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Interface Report: Health Research and Social Science

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2 Abstract

In January 2020, The National Centre for Research Methods (NCRM) identified health research as a potential domain for increased engagement regarding social science research methods (Elliot 2020). This document reports on three mini-studies examining aspects of the interface of health research and social science. The three studies are: a survey of top health-social science journals; a survey of funding agendas; and a focused exploration of biosocial research. Each mini-study was a strategic choice and, taken together, they inform an understanding of the interface of health research and social science for the purposes of planning collaborations and strategic engagements. The analysis of journals at the interface highlights the diversity of the topics of interest and the main research areas that contribute to the selected journals. The analysis of funding priorities indicates how cross-disciplinary and cross-sectoral collaboration is widespread at the interface. The exploration of biosocial research highlights existing health research and social science infrastructure, with an analysis of interview data drawing out methodological issues. The report contains suggestions and implications for methods and engagement at the interface.

Keywords: Interface, interdisciplinarity, biosocial, health research, social science, medicine, collaboration

3 Introduction

This document reports on the interface of health research and social science research as part of the engagement strategy for the UK National Centre for Research Methods (NCRM) phase IV (2020-2024). The report aims to outline various intersections between health and social science research, predominantly focusing on the academic sector. The report covers multiple research areas and topics of interest, funders and their agendas and key research infrastructure at the interface, and an analysis of interview data with academics working on biosocial research. The intention is to support the identification and prioritisation of research areas in terms of engagement focused on research methods. The report may also be useful, for example, for academics considering interface research projects and seeking collaborators.

NCRM was funded for a fourth term, running from 2020-2024. In Phase IV there is an increased emphasis on engagement within social sciences, with non-social science disciplines and with stakeholders outside of academia. Possible connections of social science to health research was identified for three primary reasons:

1. Methodologically, health research and social science often focus on individual humans and their actions as a unit of observation.
2. There is widespread recognition in research communities that questions of health and society are intertwined.
3. Research projects and centres often encompass perspectives from both health research and social science (Elliot 2020).

An internal audit found NCRM to have connections to two NHS trusts (Manchester and Tameside) and, in terms of national infrastructure, only Public Health England was stated (Elliot 2020). Subsequently, NCRM has identified health research as an area of immediate interest to explore and develop relationships based around social research methods and research methods training.

To further inform NCRM's engagement strategy, the aims of the report are to:

1. Give an overview of research areas that contribute to health research and social science
2. Outline funding priorities
3. Examine issues of method innovations and interdisciplinarity

The report is structured around three mini-studies to strategically address these aims (see Mason 2011 for a discussion of this approach)[1]. The bulk of the report details the findings from the mini studies. The mini-studies are: i) a survey of health social science journals and categories of research areas ii) an overview of funding priorities of major funders iii) observations and interviews, focused on method innovations, with actors working at an intersection of health research and social science: biosocial research. Presented together, the mini-studies give a picture of research at the interface of health research and social sciences. The final section summarises findings from the investigations and suggests implications for methods engagement at the health research and social science interface.

[1] See also the methodology section

3.1 A note on interdisciplinarity and other terminology

This report is centrally concerned with the interface between different domains of knowledge and what that might mean in terms of disciplines and methods. This means the report is broadly concerned with issues of interdisciplinarity in regards to health research and social science.

There is a varied and ever-expanding critical literature on interdisciplinarity. It is important to begin by discussing disciplines as any concept of "[i]nterdisciplinarity is derivative in nature, for we cannot truly talk of interdisciplinarity until after the creation of disciplines" (Frodeman 2014, p 54). For example, NCRM published a working paper a little over a decade ago with the title *What are Academic Disciplines? Some observations on the disciplinarity vs. interdisciplinarity debate* (Krishnan 2009). The article explores the difficulties of defining interdisciplinarity by reviewing concepts used to understand disciplines from six research areas:

- Cultures and tribes from anthropology.
- Teaching and learning from education.
- Evolution and discontinuity from history.
- Market and organization from management.
- Unity and plurality from philosophy.
- Professionalisation and the division of labour from sociology.

(Krishnan, 2009)

The article indicates the wide range of perspectives on disciplinarity and that even within disciplines there are multiple and not always compatible ways of understanding what disciplines are. The upshot is there is no overall agreed starting place from where to define disciplines and this underdetermination inevitably carries over into concepts of interdisciplinarity.

Furthermore, the work of defining disciplines and interdisciplinarity is not done by academic commentators alone, but also by academic practitioners, collaborators, managers, funders and others. As a result, there are myriad classifications and typologies of interdisciplinarity. Commonly deployed terms tend to be multidisciplinarity, interdisciplinarity and transdisciplinarity. Each term is affiliated with, for example, verbs denoting activities, such as coordinating and sequencing in multidisciplinarity; interacting and blending in interdisciplinarity, and; transcending and transforming in transdisciplinarity (Klein 2017, p. 22). There are different signifiers for degrees of integration, such as composite interdisciplinarity and encyclopaedic interdisciplinarity indicating low integration, or conceptual interdisciplinarity and structural interdisciplinarity indicating higher levels of integration (Klein 2017, p. 22). The three types of interdisciplinarity are typically arranged from low to high levels of integration, with multidisciplinarity being low and transdisciplinarity being the most radical and challenging. There are therefore many different types of disciplinary collaboration that involve different organisational, conceptual and strategic factors.

Another perspective regarding interdisciplinarity examines the rationales for collaboration and the relationships between actors in different projects. For instance, Barry and Born's (Barry et al. 2008; Barry & Born 2013) work argues that a range of logics are involved in initiating and conducting interdisciplinary projects such as increasing accountability, increasing innovation, or rethinking the philosophical assumptions of particular knowledge domains. Interdisciplinary relationships can be arranged: hierarchically, so that labour is divided and one domain provides services to another; reciprocally, so domains integrate and synthesise knowledge; or

antagonistically, so an interdisciplinary project is in self-conscious dialogue with the state of knowledge production often in order "to contest or transcend the given epistemological and/or ontological assumptions of specific historical disciplines." (Barry & Born 2013, p. 12). This is an indication of how the specifics of knowledge production arrangements can vary along different dimensions, and suggests further that the terms related to interdiscipinarity have specific meanings in different contexts. Rather than use the term disciplines, we acknowledge the challenges and difficulties in defining disciplines by using actors' own categories of spaces of knowledge production, which we refer to as research areas or [knowledge] domains.

A related point is a debate regarding the pluralisation of a mass noun: knowledges. The authors discussed the pluralisation of knowledge to knowledges: one of us prefers the former, the other prefers the latter. Using knowledges does ontological work to say there are different kinds of knowledge generated by different methods, materials, practices and philosophies. The pluralisation signals that there are different ways of knowing that are not always compatible and is therefore ethically committed to acknowledging and valuing difference. From this perspective, to generalise and say that there is one knowledge is problematic, like saying there is one language or one culture. On the other hand, the ontological work that pluralisation does may challenge a version or vision of interdisciplinarity – that researchers and collaborators are working to produce an agreed body of knowledge or a consensus. It may also weaken the standing of particular disciplines, for instance if one refers to "sociologies", as it suggests those knowledge structures are multiple and lack coherence. Deploying knowledge or knowledges therefore has important epistemological, ontological and ethical commitments. Where the report employs the term "knowledges", it is with the acknowledgement that some readers may find it awkward at best and self-contradictory at worst.

We also use the term topics of interest. This is used in an effort to capture the idea that knowledge topics may be common to different research areas. Mol (2002) showed how the disease atherosclerosis was single in theory yet multiple in practice, such that the ways that patients', physiotherapists', surgeons' and pathologists' practices all involve different methods and knowledges. Topics of interest is meant to indicate this practical plurality – that there are common subjects of health research and social science, like diseases, but they are investigated and understood using very different methods, some of which may be incompatible.

For the purposes of the report, health research and social science needed broad working definitions of the central terms. Health Research is research focusing on human health, typically with the aim of producing knowledge to improve health. This could include, for example, population health, biological science and health services research. Social science research is research focusing on societal structures and dynamics, covering economic, geographic and social phenomena. Such interests can often be theoretically or empirically entwined with health-related phenomena.

The notion of an interface is used to capture the concept of two large multifaceted and complex systems, that often overlap, encountering one another in specific ways; interface can also be used as a synonym for interaction. There are contestations about what constitutes "health research" and "social science research" and, as shown in the report, manifestations of the combinations of health research and social science are distributed, diverse and manifold. These present particular challenges in terms of definition and scope of exploring the interface. In particular, the health and social science interface could also be seen a product of particular

epistemological and social decisions about how to study phenomena, and the consequential potential for of ontological variance should be borne in mind when reading the report.

4 Methodology

Our initial exploration of encounters between health research and social science highlighted both the scope of and the diversity of the interface and thus that attempting any comprehensive overview of the interface would require more significant resources that were available. We deployed a strategic methodology adapted from "facet methodology" (Mason 2011). Facet methodology can be understood as a collection of mini-investigations, each potentially using different combinations of methods, which illuminate particular, strategically chosen, aspects of the central topic of investigation.

Facet methodology was originally conceived as a way to address the "multidimensionality of lived experience" (Mason 2011, p. 75). Instead of striving for comprehensive coverage of a topic, the methodological approach is orientated to producing studies that "are purposefully created in relation to existing background knowledge and theoretical debate to create flashes of insight" (Mason 2011 p. 80). We drew on facet methodology because of its commitments to multidimensionality and connectivity. In surveying the intersections of disparate research areas like health research and social science, we felt that using a range of methods to highlight aspects of the interface would be a beneficial approach and this report acts as a step towards developing background knowledge in the pursuit of further theoretical insights.

