or individuals, including service users, involved in</p>	<ul style="list-style-type: none"> • Professional standards, guidelines or training have been influenced by research. • Professional methods, ideas or ethics have been influenced by research. • Professionals and organisations are able to adapt to changing cultural values as a result of research. • Contribution to continuing personal and professional development. • Practitioners/professionals/lawyers have used research findings in conducting their work. 	<ul style="list-style-type: none"> • Documented change to professional standards, performance or behaviour. • Evidence of adoption of best practice (e.g. by educators or law enforcement personnel). • New or modified professional standards and codes of practice. • New or modified technical standards or protocols. • Documented changes in knowledge,

Areas of impact	Types of impacts	Indicators of reach and significance
<p>the development and/or delivery of professional services and ethics.</p>	<ul style="list-style-type: none"> Professional bodies and learned societies have used research to define best practice, formulate policy, or to lobby government or other stakeholders. Workforce planning has been influenced by research. Educational or pedagogical practices and methods have changed in primary, secondary, further or higher education, within or beyond the submitting unit. Practices have changed, or new or improved processes or methods have been adopted, by individuals, companies or other organisations, through the provision of training or consultancy. The development of expert systems has been influenced in areas such as medicine, human resources, accounting, and financial services. The quality, efficiency or productivity of a professional service has improved. Expert and legal work or forensic methods have been informed by research. Law enforcement and security practices have changed. Cessation of practices shown by research to be ineffective. 	<p>capability or behaviours of individuals benefiting from training.</p> <ul style="list-style-type: none"> Evidence of debate among practitioners, leading to developments in attitudes or behaviours. Literature/web information from practitioners and advisers, including the research findings and how they are applied in practice. Traceable reference to inclusion of research in national or international industry standards or authoritative guidance. Traceable references by practitioners to research papers that describe their use and the impact of the research.
<p>Impacts on the environment</p> <p>Impacts where the key beneficiaries are the natural, historical and/or built environment, together with societies, individuals or groups of individuals who benefit as a result.</p>	<ul style="list-style-type: none"> The environment has been improved through the introduction of new product(s), process(es) or service(s); the improvement of existing product(s), process(es) or services; or the enhancement of strategy, operations or management practices. New methods, models, monitoring or techniques have been developed that have led to changes or benefits. Policy debate on climate change or the environment has been influenced by research. 	<ul style="list-style-type: none"> Sales of new products, or improvements in existing products, that bring quantifiable environmental benefits. Verifiable influence on particular projects or processes which bring environmental benefits. Evidence of generic environmental impact across a sector, confirmed by independent authoritative evidence.

	<ul style="list-style-type: none"> • Policy debate on the environment, environmental policy decisions or planning decisions have been stimulated or informed by research and research evidence. • Improved design or implementation of environmental policy or regulation. • The management or conservation of natural resources, including energy, water and food, has changed in a developing country. • The management of an environmental risk or hazard has changed. • Changes in environmental or architectural design standards or general practice. • Influence on professional practice or codes. • Changes in practices or policies affecting biodiversity. • The operations of a business or public service have been changed to achieve environmental (green) objectives. • Direct intervention, based on research evidence, has led to a reduction in carbon dioxide or other environmentally damaging emissions. • Increased understanding of the environmental impact of a product or process means that it is not adopted by industry. 	<ul style="list-style-type: none"> • Traceable reference to inclusion of research into government policy papers, legislation and industry guidance. • Traceable reference to the influence of research in planning decision outcomes. • Sales of new products or improvements in existing products that bring quantifiable environmental benefits. • Traceable impacts on particular projects or processes which bring environmental benefits. • Evidence of generic environmental impact across a sector, confirmed by independent authoritative evidence. • Documented case-specific improvements to environment-related issues. • Traceable reference to inclusion of research into government policy papers, legislation and industry guidance. • Traceable reference to impact of research in planning decision outcomes.
Impacts on understanding, learning and participation Impacts where the beneficiaries are individuals, communities and organisations whose awareness, understanding, participation or engagement	<ul style="list-style-type: none"> • Enhanced cultural understanding of issues and phenomena; shaping or informing public attitudes and values. • Public interest and engagement in research has been stimulated through, for example, the enhancement of science education in schools. • The awareness, attitudes or understanding of (sections of) the public have been informed, and their ability to make 	<p>Many organisations use the Generic Learning Outcomes (GLO) to evaluate impacts on knowledge and understanding: https://www.artscouncil.org.uk/measuring-outcomes/generic-learning-outcomes.</p> <p>The Heritage Lottery Fund also offers guidance on evaluating participation and learning:</p>

