

## **A response from the Royal Society of Biology to the Stern Review of the Research Excellence Framework**

24 March 2016

The Royal Society of Biology is a single unified voice, representing a diverse membership of individuals, learned societies and other organisations. We are committed to ensuring that we provide Government and other policy makers, including funders of biological education and research, with a distinct point of access to authoritative, independent, and evidence-based opinion, representative of the widest range of bioscience disciplines.

The Society welcomes the Stern Review of the Research Excellence Framework and is pleased to offer these comments which have been prepared in consultation with the individual and organisational members of the Royal Society of Biology, and represents views gathered from our network which spans the life sciences community.

### **Summary**

- The Society is supportive of the broad aims and objectives of the Research Excellence Framework (REF) and notes that in our community it is regarded as promoting research quality, and helping to focus efforts to embed and explain the delivery of public benefit.
- The preservation of the science community at the heart of the process - understanding, informing and executing it - is important for quality and authority. In particular, the element of peer review is a key attribute and should be retained, alongside more sophisticated use of quantitative indicators.
- Preparation for the REF at the institutional level can impose a heavy burden on researchers, may alter the course of career progression, and alter the balance between research and teaching. Measures should be taken to mitigate negative and unintended consequences where present.
- Persistent focus by research institutions on journal impact factor (IF) has had negative effects. This should be dissuaded with clarity and force in order to reduce individual and institutional concentration on it.
- Attribution of credit for multi-author and interdisciplinary papers (outputs) is currently problematic and could hinder development of both early stage careers and the most appropriate research collaborations.

### **1 Background**

1. The Society is not a direct recipient of any REF-informed funding allocation, but many of the individuals it represents directly and indirectly through its membership participate in the REF as assessors and assessed, and are affected by the assessment and subsequent allocations. Although the REF directly concerns academic researchers, it has considerable influence on the broader scientific community and the country as a whole through the activities it drives, and through its effects on the relationships between academic researchers, the partners in and users of that research, and the broader public.

2. The Society is supportive of the broad aims and objectives of the REF and notes that in practice the REF and its predecessors are widely regarded as driving research quality and as helping to focus efforts to embed and explain the delivery of public benefit. In particular this response covers two broad areas of

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concern for the life sciences community with regard to the REF, namely the assessment process and the influence of the REF on the research landscape.

## 2 Assessment process

### 2.1 Outputs

3. There is a strong sense that improved communication and clear guidance on both submission criteria and evaluation would be beneficial, especially regarding multiple authorship, collaborations, part-time staff and multidisciplinary research (see below). There is concern that a functional repeat of the REF2014 in this regard would not be appropriate over the next assessment period, or take account of emerging trends in working practices.

### 2.2 Impact

4. In the context of the REF, “impact” was defined as ‘an effect on, change or benefit to the economy, society, culture, public policy or services, health, the environment or quality of life, beyond academia’. There is a perception that, while what exactly constituted impact was not clear at the outset of the REF 2014 and indeed during much preparation for the assessment, a great deal has been learned. In effect the assessment varied across panels, reflecting the specific knowledge of different communities of practice, and different disciplines. Although economic impact has sometimes been a focus of attention in relation to the REF, we are pleased to see increasing importance given to avoided costs and non-fiscal benefits of research to society, policy, health, wellbeing and environment within impact discussions by all sectors.

5. In addition the research community has developed increased capacity to recognise these impacts and how to capture and communicate them. In effect, clarity around impact has emerged through the process and this knowledge is vital and largely tacit; it could be difficult and counter-productive to attempt to define and translate it into a more precise definition, but communication of the principles on which it rests remains key.

6. Overall, the experience of the past REF provided a valuable learning opportunity for the life sciences academic community to better understand the many forms that impact can take, and the current criteria are sufficiently broad and flexible. We encountered concern that a prescriptive definition of impact could act against fundamental (so-called blue skies) research, which by its nature is less focused on immediate impact than more applied research. However, it must be recognised that a loose definition of impact does not allow for easy comparison across and between disciplines, and is more difficult to handle at an institutional level.

7. There is also a risk that a narrow focus on impact intended as commercial applications could encourage a culture of short-termism in which longer-term and less immediately applicable research is neglected. More theoretical research for which no immediate applications are envisioned should not be penalised. Indeed, evidence suggests that commercial users of research see the production of knowledge and the training of skilled people as the most valuable impact of university research, rather than the university’s direct commercial outputs.

8. Another risk is that a concentration on international excellence as the highest accolade is not always encouraging of local impact and engagement. Impact of university research teams on local industry should be recognised and encouraged. This impact is often achieved through collaborations (see below) and flow of people, such as CASE studentships.