To this end, the report is based on three mini-studies. Our aims and strategic reasons for the choices of subjects and methods are:

1. To generate a "bird's eye" sense of what the research landscape looks like in terms of published topics of interest and the research areas that engage in publishing health research and social science, we designed a survey of journals categorised as "Health (Social Science)" and an analysis of research area categories using data from the web service Scimagojr. This produced evidence on publications, the topics of interest, and the academic research areas that contribute to knowledge production at the health and social science interface.
2. To develop an understanding of the current agendas of funding agencies who fund work at the health research social science interface we surveyed funder websites and their funding streams relating to health and social science research. The emphasis here was to cast light on current priorities in academic research that may indicate areas of oversight, training needs and foresight, particularly in relation to methods.
3. To generate some insight into interdisciplinary working and methods innovations at the interface we focused on one area: biosocial research. The aim here was to explore issues of collaboration and innovation as the term biosocial indicates an integration or combination of biological knowledge and social knowledge, with strong connections to health research. This investigation involved data from websites, a review of selected academic literatures and a series of nine interviews.

As well as developing the mini-studies we employed a method of "following the actors" (Latour 1987) to pursue particular points of interest, be they research areas, concepts or human actors, across the different studies. Consequently, the mini-studies informed one another as they were carried out alongside one another. Findings in one area influenced directions in another area. Initially, the research focused on biosocial research as we had begun discussing interdisciplinarity

and methods before the production of the engagement strategy. This generated a preliminary survey of funders and actors, but our focus was later broadened out to “health research and social science” because, in discussion with NCRM members, there was the potential for engagement with a broader range of actors. This meant that the mini-study on funding was separated from the biosocial study and discussed separately as it grew larger in scope. More detail is given about the specific methods in the relevant sections. Having given a brief overview of our approach, the next three sections report the findings from each mini-investigation.

5 Mini-study A: An overview of research areas and topics

The aim of this mini-study is to give an overview of the health research and social science interface by charting which research areas contribute to knowledge production at the interface and to identify some of the key topics of interest.

5.1 Method

The method we used was to identify the journals that could be considered to be at the health research and social science interface. We then identified the main topics of interest and the research areas contributing to each journal using website data from both a journal ranking webpage and the specific journal's scope.

The journal ranking classification service Scimagojr was the initial source for the data.

> *The SCImago Journal & Country Rank is a publicly available portal that includes the journals and country scientific indicators developed from the information contained in the Scopus® database (Elsevier B.V.)… This platform takes its name from the SCImago Journal Rank (SJR) indicator (PDF), developed by SCImago from the widely known algorithm Google PageRank™. This indicator shows the visibility of the journals contained in the Scopus® database from 1996*[2]*.*

Scimagojr.com[3] has a range of metrics associated with journals, including how publications are produced in particular timeframe, the journal's h-index, and how many citations articles get under defined conditions. Scimagojr's produces its own ranking, using a composite of measures, which they define as "a measure of journal's [sic] impact, influence or prestige"[1]. Scimagojr also publishes the h-index for each journal. The h-index (after Jorge E. Hirsch) is the number of articles a given author or journal has published and the citations for those papers, where *h* = number of papers = number citations. The terms used by Scimagojr's to define their own measure, for instance, impact and prestige, may not be synonymous so we used the listed h-index to rank the journals because it is a standardised measure.

A limitations of using the h-index as an indicator of impact is that the maximum number of *h* is denoted by the number of publications, so journals which publish smaller numbers of papers cannot reach high values and the approach may overlook those journals that publish fewer, widely cited papers (see Costas and Bordons, 2007 for this argument about authors). For the purposes of providing an indication of the topics and research areas at the interface, however, these limitations were considered acceptable because we were not trying to identify absolute measures. Instead, we were using top ranked journals as access points to sketching a broad interdisciplinary space.

[2] https://www.scimagojr.com/aboutus.php
[3] https://www.scimagojr.com

Scimagojr has its own subject classification system and categorises journal subjects at two levels. The top level, *subject areas*, covers broad research areas, such as medicine or social science. The second level, *subject categories*, divides the top level into subclassifications. For example, the subject area medicine contains the subject categories epidemiology and oncology and the subject area social science includes anthropology and social work. An advantage is that Scimagojr lists multiple subject categories for many journals, enabling the cross-referencing of research areas that publish in any particular journal. A second advantage was that one of the subject categories in subject area of social science is "Health (social science)". This meant it was possible to filter the journals according to this one subject category and, for each journal entry, cross-reference other subject categories that appeared with it.

Categorising research domains produces partial and contingent ontologies and almost any specific ontology could be otherwise. Both points influenced our decision to use Scimagojr's own native categorisation rather than attempt to fit the journals into our own or some other contestable ontology. However, the classification system is not without problems. Primarily, it is not clear how the typology (which is based Elsevier's), has been generated. For instance, the research area "economic, econometrics and finance" is not considered to lie within the subject area of "social science", but is its own separate subject area. And, there is a subject category "sociology and political science", which might be considered too diverse to be useful for some practitioners. Psychology is its own subject area. However, regardless of way the website classifies research areas, the subject category level does broadly align with terms associated with departments and schools within the western university system, well-known disciplines and degree-level educational programmes. We felt it would therefore provide a good indication of which research areas were contributing to knowledge at the interface.

We selected the top ten percent of journals, rather than a random selection, because we felt these would best represent the field in terms of the publishing connections between research areas and domains. The top ten percent have an h-index of between 63 and 229, which suggests a good coverage of influence and also suggesting that there is some stability at the top level because higher h-index values take time to accrue. We felt that, due to the connections we were looking for, that marginal journals may skew the results towards unusual combinations of research areas, rather than giving a picture of the health research and social science interface. However, we also note that due to different research areas having different conventions regarding attribution of authors, citation of other works, and publishing expectations, journals with low h-index scores may be a feature of those cultural practices. Therefore, we suggest caution when approaching generalisation from this sample because this is a non-probability sample.

The data were generated in the following steps:

1. Journal titles were filtered using the subject category: "Health (social science)".
2. Journals were ranked according to h-index.
3. Weekly journals published by the Centre for Disease Control in the US were excluded because they were health "surveillance" publications rather than academic publications.
4. The top ten percent journal titles (n =30) were selected and recorded (see Appendix I).
5. For each of the titles the journal page on scimagojr was visited and any other subject categories recorded in a flat database (In MS Excel; see Appendix II).
6. The journal websites were then visited and the journal scope copied into the database and analysed.

7. Additional subject areas or subject categories found in the journal aims and scope[4] were added to the database (red 'X's)[5]
8. Journals were grouped according to title and scope.
9. A sociogram was generated showing the co-occurrence of subject classifications.

5.2 Findings

5.2.1 Subject classifications

The analysis generated a list of the subject categories using Scimagojr's classification system. In the table below, the subject categories are ranked according to the number of times they were mentioned in a Scimagojr entry for a journal or if they were mentioned in the journal's "aims and scope" text.

The top five subject categories by mentions account for 41% (52 of 126) of the total mentions. These five subject categories fall within three different subject areas within Scimagojr's classification:

Subject area	Subject classification
Medicine	"Public health, occupational health and environmental health" "Medicine (misc.)"
Psychology	"Social psychology"
Social science	"Sociology and political science" "Social work"

In total, 42 mentions are from the medicine subject area, 39 mentions are from the social science subject area, and 19 from psychology. This leaves 26 mentions from the humanities, nursing, computer science, biochemistry and genetics, environment sciences, and health professions. The main point from the table is the diversity of research areas that can be identified as contributing to journals that publish health research and social science.

To explore the relations between the research areas we identified, we mapped the co-occurrence of research areas within the journal sample. This gave a sense of which research areas publish in the same places and, by inference, are more closely connected in terms of scholars talking to one another. The sociogram (Figure 1) indicates the number of mentions (size of the nodes) and the co-occurrence of different bilateral combinations of subject classifications (the ties).

[4] Journals usually describe themselves with a paragraph. They use different names for this paragraph including: scope, about, aims and scope, objectives and so on.
[5] For example, the Scimagjr entry for the journal Social Science and Medicine, listed three subject classifications: History and philosophy of science, medicine (misc), and health (social science). Reading the scope of the journal further indicated: Economics, epidemiology, social psychology, anthropology, geography & planning, sociology and political science.

Table 1. Subject categories intersection with the category "Health (social science)"

Rank	Subject category	No. of mentions
1	Public health, environmental health & occupational health	18
2	Sociology & political science	12
3	Social Psychology	10
4	Medicine (misc)	7
5	Social work	5
6	Economics, econometrics and finance (misc)	4
7	Epidemiology	4
8	Geriatrics and gerontology	4
9	Psychiatry & mental health	4
10	Arts & Humanities (misc)	3
11	Gerontology	3
12	Applied psychology	3
13	Developmental and education psychology	3
14	Anthropology	3
15	Geography, planning & development	3
16	Life-span & life-course studies	3
17	Social sciences (misc)	3
18	Health Professions (misc)	2
19	Health policy	2
20	Behavioural neuroscience	2
21	Neurology	2
22	Issues, Ethics and Legal aspects	2
23	Toxicology	2
24	Neuropsychology and physiological psychology	2
25	Demography	2
26	Education	2
27	Law	2
28	History and philosophy of science	1
29	Biochemistry	1
30	Ageing	1
31	Ecology	1
32	Environmental science (misc)	1
33	Health, Toxicology and mutagenesis	1
34	Infectious diseases	1
35	Pathology and forensic medicine	1
36	Community and home care	1
37	Clinical psychology	1
38	Communication	1
39	Criminology	1
40	Library and information science	1
41	Urban Studies	1