Areas of impact	Types of impacts	Indicators of reach and significance
<p>have been enhanced as a result of research.</p>	<p>informed decisions on issues improved, by engaging them with research.</p> <ul style="list-style-type: none"> Public or political debate has been shaped or informed by research; this may include activity that has challenged established norms, modes of thought or practices. Contributing to processes of commemoration, memorialisation and reconciliation. Contributing to a wider public understanding of basic standards of wellbeing and human rights conceptions. Contributing to widening public access to and participation in the political process. Professionals and organisations have adapted to changing cultural values. Research has challenged conventional wisdom, stimulating debate among stakeholders. Increased understanding of gender roles in any given context (e.g. developing countries) has improved equality. Changes to education or the school curriculum have been informed by research. Influencing the design and delivery of curriculum and syllabi in schools, HEIs or other educational institutions. Research results in changes to the delivery of vocational courses and subsequently changes to professional practice. Reduced gap in academic attainment for students with protected characteristics. 	<p>https://www.hlf.org.uk/evaluation-guidance.</p> <ul style="list-style-type: none"> Documented evidence that public understanding has been enhanced through active collaborative involvement in research. Documented evidence of policy debate (e.g. in Parliament, the media, material produced by NGOs). Public debate in the media. Documented shift in public attitude (e.g. to sexual behaviour, or social factors in health). Documented evidence of enhanced awareness of health risks and benefits by consumers. Citation in a public discussion, consultation document or judgement. Citation by journalists, broadcasters or social media. Evidence of increased public uptake of scientific training, through public engagement. Information about the number and profile of people engaged and types of audience. Evidence of secondary reach, for example from follow-up activity or media coverage. Evidence of sustainability through, for example, a sustained or ongoing

		<p>engagement with a group, a significant increase in participation in events or programmes or use of resources.</p> <ul style="list-style-type: none"> • Evidence of engagement with campaign and pressure groups and other civil organisations (including membership and activities of those organisations and campaigns) as a result of research. • Measures of increased attainment and/or measures of improved engagement with science in non-HE education. • Evidence of use of education materials arising from the research.
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Annex B

Summary of additional information about outputs

1. This annex provides a summary table of all the additional information statements relating to outputs that are required in submissions (in form REF2). It should be read alongside, and does not replace, the guidance provided in 'Guidance on submissions' and in the relevant parts of the panel criteria statements, as indicated in 'Summary of additional information required about outputs' below. It is intended for institutions' ease of reference in identifying the requirements for additional types of information about outputs, across the four main panels.

2. The word limits for the additional information about outputs are common across the four main panels, as set out in 'Word limits for additional information about outputs' below.

Summary of additional information required about outputs

	Main Panel A	Main Panel B	Main Panel C	Main Panel D
a. Outputs that include significant material published prior to 1 January 2014 (paragraphs 214 to 215)				
Panel requirements:	All main panels: Statement on how far the earlier work was revised to incorporate new material			
Reference:	Part 3, Section 2, paragraph 215			
b. The researcher’s contribution to a co-authored or co-produced output (paragraphs 216 to 220)				
Panel requirements:	Affirmation of the author’s contribution to the output (selected from the statements provided) only where the author is not the lead or corresponding author and the output has 15 or more co-authors	Sub-panels 7, 8, 10, 11 and 12: None Sub-panel 9: Affirmation of the author’s contribution to the output (selected from the statements provided) only where the author is not the lead or corresponding author and the output has 15 or more co-authors	None	None
Reference:	Part 3, Section 2, paragraphs 221 to 225	Part 3, Section 2, paragraph 226 to 231	Part 3, Section 2, paragraph 231 to 232	Part 3, Section 2, paragraph 233 to 236
c. Request to double-weight an output (paragraphs 237 to 241)				
Panel requirements:	All main panels: a supporting statement to justify the request			