9. Given the nuanced and varied nature of impact, peer review by researchers and users is essential for its assessment and cannot be substituted for by any aggregation of available metrics (see below). It would therefore be impossible to include impact in an eventual assessment exercise based on metrics only.

### 2.3 Metrics

10. We are aware of some support within the life sciences academic community for considering the use of quantitative indicators (metrics) to assist and streamline parts of the REF assessment process. Although the current peer review process is imperfect and resource-intensive at the end of the assessment period, and it could be assisted for example with the aid of more sophisticated data on the quality of publications (see below), indicators alone cannot provide a satisfactory assessment of the quality and impact of research. The Society agrees with the view expressed in the independent review of metrics chaired by Prof. James Wilsdon that: “No set of numbers, however broad, is likely to be able to capture the multifaceted and nuanced judgements on the quality of research outputs that the REF process currently provides”.

11. Moreover there is a risk that introducing the use of quantitative indicators to simplify assessment can lead to the temptation to use as few as possible, as has happened in other sectors such as secondary education. This should be resisted in order to preserve the richness of information currently captured by the REF.

12. Journal impact factor (IF) is still wrongly perceived as a defining metric with an important role in the assessment of research outputs in the REF, and it is widely used within institutions to choose which researchers to submit and to select their key papers; this may adversely affect careers. The higher IF routes available to particular disciplines (eg biomedicine versus environmental taxonomy) can distort institutional investment priorities as well as individual career choices in anticipation of assessment under these criteria. Improved communication is needed to ensure that misperception is corrected and the use of IF as a proxy for research quality is strongly discouraged throughout the whole process of selecting outputs for REF submission. Transparency and good communication are essential to ensure trust in the assessment process and its outputs, and to prevent excessive drain of resources, as institutions prepare for, and inevitably try to second guess the assessment.

13. In measuring the quality of research outputs, a more sophisticated use of citation data would be valuable in many areas of the life sciences (although not uniformly and requiring field-specific treatment). Citation data adjusted to take into account the different citation practices of each discipline and its specific context, known biases, and the time since the research was published, could be used to assist the process of peer review by providing useful contextual information. However, citations should not be used automatically as a measure of research quality, as other factors also influence citation patterns, for example when papers are cited in order to criticise invalid conclusions.

14. The use of quantitative indicators is especially prone to ‘gaming’, as indicators can become targets when more attention is paid to the measurement of the output than its inherent quality. Well-crafted rules and criteria, based on the lessons learned in the past REF, can limit the extent of gaming. However, care should be exercised to ensure that rules are flexible enough to accommodate the legitimate needs of all those involved in research.

15. Improved inter-operability of databases and more freely-available information could bring significant benefit to Government and research funders in promoting and supporting research excellence and productivity. Developments such as widespread adoption of ORCID IDs are a step in the right direction, and to be encouraged by the REF.

### 3 Implications of the REF

16. Past experience has shown that the REF has considerable influence on academic behaviour. This influence can be positive, such as encouraging academics to think about the broader societal relevance of their research and promoting greater accessibility of research results. However, caution should be exercised to prevent unintended negative consequences. A number of areas of concern are discussed below.

### 3.1 Strategic decision-making

17. Information gathered through the REF is an important factor in strategic planning in the University sector, it influences management decisions but it is by no means the only influence. Performance in the REF does not automatically translate into positive or negative outcomes for individual departments or research groups, but it plays an increasingly important role in how such units are structured and configured. However, a risk exists of REF information taking priority over other management information, leading to institutional decisions that are based on what is inevitably a partial picture.

18. The assessment of individual UoAs provides relatively objective information on quality within institutions, playing a key role in strategic decisions about the institutions' priorities. Although QR funding is allocated at the institutional level, organising the REF at the level of individual UoAs allows the recognition of pockets of research excellence within less research-intensive institutions. To aggregate information at an institutional level risks losing potentially useful granular information on areas of achievement in non-research-intensive institutions, and this could exacerbate what is perceived to be an already high concentration of research in a small number of institutions. Moreover, aggregating data over very dissimilar UOAs would be difficult and not necessarily helpful.

19. Subjects which are naturally interdisciplinary can be penalised by the current REF if they fall between different units of assessment, and the adjudicating panels do not have the full range of necessary expertise. Therefore the same research could be assessed differently depending upon to which panel it is submitted. Despite the high profile given to funding of interdisciplinary research in policy discussion, a low availability of suitable funding is also often cited as an obstacle. Improved capacity to fully assess the value of such research in the REF could encourage institutions to allocate funding, and researchers to apply for it.