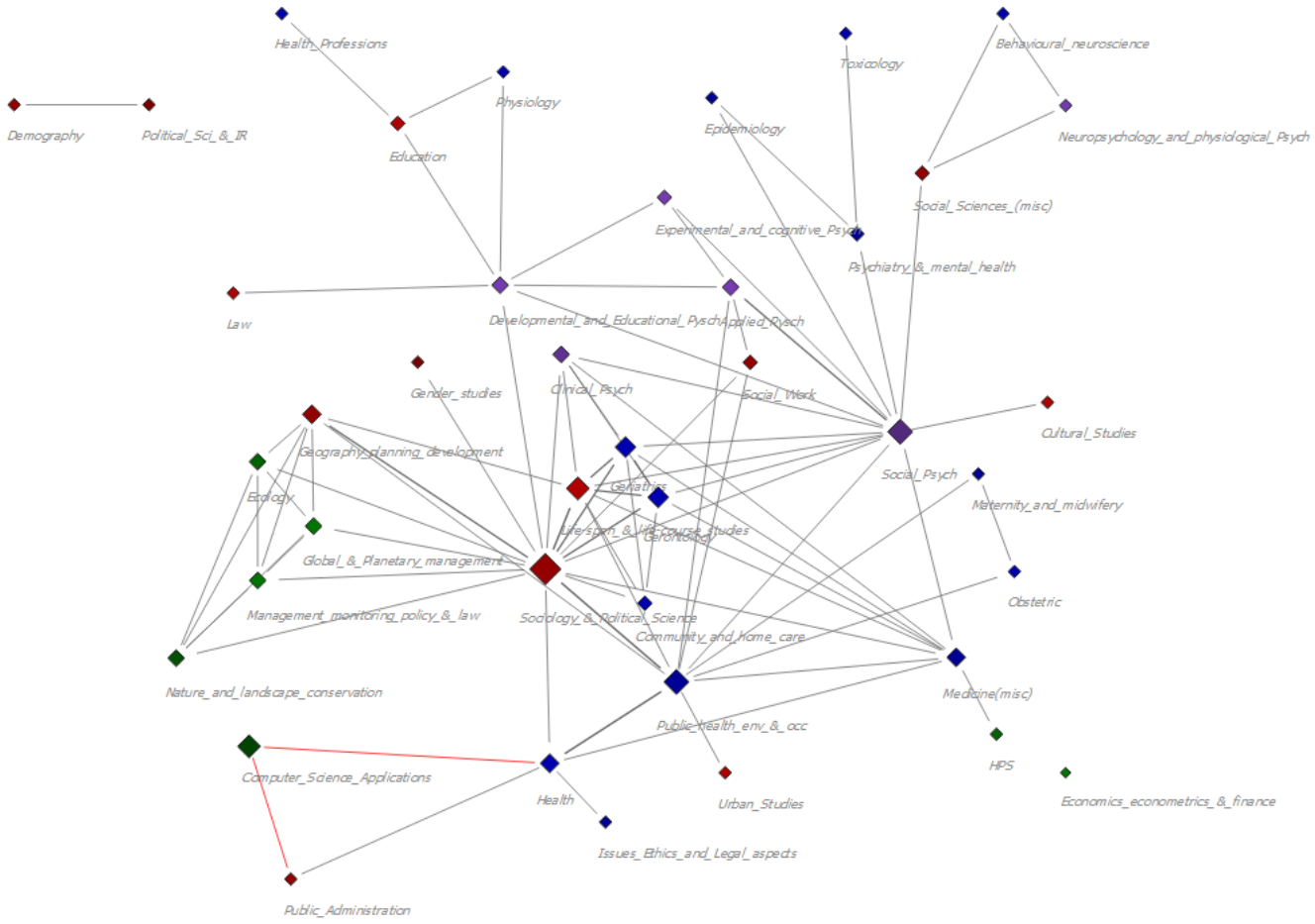

Figure 1. Sociogram of subject category co-occurrence in Health (Social Science)

There are clusters around sociology and political science, social psychology and public health. Those three disciplines form the core of the network Public health links more strongly to sociology and political science than to social psychology. Sociology and social psychology are mainly linked by a “diamond” of age-based subject classifications, indicating that publications on ageing facilitate particular combinations of collaborations. To the left is a cluster of environmental subject classifications, linking mostly with sociology and political science. Top and top right are connections from psychology to other subject classifications.

5.2.2 Topics of interest

The titles and scopes of journals indicate the particular topics they focus on. A close reading of the titles and scopes, identifying the particular topics of interest, allowed us the segment the journals into ten categories of topics. They are presented in Table 2 below, where they are ordered by h-index of the highest ranked journal in that topic (the top thirty journal titles ranked according to h-index on Scimagojr are presented in Appendix I.)

Table 2: Topics of interest of the top thirty journals in the subject category "Health (social science)"

Rank	Journal Title	h-index
General		
1	Social Science and Medicine	229
Age and Ageing		
2	Journal of Gerontology - Series B Psychological Sciences and Social	142
16	Future of Children	80
18	Ageing and Society	77
24	Journal of Aging and Health	71
25	Archives of Gerontology and Geriatrics	70
Alcohol and drugs		
3	Journal of Studies on Alcohol and Drugs	122
4	Tobacco Control	117
17	Alcohol	78
21	Substance Use and Misuse	76
26	Drug and Alcohol Review	70
Mental health and psychology		
5	Social Psychiatry and Psychiatric Epidemiology	116
6	American Journal of Community Psychology	109
30	Community Mental Health Journal	63
Environs		
7	Health and Place	101
12	Journal of Urban Health	86
28	Human Ecology	67
Disciplinary affiliation		
9	Sociology of Health and Illness	92
19	British Journal of Social Work	77
27	Journal of Medical Ethics	69
AIDS & HIV		
8	AIDS Care - Psychological and Socio-Medical Aspects of AIDS/HIV	92
22	AIDS Education and Prevention	71
Health promotion & communication		
10	American Journal of Health Promotion	87
13	Health Promotion International	82
15	Journal of Health Communication	81
29	American Journal of Health Behavior	64
Disability studies		
11	Journal of Learning Disabilities	86
23	Disability and Society	71
Violence		
14	Violence and Victims	82
20	Trauma, Violence and Abuse	77

It is possible to gain an idea of how the social sciences intersect with health concerns by examining these topics of interest. There is one journal in the general category (*Social Science and Medicine)* and this journal is ranked the highest according to *h-index*. Of the remaining nine categories, just one is focused on disease: the AIDS & HIV category. This may be linked to the initial framings during the emergence and identification of HIV/AIDS in the USA as being a disease of lifestyle or behaviour, which meant social and behavioural research began early (Fee & Krieger, 1993). If this is correct, despite the early narrow focus on homosexuality, social research contributions to understanding HIV/AIDS may have established themselves for this particular syndrome.

The other eight categories are focused on other phenomena, which have the potential to greater or lesser degrees, to intersect with health. Thus, health communication and promotion is clearly closely linked to sharing understandings of disease and best practices for improving health. Meanwhile, other categories like age and ageing, disability studies and violence, can be closely related to health, but may also be related to other phenomena. Age and ageing, for example, may be related to changes in perception and cognition, affect, or social arrangements, rather than being restricted to health aspects of ageing. Thus, the categorisation suggests that there are many journals which publish research on health that are not primarily health-focused.

5.3 Discussion

The aim of this mini-study was to give an overview of research areas and topics of interest. It indicates that there is a wide range of topics of interest as evidenced by the ten categories of journal foci. All the topics appear to indicate that a variety of research areas have been able to conceptualise that particular topic within their own methodological frameworks[6].

Furthermore, there is a wide representation of different research areas involved in knowledge production and publication at the health research and social science interface. The top subject categories in terms of their apparent contribution to the top thirty journals are:

- Public health, environmental health and occupational health (Medicine)
- Sociology and political science (Social sciences)
- Social psychology (Psychology)
- Medicine (Misc.) (Medicine)
- Social work (Social sciences)

There is a notable absence or under representation of topics or subject categories focusing on animal health, veterinary science and ecological and environmental studies. This suggests that the health (social science) category is largely separate from these areas of research. Health may be conceived in ways that are not readily related to social science knowledge and methods, and health may instead be related to other knowledges and methods, such as biology, climatology, ecology and meteorology.

There are limitations with this method. We acknowledge that the classifications used by Scimagojr are particular and open to debate. The ranking was done using one filter and it is likely that other

[6] As a counterexample, we might consider the subatomic theoretical particles “quarks”, which have been well conceptualised within physical science communities, but have significantly less development by other research areas.

journals and research areas could be identified using different ranks and metrics. Public health journals, for instance, are absent from the journal list because “public health” is classified as a subject category and many public health journals therefore do not need a “health (social science)” designation. The numbers of mentions in the cross-referencing gives no indication of the qualities of those interactions or the qualities of relationships between research areas.

Notwithstanding those limitations, the study provides an overview which will orientate the reader as to the research areas that contribute to publishing at the interface and the main topics of interest that make up that interface.

6 Mini study B: Funding Priorities

The second mini-study investigates the UK funders of research at the health research and social sciences interface on the assumption that they both reflect the current priorities in ongoing research and imminent, yet-to-be-funded research and would thus offer insight into research trends in the UK. As with the first study, the aim is not to be comprehensive and account for all funding in the UK, but to indicate potential themes that will inform understanding and engagement.

6.1 Method

The method involved two main steps. The first step was to identify funders using web searches on the Google search engine and through soliciting responses from colleagues (a convenience sample of colleagues with expertise in interdisciplinary spaces including medical sociology, science and technology studies, and health-related research, n = 6) in terms of organisations and actors who were important at the health research and social science interface. The funder's websites were analysed including the funder's remit, identifying previous calls for research and current funding priorities and projects. Where funders were not primarily in the social sciences or humanities, the websites were analysed to confirm social science relevant funding. Conversely, where they were more orientated to social sciences, the aim was to identify for support in topics related to health research. This process involved different processes on different sites, depending on what was available. It included reading current funding programme descriptions, research priority statements, project titles, project descriptions as well as past or archived information where possible and relevant.

The method identified large public and third sector organisations, but some organisations were excluded. There is a large range of disease- and health- orientated charities, such as Cancer Research UK[7], British Heart Foundation[8] and The Alzheimer's Society[9], who support health research and may work at the interface, but who are not included in the report because social science is not clearly identified on their websites[10]. Similarly, in research plan for NHS England (2017) there are indications that social science could be involved in their research, in innovation and public involvement for example, but it is not clear whether work has been or is currently funded.

Step 1 identified public and third sector funders of research at the health research social science interface were:

- UK Research and Innovation (UKRI), which is made up of seven research councils, Research England and Innovate UK, and are mainly sponsored by the Department for Business, Energy and Industrial Strategy (BEIS)[11].