Reference:	Part 3, Section 2, paragraphs 242 to 243	Part 3, Section 2, paragraphs 244 to 247		
d. Abstract for outputs in languages other than English (paragraph 272)				
Panel requirements:	All main panels: For all outputs in languages other than English, a short abstract to describe the nature and content of the work. (This requirement is waived for outputs submitted in UOA 26 (Modern Languages and Linguistics) in a language included in the sub-panel descriptor – see Part 3, Section 2, paragraph 272.)			
Reference:	Part 3, Section 2, paragraph 272.			
e. Information about the research process and/or content				
Panel requirements:	Statement where this is not evident within the output (for non-text or practice-based outputs)	Statement where this is not evident within the output (for non-text or practice-based outputs) Identification of the original research or new insights reported (for reviews)	Statement where this is not evident from the output itself (for any type of output) For practice-based outputs, an explanatory presentation in paper format should be included For software and data sets, a full written description with details how to access	Statement for any output where the role of the researcher, or research process, is not evident within the output Statement on the contribution of the attributed author to anthologies, edited books, special issues of journals and curatorial projects Rationale for grouping short items as a single output
Reference:	Part 3, Section 2, paragraph 252	Part 3, Section 2, paragraphs 254 to 255	Part 3, Section 2, paragraphs 259 to 262	Part 3, Section 2, paragraphs 263 to 273
f. Factual information about the significance of the output				
Panel requirements:	None	In UOAs 11, 12, Factual statement wherever available None in UOAs 7, 8, 9 and 10	None	None
Reference:	Part 3, Section 2, paragraph 253	Part 3, Section 2, paragraphs 256 to 257	n/a	n/a

Word limits for additional information about outputs

Type of information	Word limit
a. Outputs that include significant material published prior to 1 January 2014	Maximum 100 words for each of a–d
b. The researcher’s contribution to a co-authored or co-produced output	
c. Request to double-weight an output	
d. Abstract for outputs in languages other than English	
e. Information about the research process and/or content	Maximum 300 words
f. Factual information about the significance of the output	Maximum of 100 words

Annex C

Main Panel D – output types & submission guidance

1. Sub-panels in Main Panel D receive the widest diversity of output types across the exercise. Each submitted output needs to have a single classification selected from this list. The purpose of the classification is to assist in the management of the collection and distribution of outputs, the allocation of outputs to reviewers and a post-submission analysis of types of outputs submitted. The sub-panel will assess the research content of the material submitted regardless of the classification.
2. The format for the presentation of outputs (irrespective of their classification) is flexible, within the requirement to limit the format **either** to an electronic submission which is submitted via the REF submission system either as a URL, DOI, or by uploading a PDF; **or** as physical material which is sent to the REF team, and which may include digital/electronic material on a media storage device e.g. USB. An individual output cannot be submitted both electronically via the REF submission system and as a physical output.
3. It is the responsibility of the submitting HEI to ensure that any digital material submitted is accessible from a range of devices.
4. Please also cross-refer to Part 3, Section 2, paragraphs 263 to 271, and Annex B, covering ‘Additional Information’.