20. The REF does not assess anticipated outputs, other than on the basis of track record. It effectively rewards good investment and activity, and by doing so facilitates the possibility of more of the same. The dual-funding mechanism overall has a future-focused approach to investment through responsive-mode and grant funding albeit generally over shorter time-scales than the REF. This combination of approaches delivers an important degree of resilience. Suggestions to attempt to either include an effective grant-funding element (ie investment against research proposals) or perhaps an assessment of success against specific funded applications as a measure in the REF would add considerable complexity and is likely to be unwieldy for both the assessors and assessed. Timely grant funding decisions are essential and probably not compatible with REF timeframes. However, the environment component of the REF indicates the anticipated institutional conditions for researchers and their encouragement, and this is an important component for investment success.

### 3.2 Recruitment, promotion and selection

21. Some members have expressed concerns about the process through which staff members are internally selected for submission to the REF, which leads to an excessive burden on researchers and sometimes to gaming. Although it is recognised that sampling keeps the amount of outputs to be assessed within manageable limits, it can also generate perverse dynamics in relation to the selection of staff to be returned (see below).

22. Suggestions have been made that all academic staff should be submitted to the REF. This could reduce gaming and relieve the pressure felt by individual researchers, as well as providing a more complete picture of the research taking place in an institution. However, such an approach would require recognition of the role of those who balance research with other valuable tasks such as teaching and administration (see also below), and of the pockets of research excellence existing within larger institutions with a focus on teaching. In addition the extra volume of outputs to be assessed would be an extra burden on the assessment exercise at current staff numbers. Institutions' hiring and retention policies may be further influenced, with consequences that are difficult to predict.

23. Currently, universities have strong incentives to base their recruitment and promotion decisions on expected good performance in the REF, rather than on a more comprehensive evaluation of their broader research needs. This is especially true in the period immediately prior to the REF, sometimes leading to the perverse practice of hiring high-achieving staff towards the end of the REF reporting cycle. Institutions rightly wish to recruit excellent researchers, and researchers often wish to move to new institutions. Neither should be discouraged, but measures should be designed to discourage an effective transfer market in researchers driven by REF. For example, outputs for REF assessment could be linked to the institution at which the research was carried out.

24. Individual researchers' contributions to a REF submission are sometimes equated to their contribution to an institution, and to inform decision about hiring, promotions and performance management. The current aggregate reporting of REF results, which prevents attribution to individual researchers, is welcome. However, although the overall emphasis on conduct of excellent research may be shared across REF and promotion criteria, the latter should be broader and allow for even consideration of researchers and research active staff regardless of their inclusion in REF returns.

25. An emphatic focus on research outputs penalises academic staff whose valuable contributions are not captured by the REF, such as those who contribute to the success of universities by devoting part of their time to teaching or administrative roles. This could be mitigated by for example discounting the number of outputs to be submitted, as is currently allowed for part-time researchers, based on the agreed balance between research and other activities in the job plan of individual academics. A focus on published journal articles as an indicator of a researcher's quality also penalises those with industry experience, whose research experience might not be captured by such outputs, especially in the years before any research impact is REF reportable.

26. A potential unintended influence on the curriculum should also be considered, as a preference for staff working in fields more likely to produce REF-eligible outputs can lead to an imbalance in the disciplines being taught. For example, whole organism biology and disciplines such as taxonomy have been under-valued, and in many cases are no longer taught. This is also leading to students being pushed to choose between molecular and whole organism biology earlier in their studies, rather than maintaining a rounded curriculum. Core skill teaching areas, for example taxonomy and botany, are an important part of rounded curricula, even though research in these areas might result in a lower number of outputs suitable for submission. In order to maintain a lively and successful life sciences research sector, it is important to ensure that a broad array of research areas are supported and taught. It is vital to ensure that incentives do not work against this.

### 3.3 Publications

27. The REF also influences the publication strategies of individuals and groups. In the biosciences it can encourage greater focus on few 'large' publications (which can negatively influence the progress of early-career researchers) and less appetite for reviews or other articles that are less likely to be submitted. This includes the reporting negative results or confirmatory research which generally will find space only in less cited journals, as well as for research outputs other than journal articles.

28. The focus on publishing four high-profile papers for inclusion in the REF can result in several projects being combined into a single paper, for which only a few authors get real credit (see collaborations below). This can reduce attention to papers that will not be submitted but which might be important for the careers of PhD students and early-career researchers. Writing up research results into a paper is a crucial part of a scientist's training, and combining several projects into a single paper denies many of those involved the opportunity to gain such experience. There is also a possibility that researchers who are not returnable to the REF, such as graduate students, might be denied full credit for their work in favour of returnable colleagues.