[7] https://www.cancerresearchuk.org/our-research-by-cancer-topic
[8] https://www.bhf.org.uk/what-we-do/our-research
[9] http://alzheimers.org.uk/research/our-research/what-research-alzheimers-society-funding
[10] Since the primary research was conducted NCRM has been approached by a third sector group called the Knowledge-Evidence Network (KEN), which largely operates in the health research space. This interaction has confirmed the difficulties in identifying social research in the third sector using our method and indicates that interactional approaches could be developed.
[11] https://www.ukri.org/about-us/who-we-are/ (accessed: 5th Feb 2021)

- the National Institute of Health Research (NIHR), which is primarily funded by the Department of Health and Social Care, but also receive UK aid funding to support research in low- and middle- income countries[12].

The funders that were not publicly-funded quangos and were identified as funding research at the health research social science interface were:

- The Wellcome Trust
- The Leverhulme Trust
- The Nuffield Foundation

The second step involved further analysis of the funders identified in step 1. The aim was to analyse their programmes and priorities.

6.2 Findings

6.2.1 Public funding priorities

Six of the seven UKRI research councils were found to contribute to health research and social science. Of those, the Art and Humanities Research council (AHRC), Biotechnology and Biological Sciences Research Council (BBSRC), Economic and Social Research council (ESRC), Medical Research Council (MRC) and the Natural Environment Research Council (NERC) were found to have current interests at the health research social science interface. The main evidence NERC was involved in research at the interface was a cross-funder initiative that ran from 2006 to 2010 on environment and health, although that initiative had two successor programmes with less clear social components. However, they also announced funding in 2019 as part of the Belmont Forum[13], which is an international partnership of funding councils and agencies aimed at collaborative knowledge production related to global environmental change[14].

The following themes were identified as priorities[15] for funding that were related to health research and social science in the relevant research councils:

- AHRC
  - Communities (Connected Communities[16] is a cross-council programme AHRC are leading to understands historical and cultural changes in communities)
  - Antimicrobial resistance
  - Environment
- BBSRC
  - Healthy ageing.
  - Animal health
    - In agriculture
    - In research
  - Food and nutrition

[12] https://www.nihr.ac.uk/about-us/ (accessed: 5th Feb 2021)
[13] https://www.belmontforum.org/news/climate-environment-and-health-awards/ (last accessed: 14th March 2021)
[14] https://www.belmontforum.org/about/ (last accessed: 14th March 2021)
[15] It was often not possible to ascertain whether funding past or current. For instance, some funded projects run for years after the close of a funding call
[16] https://connected-communities.org (last accessed: 14th March 2021)

    - One Health[17]
    - Antimicrobial resistance
    - Epigenetics[18]
- EPSRC
    - Lifelong health and wellbeing (cross council initiative ended in 2015)[19]
    - Healthcare technologies
    - Regenerative medicine platform
- ESRC
    - Public health
    - Mental health
    - Health inequalities
    - Lifecourse and health
    - Health data
    - Economics and market
- MRC
    - Global health and international partnerships
    - International health and global health inequalities
    - Methodology research
    - Infections and immunity
    - Molecular and cellular medicine
    - Neurosciences and mental health
    - Population and systems medicine
    - Translational research.
- NERC
    - Food
    - Heat (climate)
    - Infectious disease

The summary list shows a wide range of specific priorities across the research councils. Many of these themes overlap with one another, for instance: ageing, public health, health inequalities can all contain elements of one or more of the others.

Significantly, there are many cross-council initiatives that are related to health research. While it was not possible to identify a UKRI-level summary of cross-council funding in the study period, the AHRC lists six cross-council initiatives in which it is involved, four of which it was possible to connect to health research and social science, and from where it was possible to identify the lead research council:

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[17] The World Health Organisation defines "One Health" as "an approach to designing and implementing programmes, policies, legislation and research in which multiple sectors communicate and work together to achieve better public health outcomes. The areas of work in which a One Health approach is particularly relevant include food safety, the control of zoonoses (diseases that can spread between animals and humans, such as flu, rabies and Rift Valley Fever), and combatting antibiotic resistance (when bacteria change after being exposed to antibiotics and become more difficult to treat)." https://www.who.int/news-room/q-a-detail/one-health (last accessed: 10th Mar 2021)

[18] A top level definition of epigenetics is: "Epigenetics is an area of biology that describes the study of heritable changes in gene expression that does not involve changes in the DNA sequence." https://www.imperial.ac.uk/department-surgery-cancer/research/cancer/research-areas/epigenetics/ (last accessed: 10th Mar 2021)

[19] https://mrc.ukri.org/research/initiatives/lifelong-health-wellbeing/

- Connected communities[20] (led by AHRC)
- Lifelong health and wellbeing[21] (led by MRC; ended in 2015)
- Antimicrobial resistance[22] (led by MRC)
- Digital economy[23] (led by EPSRC)

These cross-council initiatives are evidence that research at the interface of health research and social science intersects with, or falls between, the remits of many research councils.

The UK has a separate agency, the NIHR, with the remit of funding health research. The NIHR is the largest funder of UK health research and has a range of funding programmes[24]. Several of their programmes, listed below, either explicitly state or imply the involvement of social science and we discuss these further below. The others may involve social research methods, but it was not possible to confirm from our analysis.

- Efficacy and Mechanism Evaluation
- Evidence Synthesis
- Health Services and Delivery Research
- Health Technology Assessment
- Invention for Innovation
    - Artificial Intelligence Health and Care Award
- Policy Research Programme
- Programme Development Grants
- Programme Grants for Applied Research
- Public Health Research
- Research for Patient Benefit
    - Research for Social Care

NIHR separates the *evidence synthesis* programme into two strands. First, they fund the infrastructure costs of the *Cochrane Review Groups*. Cochrane is an international organisation for supporting decision making in healthcare[25]. Second, the NIHR provides support for reviews of methodologies through the *Complex Review Support Unit*[26], a collaboration led by the University of Glasgow which provides specialist expert advice on methodological fields such as:

- Diagnostic Test Accuracy
- Network Meta-Analysis
- Individual Patient Data/Clinical Study Report Meta-Analysis
- Causal Pathway Analysis
- Economic Evaluations
- Non-randomised studies
- Prognostic reviews

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[20] https://ahrc.ukri.org/research/fundedthemesandprogrammes/crosscouncilprogrammes/connectedcommunities/
[21] https://mrc.ukri.org/research/initiatives/lifelong-health-wellbeing/
[22] https://mrc.ukri.org/research/initiatives/antimicrobial-resistance/tackling-amr-a-cross-council-initiative/
[23] https://epsrc.ukri.org/research/ourportfolio/themes/digitaleconomy/
[24] https://www.nihr.ac.uk/explore-nihr/
[25] https://www.cochrane.org/about-us
[26] http://www.nihrcrsu.org

- Prevalence reviews
- Realist synthesis
- Qualitative Analysis
- Use of routine data.

There may be overlap with review methodologies and social research methodologies and a prospective engagement with specific Cochrane Review Groups and the Complex Review Support Unit may suggest possibilities for future engagement.

The *Health services and health delivery research* programme specifically deals with:

- "research into any aspect of health and social care service quality, accessibility and effectiveness, as long as its importance to the NHS and social care can be clearly demonstrated."
- any methodology as long as it is appropriate, proportionate and likely to answer the research questions – which must relate to health service and social care issues"[27]

This is likely scope for social research methods in this programme, and further knowledge of current methodologies and projects may indicate the ways that NCRM can engage with NIHR in terms of health services.

Artificial intelligence funding. Machine learning and AI are finding their place in many aspects of organisations administration and bureaucracy. There are three NIHR funding streams that relate to AI – AI in health and care, multiple long-term conditions, and racial and ethnic inequalities[28]. Each of these suggest intersections with other topics of interest that we identified in mini-study A.

There is therefore scope for NCRM to identify the uses of AI in health and the intersection with social research methodologies. There may be methodological innovations in this space that are indicative of and relevant for collaborative training opportunities.

The *Programme Grants for Applied Research and Programme Development Grants* are taken together here as the latter is in place to lead to the former. The aim of the programme grants is to:

> *…deliver research findings that will lead to clear and identifiable patient, service user or carer benefits, typically through promotion of health and wellbeing, prevention of ill health, and optimal disease management (including safety and quality).*[29]

It is a researcher-led scheme that can be on any topic within applied health research and social care research (including health services research; public health research; social care research; economic evaluations; and modelling). The funding is methodologically diverse, ranging from qualitative and observational research, to applied epidemiology, using secondary data. However, the work must be applied to the NHS, public health or social care, and it would therefore be useful to understand how social research methodologies might be implementable in this space. It may be useful to engage with the NIHR to explore interdisciplinary collaboration in this space.

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[27] https://www.nihr.ac.uk/explore-nihr/funding-programmes/health-services-and-delivery-research.htm
[28] https://www.nihr.ac.uk/explore-nihr/funding-programmes/ai-award.htm
[29] https://www.nihr.ac.uk/explore-nihr/funding-programmes/programme-grants-for-applied-research.htm

The *Public Health* programme funds research to generate evidence to inform the delivery of non-NHS interventions, specifically, we provide new knowledge on the benefits, costs, acceptability and the wider impacts of non-NHS interventions intended to improve the health of the public, and reduce inequalities in health. This is particularly an evaluative strand of funding which aims to understand the potential for adapting existing interventions or assessing the feasibility of optimised interventions[30]. Thus, any social research methods in this stream will be orientated towards evaluation. Evaluative methods may be a space for connection between NCRM and NIHR. The Research for Patient Benefit programme will support[31]:

- Research into the provision and use of NHS services.
- Effectiveness and cost effectiveness evaluations of interventions.
- Research that examines the resource use of alternative means for healthcare delivery.
- Feasibility research to support applications for major awards to other funders.
- Development and refining of new interventions, scales or outcome measures.
- Research to explore the potential for improving patient health and wellbeing through needs assessments, methods development and exploratory studies.
- Evidence synthesis and systematic reviews.