Type	Recommended additional statements (making clear the research process/ content/ contribution)	Medium	Recommended content
Artefact	Up to 300 words	DOI/URL/PDF/ USB	<p>A succinct and coherent presentation of the research, evidencing the year and mode of dissemination.</p> <p>The material submitted should provide sufficient information to allow the panel to assess the research process, research insights, and time and manner of dissemination. This may take the form of moving image, sonic, visual or other digital media or written text, or a combination of these, as appropriate, to enable the panel to access the research dimensions and/or the researcher's contribution to the artefact and to assess its significance, originality and rigour. The panel does not normally expect to receive physical artefacts.</p>
Authored books	Up to 300 words*	Physical copy of the book/PDF	<p>It is anticipated that the research will normally be evident within the submitted 'book' and that no additional information is required.</p> <p>Novels and poetry collections should be submitted in this category.</p> <p>*For books where the research is not self-evident (e.g. Artists' books) they should be submitted with a 300-word statement, or submitted as 'Artefact' or 'Other'.</p>
Chapter in book	Up to 300 words*	Physical copy of the book/PDF	<p>It is anticipated that the research will normally be evident within the submitted chapter and that no additional information is required.</p> <p>Short stories and individual poems should be submitted in this category or under journal article.</p> <p>*For chapters where the research is not self-evident they should be submitted with a 300-word statement, or submitted as 'Artefact' or 'Other'.</p>
Composition	Up to 300 words	DOI/PDF/USB or a printed score where appropriate	<p>A succinct and coherent presentation of the research, evidencing the year of dissemination.</p> <p>The material submitted should provide sufficient information to allow the panel to assess the research process, research insights, time and manner of dissemination.</p>

			(e.g. large-format scores)	This may take the form of moving image, sonic, visual or other digital media or written text, or a combination of these, as appropriate, to enable the panel to access the research dimensions and/or the researcher's contribution to the composition and to assess its significance, originality and rigour. Where possible or appropriate, scores should be accompanied by recordings.
Conference contribution	Up to 300 words*	DOI/PDF		<p>It is anticipated that the research will normally be evident within the submitted proceedings and that no additional information is required.</p> <p>*Where the Conference Contribution is other than a paper (e.g. a performance or visual presentation), this should be submitted as 'Performance' or 'Other', and be supported by a 300-word statement.</p>
Confidential report		PDF		It is anticipated that the research will normally be evident within the submitted report and that no additional information is required.
Design	Up to 300 words	DOI/PDF/USB		<p>A succinct and coherent presentation of the research, evidencing the year of dissemination.</p> <p>The material submitted should provide sufficient information to allow the panel to assess the research process, research insights, and time and manner of dissemination.</p> <p>This may take the form of moving image, sonic, visual or other digital media or written text, or a combination of these, as appropriate, to enable the panel to access the research dimensions and/or the researcher's contribution to the design and to assess its significance, originality and rigour.</p>
Devices & products	Up to 300 words	DOI/PDF/USB		<p>A succinct and coherent presentation of the research, evidencing the year and mode of dissemination.</p> <p>The material submitted should provide sufficient information to allow the panel to assess the research process, research insights, and time and manner of dissemination.</p> <p>This may take the form of moving image, sonic, visual or other digital media or written text, or a combination of these, as appropriate, to enable the panel to access the research dimensions and/or the researcher's contribution to the devices or products and to assess its significance, originality and rigour. The panel does not normally expect to receive physical devices or products.</p>