29. Moreover, the delay that can be caused by such behaviour is at odds with the need for early-career researchers to publish in order to advance in their careers. Pressure to produce publications likely to get

high REF scores can sometimes lead to otherwise valuable research being delayed or held back. Reluctance by academics to invest time in publications that are judged unsuitable for REF submission can also be an obstacle to collaborations between academic and non-academic researchers (see collaborations below).

30. The publication of review papers is currently de facto discouraged by the REF. Although not every review can be counted as an excellent contribution to the body of existing scholarship, good quality reviews summarising, contextualising and distilling existing knowledge are especially valuable for new entrants in the fields and users of research such as those in industry and policy settings. Moreover, critical reviews can be very important in the development of a field, sometimes shifting research paradigms by interpreting existing knowledge in a new light. Good reviews require time and effort, and the REF submission criteria should allow for the recognition of these.

31. Another example of publications that are marginalised by the REF are those reporting negative results. Reporting a lack of association, for example, is not as newsworthy as showing that one does exist, and therefore publication of such results is not currently rewarded. However, deficits in the reporting canon can in turn translate into resources being wasted in pursuit of the same discovery research over again (not for the purpose of replicating and validating findings), and into decisions being based on incomplete or biased evidence.

32. The erroneous perception that publications in high impact factor (IF) journals is a necessary prerequisite for a successful REF submission has affected publishing patterns, and penalises some disciplines. For example soil scientists, anatomists or endocrinologists might feel pushed to publish in higher impact cross-biology journals, which may not be the best avenue for communicating their findings, because they fear being penalised for publishing in discipline-specific journals with a lower IF. It is therefore important that the process of assessment by qualified peers is properly and robustly communicated, and the use of journal impact factor as a proxy for research quality discouraged.

### **3.4 Collaborations**

33. Collaborations, whether across disciplines, sectors or institutions, can produce excellent results and help address many research questions of high societal relevance. However, such collaborations should be a means to advance research, rather than be regarded as an end in themselves. Collaborative research cannot be forced and works best when allowed to form naturally and evolve around specific research questions. Rather than promoting collaborations per se, the REF should foster permissive conditions that allow research to flourish, removing unintended barriers to fruitful collaborations across disciplines, sectors and institutions.

34. Some features of the current REF could act as a barrier to collaborations across different sectors and within institutions themselves. Collaborations across different sectors for example, can be hampered by differing priorities of organisations in different fields. Although the REF might encourage collaborations between academics and research users through rewarding impact beyond academia, we hear that it can also hamper such collaborations if the two sides cannot agree on a research question because some are driven by REF considerations and others are not. For example, universities might prioritise research questions which are more likely to result in publication at the expense of others of practical interest to a commercial partner. In other words, a tension might exist between the excellence of the research as measured by publication in scientific journals and its real world relevance.

35. There is also a danger that the REF could inhibit collaborations by over-incentivising REF performance of individual institutions and competition for papers authorship. In particular, restrictions imposed by the REF on returns by authors of a paper who are in the same institution has potential to disadvantage collaboration within institutions. More clarity and consideration may be required on the eligibility of multi-author outputs, as the current definition of what constitutes a “significant contribution” is unclear. Moreover, anecdotal evidence suggests that different UoAs use different criteria in assessing authors’ contributions. A potential solution would be to request that each author’s role is clearly stated prior

to publication, in order to make it easier to assess the extent of each contribution. This is already implemented by some journals.

### **3.5 Equality and diversity**

36. Achievement of equality and diversity in the higher education sector is fundamentally important, and it is welcome that the next REF will require engagement with the Athena SWAN programme. However, more can be done. The new Athena Swan processes will include the interactive effects of multiple equality and diversity issues. The combination of circumstances such as both maternity leave and a disability or part-time working and a period of leave, has non-additive and long-lasting effects on volume of research but is not a predictor of quality. This is something that the next REF should address, as in the current model it is not clear how complex or multiple considerations should be combined. For example a researcher taking maternity leave, and then returning to work part-time for a period, will get one paper 'discounted' for the maternity leave, but it is then unclear how part-time working is accounted. More generally, better guidance is needed around complex but common factors related to health, parenthood, caring duties and part-time work.

### **3.6 Development of research fields**

37. It has been suggested that there should be specific support for areas of research that can be proved to be under development within the university. This could be achieved for example through a section in the environment section for grading for developing areas, as for impact cases.

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