There appears to be overlaps between the NIHR funding programmes. However, what is notable is that they are all orientated to improving health, healthcare and health services. NIHR have recently run themed calls on the following topics[32]:

- Antimicrobial resistance (closed 2013)[33]
- Dementia (closed 2011)[34]
- Medicinal cannabis (closed 2019)[35]
- Prevention and treatment of obesity (closed 2016)[36]
- Primary Care interventions (closed 2013)[37]
- Promotion of good mental health and the prevention or treatment of mental ill health (closed 2018)[38]
- The management of chronic pain (2018)[39]
- Complex Health and Care Needs in Older People (2017)[40]
- Frailty (2018)[41]
- Long Term Conditions in children (closed 2014)[42]

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[30] https://www.nihr.ac.uk/explore-nihr/funding-programmes/programme-grants-for-applied-research.htm
[31] https://www.nihr.ac.uk/explore-nihr/funding-programmes/research-for-patient-benefit.htm
[32] https://www.nihr.ac.uk/explore-nihr/funding-programmes/themed-calls.htm
[33] https://www.nihr.ac.uk/documents/antimicrobial-resistance-2013/11950
[34] https://www.nihr.ac.uk/documents/applied-health-research-on-dementia-2011/11953
[35] https://www.nihr.ac.uk/documents/themed-call-cannabis-based-products-for-medicinal-use/24043
[36] https://www.nihr.ac.uk/documents/themed-call-prevention-and-treatment-of-obesity/11948
[37] https://www.nihr.ac.uk/documents/themed-call-primary-care-interventions/24075
[38] https://www.nihr.ac.uk/documents/themed-call-promotion-of-good-mental-health-and-the-prevention-or-treatment-of-mental-ill-health-2017/24062
[39] https://www.nihr.ac.uk/documents/the-management-of-chronic-pain/11923
[40] https://www.nihr.ac.uk/documents/themed-call-complex-health-and-care-needs-in-older-people/24074
[41] https://www.nihr.ac.uk/documents/improving-the-outcomes-of-health-and-social-care-for-frail-people-and-their-carers/11658
[42] https://www.nihr.ac.uk/documents/themed-call-long-term-conditions-in-children-and-young-people-2014/24073

- Multimorbidities in older people (closed 2015)[43]

Five of the eleven calls are related to age and ageing[44], four are primarily focused on therapies and drugs, one is focused on mental health and one on obesity.

Although the NIHR is the largest funder, their projects and research appear to be often funded in collaboration with other funding bodies, including those in the third sector. Perhaps the most notable collaboration from the perspective of social research methods is the *MRC-NIHR methodology programme*[45]. This programme includes medical and health research methodologies such as:

- Health economics and decision science
- Trial design, biostatistics and mathematical modelling
- Bio and health informatics and computational modelling
- Epidemiology and public health (including geography)
- Behavioural sciences and health psychology
- Social Sciences (including sociology and anthropology)
- Organisational/management science
- Qualitative and health services science
- Ethics and law

MRC offers a broad definition for methods, specifying that research methods can be in disciplines underpinning health research such as trials, cohorts, experimental medicine and behavioural and social sciences, as well as methods for regulation or for developing valid measures for health[46]. There is therefore an explicit overlap between health research and social research methods and engaging with funded studies in this space and this may itself indicate training needs and capacity building opportunities.

6.2.2 Third sector funders

We identified three main funders in this sector for inclusion in the report, the Wellcome Trust, the Leverhulme Trust and the Nuffield Foundation.

The Wellcome Trust is an independent global charitable foundation with a £29bn investment portfolio and directs about £1bn per year to research, with the stated mission:

> *We support discovery research into life, health and wellbeing, and we're taking on three worldwide health challenges: mental health, global heating and infectious diseases.*[47]

The Trust have recently published a new strategy with funding calls opening in summer 2021. They have five funding areas:

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[43] https://www.nihr.ac.uk/documents/themed-call-multimorbidities-2015/24059
[44] This is consistent with the UK government's identification of the ageing society as a Grand Challenge https://www.gov.uk/government/publications/industrial-strategy-the-grand-challenges/industrial-strategy-the-grand-challenges
[45] https://mrc.ukri.org/funding/science-areas/methodology-research/remit/
[46] https://mrc.ukri.org/funding/science-areas/better-methods-better-research/remit/
[47] https://wellcome.org/about-us (accessed: 2nd Feb 2021)

- Biomedical science
- Population health
- Product development and applied research
- Humanities and social science
- Public engagement and creative industries

Social research methods could be involved in at least three of the funding areas – population health, humanities and social science, and public engagement and creative industries. There is already cross-fertilisation and methods adaptations between the latter areas in other sectors so exploring methods innovations and trends at these intersections could be fruitful for NCRM.

The Leverhulme Trust is philanthropic charitable organisation with a wide funding portfolio. The Trust is explicit about its role in funding research and says:

> *The Trust seeks to fund outstanding scholarship, while maintaining a distinctive role within the research funding landscape…*
>
> *[T]he Trust does not work within a disciplinary framework, and we particularly welcome proposals that are not bound by conventional disciplinary understandings.*[48]

The Trust has a range of funding schemes that are, for example, at career stage (Early Career Fellowship, Professorial), by centre or project, or for prizes and travel. They classify their funded projects as: science, humanities or social science. They fund research at the health research social science interface, for instance: Dr Dieuwertje Dyi Huijg (University of Roehampton, Early Career Fellowship 2020): ADHD women: resisting a neuronormative world[49].

Due to the deliberate positioning of the Leverhulme Trust as an unconventional funder, there exist possibilities for creative research engagements and interdisciplinary interactions in this space. Further investigation into Leverhulme's projects would be a way for identifying potential for NCRM's engagement.

Finally, The Nuffield Foundation is a funder of studies at the health research and social science interface. The website says:

> *We are an independent Foundation with a mission to advance educational opportunity and social well-being.*[50]

Among their funding programmes they have a specific fund, the Oliver Bird Fund, which is £12.5 million for research on musculoskeletal conditions. This is a broad area of research covering conditions such as arthritis, pain and rare autoimmune diseases. The funding is available in three streams: national-level administrative and longitudinal data analyses; local level data integration; interdisciplinary research for public health and social well-being. In terms of social research methods, the first and last seem to be most relevant. The studies funded under this scheme may involve method development to address the national-level and interdisciplinary questions of

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[48] https://www.leverhulme.ac.uk/funding/our-approach-grant-making (accessed: 4th Feb 2021)
[49] https://www.leverhulme.ac.uk/early-career-fellowships/adhd-women-resisting-neuronormative-world%C2%A0 (accessed: 6th March 2021)
[50] https://www.nuffieldfoundation.org (accessed: 4th Feb 2021)

musculoskeletal conditions. NCRM should identify the studies and establish initial connection with lead academics.

Within their Welfare funding stream, they list public health as a funding area, with the aim and explanation:

> *to improve understanding of the relationship between people's mental and physical health and their social and economic outcomes…*
>
> *Our public health research explores the social and economic implications of physical disability, mental ill health and chronic illness. For example, the relationship between people's health and their income, quality of life, and family circumstances.*
>
> *We also want to understand more about health inequalities; for example, the impacts of ethnicity, socioeconomic status or geography, and what policy options might address them.* [51]

In summary, the Nuffield Foundation funds public health research and research investigating the relationships between health and socioeconomic factors and health inequalities, as well as prioritising musculoskeletal conditions and ethics of medicine and biology. As a final note, The Nuffield Council on Bioethics is jointly funded by the Nuffield Foundation, Wellcome and MRC, which is "an independent body that informs policy and public debate about the ethical questions raised by biological and medical research.[52]

6.3 Discussion

This mini survey of UK-based funders of research at the health research and social science interface shows the breadth of funding priorities. The funding priorities indicate a comparable diversity to that identified in mini-study A. They also highlight overlaps between and across funding themes and organisations. For instance, antimicrobial resistance (AMR) features across several funders. One of the key insights is the division of labour of the publicly funded organisations of UKRI and NIHR. The former is orientated to academic research and the latter is orientated to improving health outcomes and is more closely affiliated with the NHS and social care sectors. This means that engagement activities need to be sensitive to the different ethical commitments of funders.

One of the main points is the range of collaborative funding initiatives set up to the tackle research at the interface. This limited survey shows that funding collaborations include cross-council, inter-agency and public-third sector combinations. For instance, the methodology programme by MRC and NIHR, the Nuffield Council on Bioethics funded by the Nuffield Foundation, Wellcome Trust and MRC, and the theme of AMR all involve co-funding and often have a lead agency. This suggests that health-related research does not fit neatly into existing organisational structures and often requires collaboration to address specific issues. The evidence of collaboration funding collaboration further indicates the different knowledges required to address health issues and

[51] https://www.nuffieldfoundation.org/research/welfare/public-health (accessed: 4th Feb 2021)
[52] https://www.nuffieldbioethics.org (accessed: 4th Feb 2021)

contemporary changes in the academe to orientate research increasingly to societal problems (Gibbons et al. 1994).

The MRC's programme on Translational Research signposts this change because "bench to bedside" research implies a relation between science and society that serves to highlight the contemporary importance of delivering societal benefits emerging from biological, biomedical and medical research. The Cooksey Report (2006) led to restructuring the UK's health funding priorities and organisational landscape and, in part, was orientated to increasing the use and application of research for improving health outcomes, as well as consolidating the coordination of health research in the UK. The engagement of various funders in collaborations related to health research further indicates a strategy to increase the accountability of health research to broader audiences (Barry and Born 2013). Social research methods are widely funded, to develop new understandings, evaluate interventions and support evidence of the benefits of health research to society. Collaborations in funding can therefore be established for political, epistemological and financial reasons.

In terms of engagement, it has been possible to identify five suggestions for NCRM:

1. Prospective engagement with Cochrane Review Groups the Complex Review Support Unit may indicate training needs in social science methods.
2. Engaging with NIHR regarding health services research may indicate the methods used in this kind of work.
3. There is therefore scope for NCRM to identify the uses of AI in health and the intersection with social research methodologies. There may be methodological innovations in this space that are important for collaborative training opportunities.
4. The MRC-NIHR methodology programme clearly identifies social research methods and further exploration of method innovation and training needs would indicate the roles NCRM can play in supporting health research methods.
5. The third sector funders all have specific interests in health research and social science and exploring trends and possibilities with them may indicate themes and methods that are not primary concerns of the main public funders.