Digital or visual media	Up to 300 words	DOI/PDF/USB	<p>A succinct and coherent presentation of the research, evidencing the year and mode of dissemination.</p> <p>The material submitted should provide sufficient information to allow the panel to assess the research process, research insights, and time and manner of dissemination.</p> <p>This may take the form of moving image, sonic, visual or other digital media or written text, or a combination of these, as appropriate, to enable the panel to access the research dimensions and/or the researcher's contribution to the output and to assess its significance, originality and rigour.</p>
Exhibition	Up to 300 words	DOI/PDF/USB	<p>A succinct and coherent presentation of the research, evidencing the year of dissemination.</p> <p>The material submitted should provide sufficient information to allow the panel to assess the research process, research insights, and time and manner of dissemination.</p> <p>This may take the form of moving image, sonic, visual or other digital media or written text, or a combination of these, as appropriate, to enable the panel to access the research dimensions and/or the researcher's contribution to the exhibition and to assess its significance, originality and rigour.</p>
Edited book	Up to 300 words	Physical copy of the book/PDF/DOI	<p>Sub-panels expect to receive edited books where the researcher has made a demonstrable contribution to the research published (in addition to any chapter published in the same work). Where such a research contribution is part or all of the output to be assessed, the whole work should be submitted. Submitting units may provide a statement (of up to 300 words) to clarify the nature of the individual's research contribution.</p> <p>Special Issues of Journals should be submitted in this category.</p>
Journal article		DOI/PDF	<p>It is anticipated that the research will normally be evident within the submitted journal article and that no additional information is required.</p> <p>Short stories and individual poems should be submitted in this category or under 'Chapter in book'.</p>

Patent/ published patent		PDF/physical copy	It is anticipated that the research will normally be evident within the submitted patent and that no additional information is required.
Performance	Up to 300 words	DOI/PDF/USB/ CD/DVD	<p>A succinct and coherent presentation of the research, evidencing the year of dissemination.</p> <p>The material submitted should provide sufficient information to allow the panel to assess the research process, research insights, and time and manner of dissemination.</p> <p>This may take the form of moving image, sonic, visual or other digital media or written text, or a combination of these, as appropriate, to enable the panel to access the research dimensions and/or the researcher's contribution to the performance and to assess its significance, originality and rigour.</p>
Research data sets and databases	Up to 300 words	DOI/URL/PDF	<p>A succinct and coherent presentation of the research, evidencing the year of dissemination.</p> <p>Research Corpora should be included in this category.</p> <p>The material submitted should provide sufficient information to allow the panel to assess the research process, research insights, and time and manner of dissemination.</p>
Research report		DOI/PDF/ physical copy	It is anticipated that the research will normally be evident within the submitted report and that no additional information is required.
Scholarly edition	Up to 300 words*	DOI/PDF/Object	<p>It is anticipated that the research will normally be evident within the submitted edition and that no additional information is required.</p> <p>* Scholarly Editions where the research is not self-evident (e.g. some Editions of Music) should be submitted with a 300-word statement.</p>
Software	Up to 300 words	DOI/PDF/USB	<p>A succinct and coherent presentation of the research, evidencing the year of dissemination.</p> <p>The material submitted should provide sufficient information to allow the panel to assess the research process, research insights, and time and manner of dissemination.</p>

Translation	Up to 300 words*	DOI/PDF/Object	<p>It is anticipated that the research will normally be evident within the submitted 'translation' and that no additional information is required.</p> <p>*Translations where the research is not self-evident, should be submitted with a 300-word statement.</p>
Working paper		DOI/PDF	<p>It is anticipated that the research will normally be evident within the submitted output and that no additional information is required.</p>
Other	Up to 300 words	DOI/PDF/USB/ physical copy	<p>Likely to include, but not limited to:</p> <ul style="list-style-type: none"> • creative projects where another item classification is unsuitable • curatorial projects • a creative writing collection (a number of related works that were published in forms other than a book length collection) • a collection of creative and/or critical work (e.g. related articles, books, choreographic materials, essays, dramaturgical works, films, recordings etc.) on a related topic that address different aspects of a single project and are collectively greater than the sum of their parts • substantial dictionary or encyclopaedia entries and groups of short items including groups of entries • buildings • design processes / programme of research. <p>In all such cases, the submission should provide a succinct and coherent presentation of the research, evidencing the year of dissemination.</p> <p>This may take the form of moving image, sonic, visual or other digital media or written text, or a combination of these, as appropriate, to enable the panel to access the research dimensions and/or the researcher's contribution to the output and to assess its significance, originality and rigour.</p> <p>The material submitted should provide sufficient information to allow the panel to assess the research process, research insights, and time and manner of dissemination.</p>

Annex D

Managing conflicts of interest

1. The primary purpose of REF 2021 is to produce overall quality profiles for each submission made by institutions, which will be used by the UK higher education funding bodies in determining the main grant for research to the institutions which they fund.
2. The REF is governed by the principles of equity, equality and transparency. In order to ensure that these principles are adhered to, we set out below arrangements for recording declarations of interest and avoiding potential conflicts of interest.

Declarations of interest

3. All main panel chairs and members, sub-panel chairs and members, panel advisers and panel secretaries, observers and assessors (hereafter collectively called panel members) are asked to make a declaration of their interest through the panel members' website. All interests which an objective and fair minded observer would consider could improperly influence a panel member's assessment of an HEI's submission should be declared. An improper influence is one which prevents a panel member judging a submission open mindedly and exclusively on its own merits. It is important to realise that influence might be subconscious, and that the appearance of impartiality is as important as impartiality itself. All such interests which the objective and fair minded observer in possession of all the facts would consider raised a real (i.e. more than fanciful) possibility of improper influence are disqualifying interests in respect of the HEI concerned. For the purpose of REF, such disqualifying interests include:

- any UK higher education institution(s) at which the individual is employed
- any UK higher education institution(s) at which the individual has been employed since January 2014
- any UK higher education institution(s) at which the individual has been engaged in substantial collaboration since the start of the assessment period (1st January 2014). This might include organisations at which the individual has visiting lecturer/fellow/professor or similar status or has worked on a commercial contract or consultancy basis
- any UK higher education institution(s) at which the individual's partner and/or immediate family member (parent, sibling, child, and any person in respect of whom the individual has an equivalently close family relationship whether biologically related or not) is employed
- any financial or commercial interest in a UK higher education institution(s), including spin-out companies
- any minor interest(s), including those listed in paragraph 11 below, ruled by a panel chair to be treated as a disqualifying interest.

Association with what might be considered to be rival research groups or interests or a particular approach to or school of thought within the subject area in question will not be considered to be a declarable interest unless the panel member is unable to judge a submission open mindedly on its merits.

Panel procedures

4. A complete list of the declared interests of panel members and others involved in the assessment will be prepared by the REF team and made available, in confidence, to panels when they start their work.
5. Individuals will be asked to update the REF team regularly on any additional interests, through the panel members' website. Complete lists of declared interests will be updated and circulated accordingly on an ad hoc basis.
6. Panel members may not take part in the assessment of submissions from institutions in which they have declared a disqualifying interest. Panel members must ensure their declarations of interests are up to date in advance of any meeting at which any institution(s) in which they have a disqualifying interest is to be discussed. Panel members must withdraw from that part of the meeting at which the institution in which they have a disqualifying interest is to be discussed. Withdrawals due to disqualifying interests shall be minuted. These procedures will also be set out in the published panel criteria.

Requests for information

7. Panel members are likely to receive numerous invitations to discuss issues concerned with REF 2021. Although the REF team seeks improved clarity and transparency during this exercise through the dissemination of information, we do not wish panel members to compromise their position by entering into discussions which could be perceived to give a particular individual or institution an unfair advantage.
8. Therefore, panel members should not discuss issues concerning individual departmental or institutional submissions that in any way break the confidentiality agreements they have entered into in order to work on the REF. However, they may accept invitations to talk at meetings where a number of different institutions are represented, for example those arranged by a professional body or subject association to discuss the REF process in general terms. If any member has concerns over a potential conflict of interests or the propriety of a proposed action, they should discuss it with the REF director.
9. Panel members are not expected to suspend normal relations with their colleagues and peers during the exercise. They should not feel in any way obliged, for example, to withdraw from external examining, or participation in appointment committees. They are, however, asked to exercise caution in dealings with individual departments, or with subject associations or similar bodies, where there is an actual or clearly inferable connection with their panel membership.