A significant theme from this mini-study is collaboration. There is widespread collaboration on health research and social science issues between publicly funded agencies and also between third sector and publicly funded agencies. Reflecting this trend in the design of engagement activities would likely be a useful strategy.

7 Mini-study C: Biosocial Research

The idea of focusing on biosocial research was part of initial discussions for focusing on a specific area to explore interdisciplinary engagement in NCRM. The term biosocial connotes a combination or integration of biological and social understandings and so provides an interesting case of interdisciplinary research. Writing for ESRC's magazine *Society Now*, John Hobcraft explains the relationship between important concepts in biosocial research as:

> *Alleles, Brains, Bodies, and Contexts interplaying with the individual through development and Experience over the life-course [sic]. (Hobcraft 2016 p. 18)*

This highlights some key approaches in biosocial research: genetics, neuroscience and psychology, human biology, the wider environment, and how they affect an individual's life. He goes on to say that "persistence of these [experiential] effects is partly through 'biological embedding' whereby the adverse experiences 'get under the skin' to alter biology at one or more levels", while at the same time biology can also "get 'outside the skin' to affect behaviours, choices and outcomes" (Hobcraft 2016 p. 18). In this definition, then, there is the notion of discrete entities at the levels of molecules, bodies and the environment, which interact and produce an individual's developmental trajectory and their experience of that trajectory. By way of introduction, we provide a brief review of developments in biosocial debates. Following that, we report on two empirical strands in this mini-study. One strand explores biosocial research in the UK, told through funding and organisation and the other strand reports on interview data.

7.1 Biosocial debates

There are vast literatures discussing the ontological and epistemological elements of the biosocial. They include contributions from anthropology, biology, philosophy, psychology, sociology and others. The aim here is to briefly identify some academic debates which are important touchstones for contemporary understandings of biosocial research. This section introduces debates in biology, anthropology and developments in the interdisciplinary field of science and technology studies, which includes contributions from anthropological, sociological, historical and philosophical writers, all of which tend to deal with attempting to identify relationships between biological, cultural and social phenomena.

The contemporary canon of biosocial debates begins with E.O. Wilson (1975), although the term appears to have earlier use in demography and psychology. In the 1970s, genetic science was in the ascendency in biology and scholars were beginning to suggest its application to understanding animal and human behaviour. An evolutionary biology perspective emerged with E.O. Wilson's books *Sociobiology: a new synthesis* (Wilson 1975) and *On human nature* (Wilson 1978). These books advanced a behavioural ecology framework in which animal behaviour was investigated from a biological perspective, and which were mostly concerned with understanding the evolutionary basis of animal behaviour. Wilson outlined the possibilities for understanding human behaviour, though, particularly in the later book. The books sparked debate regarding the scope and deterministic features of genetics (Driscoll 2018). There was an inter-departmental Harvard argument between E.O. Wilson on the one hand, and Richard Lewontin (Professor of

population genetics) and Stephen Gould (Professor of paleontology), who were concerned about "a return to eugenics, social Darwinism, a harmful dependence on shoddy intelligence tests, and a loss of the gains that had been made by women and minorities" (Jumonville 2002; p. 571). The main concern was that a strong version of genetic determinism could result in poor social practices and the debate thus centred on the epistemological claims and political implications of evolutionary biology, as applied to humans.

Within anthropology, a research area focused on culture that is conventionally divided across biological and social approaches, debates regarding biological and social influences on societal structure took a different course. Biological anthropologists and social and cultural anthropologists argued about how best to understand the causes of societal structures and routines. These disagreements were largely due to the menace posed to cultural approaches if one took the predominantly genetics-based approach - that culture is a product of genes - to its conclusion that positions genetics as the ultimate cause of society (Fox Keller 2016). In 1998, such arguments led to the division of the prestigious department of anthropology at Stanford into two separate departments: biological anthropology and cultural anthropology (although they were to reunite ten years later) (Fox Keller 2016).

An important intervention in the debate, and one that appears to have been taken up widely in medical sociology and science and technology studies, has been the idea of biosociality (Rabinow 1992). This proposition was an attempt to recognise that, in light of the human genome project (HGP) and the creation of possibilities facilitated by novel genetic knowledge for people to interact, there needed to be new ways to conceptualise the relation between biology and culture. Hacking (2006) argues that, although biosociality was not a new idea if one takes the view that humans have long formed social groups around biological characteristics, Rabinow was correct and new forms of sociality manifested as people formed groups exchanging understandings of the risk of diseases arising from genetic knowledge produced by the HGP. Anthropology has therefore been a notable space for the articulation of biological and social approaches to culture.

As the HGP neared completion, problems emerged with the deterministic viewpoint that genes were the blueprint for life and that knowledge of them equated to understanding life. The problems were: a) there are not enough genes for all the observable functions in organisms b) what had been labelled "junk" DNA turned out to have biomolecular roles and c) the timing and location of gene expression appeared important (e.g. Claverie, 2001). This sparked concerns in other research spaces (e.g. Strohman, 2003). Following this, biologists became increasingly interested in proteins, since these were the 'product' of DNA code. As well as proteins, research regarding the timing and location of molecular events around DNA took hold and the field of epigenetics emerged, which focuses on how DNA can be temporally modified by a process called methylation, which affects how genes are expressed, and that this process, more importantly, changes how gene expression changes in response to environmental events. It became apparent that there was potential for these methylation and DNA folding profiles to be inherited. In other words, it became possible for organisms to inherit non-genetic, environmentally-shaped characteristics. This has been identified as a shift from "gene action to reactive genomes" (Fox Keller, 2014).

The advent of epigenetics has arguably generated renewed interest in the biosocial. It may be there is a "biosocial turn" in the academe (Meloni 2014). Studies have shown, for example, that deprivation affects DNA methylation (McGuinness et al. 2012). This means the social environments can affect the biological, and those adaptions can in fact be passed on. However,

the structure of the relationships and the causal directionality between the biological and environmental factors are still far from clear. Debates within and between scholars advocating biological underpinnings to culture and those advocating the importance of social and cultural analyses are ongoing (Ingold and Palsson 2013; Meloni et al. 2016).

In sociology, science and technology studies, cultural anthropology and cognate research areas, contemporary interest in the intersection of biological and social knowledge was consolidated with the launch of the journal *Biosocieties* in 2006. The editors listed a wide range of subjects with the prefix "bio", but prioritised two substantive areas of study: genomics and brain sciences (Harrington et al. 2006, p. 3). More recently, the *Palgrave Handbook of Biology and Society* was published (Meloni et al. 2018). The handbook is edited by a social theorist, a sociologist, an anthropologist and a psychologist, and many of the contributions are from scholars trained in the biosciences. It indicates some of the key research areas involved in the biosocial debate, as well as the contemporary relations between research biographies and current research agendas. The volume of 38 essays is divided into six sections focusing on: the history of the biosocial; genomics and epigenetics; neuroscience and culture; social epidemiology; medicine; and futures. Health-related discussions crop up throughout the volume.

This potted overview indicates the breadth of debates regarding the biosocial and its relevance for philosophy and practice of genetics, molecular biology, and numerous social research areas, many of which have implications for health. The term the biosocial therefore invokes ontological, epistemological, methodological and ethical considerations that are often of relevance to discussions at the health research social science interface.

7.2 Methods

This mini-study changed over time. The earlier aims of the mini-study were to map out biosocial research funding in the UK and explore understandings of interdisciplinarity and methodological innovation with practitioners. This approach was then adapted to help inform NCRM in terms of engagement possibilities, and was brought into the larger project of charting the interface of health research and social science.

Initial searches using internet search engines (Google and Google Scholar) for "biosocial research" and "biosocial" revealed two broad avenues for investigation. The first was that biosocial research was a recent cross-council funding priority led by ESRC. ESRC identified several panel and longitudinal cohort studies as being important to this work. The second was that "biosocial" is used in multiple research areas, including anthropology, biology – especially genetics, psychology and sociology. The scoping work indicated that two facets were appropriate to develop this mini-study.

The first facet focused on research funding, the larger centres funded through ESRC's scheme and grey literature commentaries. This included an exploration of the biosocial funding under the ESRC's biosocial programme, which was a partnership with BBSRC, MRC, and Wellcome that officially ended in 2019[53]. Through this we identified longitudinal studies (n = 20), the respective centres from where they were administered in UCL and the University of Essex (n = 3), and a

[53] ESRC does not appear to explicitly connect its funding priority on mental health to biosocial research on its website.

BBSRC-ESRC programme on epigenetics, led by the University of Bristol, which consisted of eight projects. The aim was to understand how the biosocial was understood within UK funding and, in the analysis, this became an investigation into understanding how the biosocial was instantiated as research infrastructure.

The mini-study's second facet was an interview study with biosocial researchers. Meckin conducted a series of nine interviews with senior academics, mostly professors and senior lecturers (more detail below). He also observed a three-hour period of PhD student training as part of a winter school and had informal discussions with PhD students and trainers both during the session, at lunch and after the period of observation. He used this to gather reflections on the initial round of interviews and generate possible themes for the upcoming interviews.

Eight of the interview participants were affiliated with one of the projects identified during the data generation phase of the first facet, which focused on research infrastructure.The interviews took place in parallel to the infrastructure research and thus facets informed one another. Of the interviews, seven of the interviews were audio recorded and two involved taking field notes (see Appendix IV for an example question schedule). Four interviews were audio-only (using the platform Skype) and five interviews were face-to-face. Predominantly, the researchers were in senior academic positions.

Table 3: Status of participant and date of interview.

	No.	Occupation	Date of interview
	1	Professor	8th November 2019
	2	Senior researcher	20th November 2019
	3	Professor	14th January 2019
	4	Senior lecturer	20th January 2020
	5	Reader	22nd January 2020
	6	Senior researcher	24th January 2020
	7	Senior lecturer	31st January 2020
	8	Professor	4th February 2020
	9	Lecturer	6th February 2020

Table 4: Organisational discipline of interviewee (not in the same order as first list to preserve anonymity).