Declarations of minor interests

10. Any interest that could lead a reasonable observer to doubt the impartiality of a panel member's assessment of work that has been allocated to them, that is not a disqualifying interest, must be declared by that panel member as a minor interest. Minor interests should be declared on an ad hoc basis to the chair of the relevant main or sub-panel. Declarations of minor interests shall be minuted.
11. Minor interests could include, for example:
 - A panel member supervises or co-supervises one or more doctoral students from the submitting institution, or who went on to become an academic staff member within the submitting institution.

- A panel member was supervised as a doctoral student by a staff member who is returned within the submission.
- A panel member is co-investigator or co-holder of a grant with the submitting institution.
- A panel member, or their partner or immediate family member, is employed by a 'user' organisation that is the focus of an impact case study.
- A panel member is on the editorial board of a journal series published by the submitting department or unit, or has co-organised a conference or conference series with the submitting department.
- A panel member has acted during the assessment period as a member of an appointment or promotions committee for the submitting institution.
- Prior to their appointment to the REF panel but during the assessment period, a panel member has acted as an external adviser to the submitting institution on their research or REF strategy.
- A panel member acts as an external examiner for research degrees for a submitting department or unit.

12. In each case it shall be for the chair to decide what effect the existence of a minor interest shall have on a panel member's participation in the assessment. These decisions shall also be minuted. Depending on the nature of the interest, the sub-panel chair may decide:

- that the interest should be noted by the sub-panel, but that it should not affect the panel member's participation in assessing the submission
- that the panel member should not take sole or lead responsibility for assessing the particular aspect of the submission affected by the interest, but may otherwise be involved in assessing the submission
- that the panel member should take no part in assessing the particular aspect of the submission affected by the interest, but may otherwise be involved in assessing the submission
- that the interest – or a group of interests relating to an institution – held by a panel member shall be treated as a disqualifying interest, and the panel member should play no role in assessing the submission.

Annex E

Confidentiality and information security agreement for REF 2021 panels

1. This document sets out arrangements for the REF panels to maintain the confidentiality and security of information they generate and have access to throughout the REF process ('Confidential Information'). **Confidential Information** means all confidential or proprietary information (however recorded or preserved) related to the Purpose that is disclosed or made available whether before or after the date of this agreement (in any form or medium), directly or indirectly by the REF team to the panel member.
2. All REF main and sub-panel chairs, members, assessors, secretaries, advisers and observers for all REF assessment and advisory panels are bound by the terms set out below. For the purposes of this document these people will all be referred to as 'panel members'.
3. This document deals only with the relationship between the four UK higher education funding bodies on the one hand and panel members on the other. It does not give rise to any rights or obligations to or from HEIs participating in the REF.
4. Nothing in this agreement prevents panel members from disclosing information after it becomes freely available in the public domain (without the breach of any obligation of confidentiality), or that which they are required by law to disclose, or that which was already known and not subject to confidentiality obligations before being disclosed in the context of the REF. It would be prudent, however, to contact the REF director in advance to discuss any such disclosure.
5. Some Confidential Information may have to be disclosed by the UK higher education funding bodies under the Freedom of Information Act 2000 or other legislation. If any requests for information are received, these must be passed to the REF director immediately for consideration and action, and should not be responded to by panel members.
6. If there is any doubt with regard to any issue of confidentiality, either in general terms or in relation to a particular piece of information, panel members should seek advice from the REF director.

Purpose

7. The Confidential Information is being provided to panel members solely to enable panel members to carry out their agreed duties in relation to the REF, as set out in the REF appointment invitation and associated panel role information³.
8. For the avoidance of doubt, all information panel members acquire as a result of their appointment is confidential to the REF team and REF panel members and should not be released or shared in any way, either during their appointment or afterwards, to third parties without the prior permission of the REF director.

³ For REF advisory panels, IDAP and EDAP, the panel role will be set out in the terms of reference as agreed by the panel at their first meeting and reviewed as appropriate points throughout the REF exercise. For REF main and sub-panels, the panel role is set out in the REF publication 'Roles and recruitment of the expert panels' (October 2017).