Main affiliation	No.
Medical sociology	2
Social epidemiology	2
Social statistics	2
Psychology	2
Education	1

Total	9

The audio recordings were transcribed using the automated transcription website Otter.ai. Afterwards they were checked and corrected and subsequently de-identified. The themes used in this report were identified during the transcription and checking process. The de-identified transcripts were loaded into NVivo in order to facilitate easier searching through the data.

With regard to ethics, the project was designed according to University of Manchester and British Sociological Association guidelines. The project did not require review by an ethical review board because the subjects are professionals being interviewed about their area of expertise, are not considered vulnerable and minimal identifying information was collected. Interview participants were given a project information sheet and asked to sign a consent form.

7.3 Findings

7.3.1 Biosocial research and research infrastructure

In the UK, the ESRC, BBSRC, MRC and the Wellcome Trust collaborated on funding a stream of work to facilitate "engagement of the social sciences in biosocial research"[54]. This was published as the document *Framework to enable Biosocial Research* (ESRC 2014). The framework document begins with the following definition:

> *Biosocial research is concerned with the dynamic interplays [sic] between biology, experiences and behaviours over the course of a person's lifetime.*
>
> *Encompassing multidisciplinary science, biosocial research brings together expertise from the biological, medical and social sciences. It aims to further enable understanding of the complex pathways and mechanisms that shape physical and mental health, social behaviours and outcomes, and genomic, neurological and physiological systems. (ESRC 2014 p. 1)*

This definition provides an indication as to how biosocial research can be interpreted. The first is that individual humans are an apparent unit of observation in understanding the connections between biology and experience. The second is that a combination of different sciences can be involved in furthering understanding and the implicit need for collaboration in bringing biological and social knowledges together. The third is the breadth of the definition, which includes a wide array of research areas and which, by implication, suggests a diversity of methods.

The *Framework* outlines various approaches that ESRC is taking, including building partnerships and collaborating with other research councils and funders such as NIHR; building resources and maximising the use of data; building capacity through interactive events, funding researchers and doctoral training (ESRC 2014). The framework document indicates biosocial research is predominantly conceived as operating through longitudinal and cohort studies, and subsequent secondary data analyses.

[54] https://esrc.ukri.org/research/our-research/biosocial-research/ (last accessed: 1st March 2021)

The significant investments in research infrastructure of relevance to biosocial research, according to ESRC, are:

- *Understanding Society*[55], the UK's longitudinal household panel survey collects health measures and biomarkers, including blood and genetic samples.
- Three birth cohort studies that collect biomedical data.
- The Cohort and Longitudinal Studies Enhancement Resources (CLOSER)[56] harmonises biological sample collection, biomedical measures and linkage to health data.
- A joint ESRC-BBSRC investment in epigenetics research[57].
- The secondary data analysis initiative, which is funding for encouraging the reuse of ESRC datasets[58].
- A centre for doctoral training (Soc-B)[59].
- NCRM phase 3 included a theme for biosocial methods development[60].

7.3.2 Longitudinal and cohort studies

Biosocial research appears to have been institutionalised through a range of investments in longitudinal and cohort studies. For example, *Understanding Society* (also called the UK Household Longitudinal Study; UKHLS) is the UK's major household panel survey. It continues from an earlier panel survey: 1991-2008 British Household Panel Survey (BHPS). The study has begun collecting various biological samples from participants, which can be used to identify biomarkers, and genetic and epigenetic factors. Access to the data is through the UK Data Service. The Centre for Longitudinal Studies (CLS) at UCL's Institute of Education has also begun collecting more biological data. CLS includes four birth cohort studies - 1958 National Child Development Study (17000 participants); 1970 British Cohort Study (17000 participants); Next Steps (1989/1990 birth cohort of 16000, and the Millennial Cohort Study (19000). CLS is funded by the ESRC.

Also based at UCL's Institute of Education is CLOSER (Cohort and Longitudinal Studies Enhancement Resources) which aims to 'maximise the use, value and impact' of the UK's major longitudinal studies. CLOSER is funded by the ESRC and MRC. Their focus is on data harmonisation, linkage and methodological innovation. As well as the studies already mentioned, CLOSER also engages with data and resources from other sources. They present their work in a timeline (see figure 1).

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[55] https://www.understandingsociety.ac.uk (last accessed: 4th Sep 2020)
[56] https://www.closer.ac.uk (last accessed: 5th Sep 2020)
[57] http://www.bristol.ac.uk/integrative-epidemiology/epigenetics-social-science-network/ (last accessed: 10th March 2021)
[58] Note that this is not purely biosocial datsets. See https://esrc.ukri.org/research/our-research/secondary-data-analysis-initiative/ (last accessed: 10th March 2021) for more details.
[59] https://www.ucl.ac.uk/soc-b-biosocial-doctoral-training/ (last accessed: 10th March 2021)
[60] https://www.ncrm.ac.uk/resources/online/all/?main&id=20592 (last accessed: 10th March 2021)

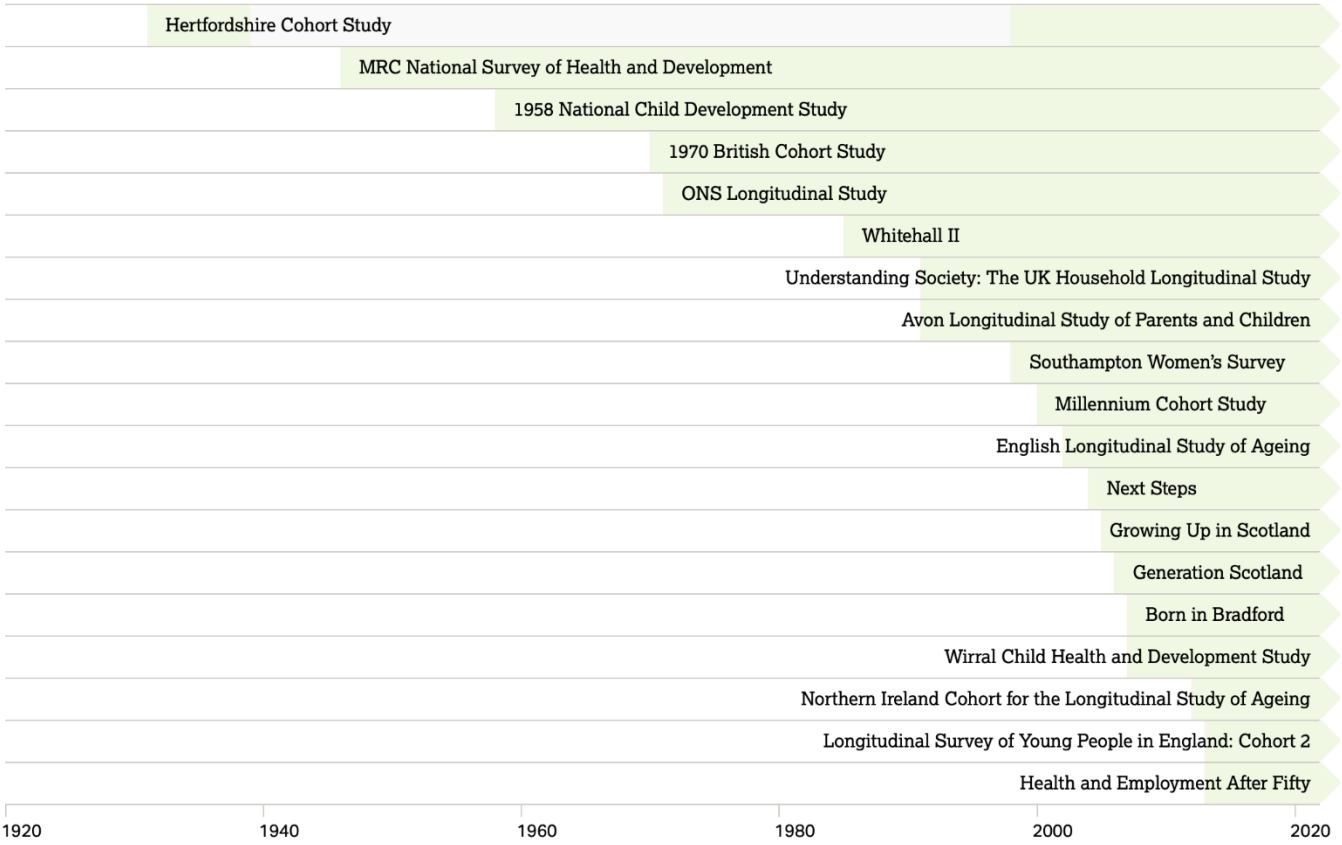

Figure 1. CLOSER's studies. (Image adapted from Closer.ac.uk[61])

The methodological innovation strand[62], led by Professor Michaela Benzeval (Institute for Social and Economic Research (ISER), University of Essex), Professor Annette Jäckle (Understanding Society, ISER, University of Essex), Professor Kate Tilling (University of Bristol) and Dr Andy Skinner (University of Bristol), supports investigations of new technologies and modes of data generation, such as active participation e.g. completing surveys, diaries and so on using smartphone apps, and passive technological data collection e.g. air quality, spending, electricity use, surrounding noise, mobile phone GPS etc. They explore technology related to biological and health data and reporting, as well as data management and developing the metadata for published data.

The English Longitudinal Study of Ageing (ELSA), piloted in 2001, has been collecting biological samples approximately every four years since 'wave 2' in 2004[63]. This is funded by a range of government departments and the ESRC. The study collects a range of data with participants (about 18000), including demographics, health, social care, work and pensions, income, housing, walking speed and weight, among others.