Rationale for confidentiality

9. Subject only to any other legal obligations on the UK higher education funding bodies to disclose further information, in order to properly manage the integrity of the REF it is necessary to ensure that public comment from REF panels and their constituent members on individual submissions is limited to:

- the 'Panel criteria and working methods' publication and any REF guidance documents directly associated with formal guidance to HEIs developing submission material
- the overall assessment outcomes awarded to each submission (comprising the overall quality profile and the three sub-profiles for outputs, impact and environment)
- the 'Panel overview reports' detailing how the assessment was carried out, and providing observations about the assessment and the state of research within their discipline areas.

10. Subject to any overriding legal obligation, we seek to avoid any situation in which parties not involved in the assessment process approach or place pressure on panel members to disclose information about the panel's discussion of particular submissions. In other words, maintenance of confidentiality is essential if panel members are not to be inhibited from expressing their opinions freely in panel discussions, which is essential to the effective operation of the REF as an expert review exercise.

11. Given the nature of the information that panel members will have access to, the confidentiality arrangements also set out measures to prevent acts by a panel member which might, in certain circumstances, lead to a claim being made against them or the UK higher education funding bodies for: breach of data protection legislation; breach of a common law duty of confidentiality; defamation; infringement of intellectual property rights in research outputs; or otherwise give rise to financial or reputational losses for which a legal claim is made or may be made.

Panel members' obligations

General obligations

12. Acceptance of the purpose and rationale as set out in this document is a condition of appointment as a panel member. Panel members are required to provide written confirmation of agreement to these terms alongside acceptance of the appointment. The chief executives of the four UK higher education funding bodies reserve the right to terminate appointments in the event of any breach of these terms.

13. Panel members shall use confidential information only for the purposes of the REF. Confidential information must be handled in accordance with reasonable instructions given by the REF team. In particular, the REF team may require the deletion of any confidential information or all copies of confidential information, or to take such additional reasonable steps to preserve the security of the confidential information as the REF team may determine. Panel members must promptly comply with any such instructions.

14. Panel members should respect the confidentiality of the information provided in any form (electronically or otherwise) and the discussions panel members will be privy to, by:

- only using such information for the purposes of the REF criteria development and REF assessment, as applicable
- taking all reasonable steps to ensure the security of the information, and handling it in accordance with reasonable instructions given by the REF team
- keeping the information for the purposes of the REF criteria development and REF assessment, as relevant, and securely disposing of information when requested by the REF team
- promptly reporting any incident of information loss to the REF team
- not disclosing any unpublished information about the REF assessors' or panel members' discussion of individual or other submissions
- observing protocols issued by the REF team for responding to media or other requests for further information. This includes consulting the REF team should panel members be invited to speak about the REF
- seeking advice from the REF team if panel members have any concerns during the process or are unsure about the appropriate course of action.

15. Confidential information shall not be disclosed to any other person except panel members and the REF team. All reasonable steps shall be taken to ensure that other people cannot have access to the information, whether held in paper or electronic copy. In particular:

- a. It is important to remember that computer systems, and specifically email, are not necessarily secure, and panel members shall agree to exercise appropriate caution when using them.
- b. Confidential information will be made available to panel members via secure, password-protected systems. Passwords must not be divulged to any other person.

16. The obligations set out in this document will subsist indefinitely.

Annex F

List of abbreviations

CPD	Continuing professional development
DOI	Digital Object Identifier
EDAP	Equality and Diversity Advisory Panel
FDI	Foreign direct investment
FTE	Full-time equivalent
GLO	Generic Learning Outcomes
HE	Higher education
HEI	Higher education institution
HESA	Higher Education Statistics Agency
IDAP	Interdisciplinary Research Advisory Panel
IDR	Interdisciplinary research
NGO	Non-governmental organisation
ODA	Official Development Assistance
PGR	Postgraduate research
RAE	Research Assessment Exercise
REF	Research Excellence Framework
UOA	Unit of assessment



Cyngor Cyllido Addysg
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