Understanding Society, is the world's largest household panel survey. It collects a range of biological indicators and measures. Adult participants received a follow-up health assessment visit from a registered nurse. A range of bio-medical measures were collected from around 20,000 adults, which included blood pressure, weight, height, waist measurement, body fat, grip strength

[61] https://www.closer.ac.uk/timeline/
[62] https://www.closer.ac.uk/research-fund-2/research-fund-3/methodological-innovations-data-collection-longitudinal-studies/
[63] https://www.elsa-project.ac.uk/about-elsa

and lung function. Blood samples were also taken at these visits and biomarker data is available including: Measures of fat in the blood, an indicator of diabetes, measures of inflammation, anaemia, liver and kidney function, among others. The study also generated genome-wide scan data[64] on 10000 people and epigenetic methylation[65] profiling of 1200[66].

One point to note is how challenging it might be to establish large scale, novel cohort studies. The ESRC and MRC funded the Life Study in 2014, hosted at UCL, which was intended to collect socio-economic and biological data from 80000 children and their parents. The study was abandoned in 2016 due to difficulties in recruiting participants. Thus, despite significant institutional support, the establishment of longitudinal biosocial studies may not succeed.

Michaela Benzeval[67], director of *Understanding Society*, reports that she does not personally use the term "biosocial" because of, its historical affiliation with biological determinism (Benzeval 2016). Instead, Benzeval prefers the idea of "integrating social and biological perspectives", by which she further explains means using significant amount of both biomedical and social data in analyses. Benzeval suggests a range of activities in which research can link biological and social factors. These include:

- Using biomarkers (weight and BMI being simple indicators, but other things, including blood samples, saliva samples etc) to provide more objective measures for disease than self-reporting health and illness and to collect earlier, more defined, measures for predicting outcomes.
- Understanding the pathways by which social factors are associated with health and biological changes producing illness (E.g. hypothalamic-pituitary-adrenal axis/Cortisol).
- Understanding biological underpinnings of social phenomena.
- Exploring gene-environment interactions, such as do genes influence an individual's response to air pollution or the effects of deprivation on DNA methylation profiles.
- Understanding how environment events become part of biology and genetic processes[62].

Thus, *Understanding Society* has expanded its data collection to more facilitate panel analyses of the links between environmental, social and biological phenomena and enacts the idea the potential for hybridity in biological and social research.

The ESRC-BBSRC £3m joint call for epigenetics research, the *Epigenetics and social science network*[68], funded a range of interdisciplinary projects in 2015, led by University of Bristol. Epigenetics is an evolving area of research that began to develop as the Human Genome Project neared completion and realisation that genes were not as deterministic as expected spread among the genetics research community. DNA methylation was identified as an important factor

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[64] Genome-wide scans are genetic analyses of individuals' genomes that look for markers of specific gene polymorphisms (variations). The data can be used for Genome Wide Association Studies (GWAS) that can show association patterns between genetic and other factors in populations.

[65] DNA methylation is a process by which cells add methyl groups to DNA, that changes the expression of genes, that can be in response to environmental factors. It is one of several epigenetic processes which have the potential to facilitate inheritance of nongenetic (non-DNA) traits.

[66] https://www.understandingsociety.ac.uk/documentation/health-assessment (last accessed: 14th Oct 2020)

[67] https://www.understandingsociety.ac.uk/topic/biomarkers-genetics-and-epigenetics (last accessed: 10th March 2021)

[68] http://www.bristol.ac.uk/integrative-epidemiology/epigenetics-social-science-network/ (last accessed: 14th March 2021)

in determining how and when genes were expressed. There were eight activities under the funding stream, five projects and three networks, covering a range of epigenetic, social and psychological topics.

- **E4**[69]: epigenetics, environment, embodiment and equality
- **Epigenetic trajectories**[70] - epigenetic trajectories of adolescent exposure to psychosocial stress
- **Imprinting methylation**[71] - early life influences and later cognition and mood
- **EpiFASST**[72] - epigenetic effects on children's psychosocial development in a randomised trial of folic acid supplementation in second and third trimester
- **Epigenetic responses**[73] - Epigenetic responses to social and environmental cues in early life and over the life course: impact on healthy ageing in UK population-based cohorts
- **Interstela network**[74]**:** Interpreting epigenetic signature in early life adversity
- **Epigenetic stability network**[75]**:** Epigenetic stability in a stressful environment and its effects on reproductive function
- **Epigenetics and stress network**[76]**:** Network of various scholars interested in the interplay between epigenetics and indicators of stress

One of salient terms appearing to link epigenetics research is the term "stress". Stress has various biological, ecological, psychological and sociological interpretations, but generally implies some kind of pressure being exerted on an entity, which can produce a state of physical, mental, emotional or population-level strain. The focus appears to be on characterising the different epigenetic profiles emerging from differing levels of stress. The epigenetic work attempted to establish how particular experiences manifested in the methylation of DNA and the extent to which those changes were stable.

The biosocial, as funded by ESRC, BBSRC and The Wellcome Trust manifests as research infrastructure that has been (partly) repurposed or newly created to collect and analyse biosocial data. Large survey and longitudinal studies now collect health and biological data as well as social and demographic data. Recognition that this infrastructure and related developments raise ethical and practical issues resulted in the establishment of the Expert Advisory Group on Data Access (EAGDA)[77]. With expertise spanning genetics, epidemiology, social scientists, IT, data

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[69] http://www.bristol.ac.uk/integrative-epidemiology/epigenetics-social-science-network/research-projects-and-networks/e4/
[70] http://www.bristol.ac.uk/integrative-epidemiology/epigenetics-social-science-network/research-projects-and-networks/epigenetic-trajectories/
[71] http://www.bristol.ac.uk/integrative-epidemiology/epigenetics-social-science-network/research-projects-and-networks/imprinting-methylation/
[72] http://www.bristol.ac.uk/integrative-epidemiology/epigenetics-social-science-network/research-projects-and-networks/epifasstt/
[73] http://www.bristol.ac.uk/integrative-epidemiology/epigenetics-social-science-network/research-projects-and-networks/epigenetic-responses/
[74] http://www.bristol.ac.uk/integrative-epidemiology/epigenetics-social-science-network/research-projects-and-networks/interstela/
[75] http://www.bristol.ac.uk/integrative-epidemiology/epigenetics-social-science-network/research-projects-and-networks/epigenetic-stability/
[76] http://www.bristol.ac.uk/integrative-epidemiology/epigenetics-social-science-network/research-projects-and-networks/epigenetics-and-stress-network/
[77] https://esrc.ukri.org/research/our-research/expert-advisory-group-on-data-access-eagda/

management and security, law and ethics, the EAGDA was equally funded by The Wellcome Trust, Cancer Research UK, ESRC and MRC. EAGDA, which was officially funded until 2019, provided "support… across the fields of genetics, epidemiology and the social sciences – promoting best practice and encouraging consistency in governance and decision making."[78] The group, with partners, produced reports on a range of data sharing issues, including infrastructural standards, data access provision, incentives for data sharing, data misuse, and protection of confidentiality.

There are three things to draw from this study of biosocial infrastructure. First, the biosocial infrastructure encompasses more than health research, and generates data on a range of questions related to environmental and societal changes and their relations to biological changes in humans. Second, biosocial research infrastructure has a temporal component that is importantly entwined with human age and ageing. The studies tend to be longitudinal and attempt to construct meaning and change across the human life course. Third, in terms of data methods, advanced mathematical and statistical tools are deployed, along with clear understandings of what biomarkers and socio-economic data indicate, and aspects of data linkage, harmonisation and security. The realisation of biosocial research as infrastructure therefore facilitates particular methods and modes of knowing connections between biological and social phenomena.

7.4 Interview data and thematic discussion

This section draws on data from the nine interviews and the participant observation. The interviews focused on themes of method development and methodological innovation in biosocial research. The following section discusses how participant researchers talked about methods. As will be apparent, method could mean many different things and there was no clear boundary around how participants implicitly defined method. In their responses, talk about methods ranged across:

- Data collection, sampling and analysis (from the intellectual to the mundane)
- Ethical review procedures and ethics
- Combining social theory and data
- Doing interdisciplinary work and collaboration
- Communication
- Aligning interests and gaining "buy in"

Thus, the themes discussed below cover a range of different topics, some of which seem less immediately related to methods and method innovation than others.

7.4.1 Valuing methods in terms of researcher identities

Researcher related methodological choices to epistemic issues connected to identity. Below, a researcher talks about a deliberate shift to quantitative work towards the end of their undergraduate course because it seemed to them easier to practice objectivity.

[78] https://esrc.ukri.org/research/our-research/expert-advisory-group-on-data-access-eagda/

> *I found qualit- qualitative research, a lot hard harder than I had expected. And I wanted to shift a bit towards more quantitative methods. And for almost as a reassurance I felt more reassured by those methods… it's not because in anyone I was feeling critical of qualitative methods and in fact I very much always admired them and enjoyed reading them and using them but I felt really uneasy about practising them myself I felt like that there was I was never sure when I was when sort of my personal investment ended and the method started. I don't know how to explain that very clearly. But I felt like it so much of it was riding upon me as an individual. When you observe things and when you're interviewing somebody, and how well you do that, or how you orient your questions, or how you've decided to observe something on a certain day. And, maybe, how you're just feeling on that day will influence what you observe and how you observe it. And I felt that I personally found that really hard, and I didn't know really how to do that in a way that wasn't basically contaminating everything I was seeing. (Senior Researcher, 24th January 2020)*

Method here was a way of being confident about one's research that was connected to how the researcher situated themselves in knowledge production. The researcher discusses epistemology in terms of interpretation and data. For them, using quantitative methods is a way to isolate the researcher from data generation to ensure they are not affecting the data. This personal affiliation is what is important here – the researcher opted for a particular set of methods because they felt able to be more confident in their research by selecting those methods. A further implication from this quotation is that, because the researcher was trained in other methods and states their admiration for interpretive methods (although this may have been flattery because they were being interviewed), this suggests an openness towards other methods. The value of methods, then, can be related to research identity and self-confidence in knowledge production.

Talking about methods, then, is a way for researchers to define their academic identities. For instance, to separate their identity as a 'user' of method from a 'developer' of methods, one researcher quoted below referred to "methodologists" as they described software developments in relation to machine learning:

> *Those sort of [machine learning] approaches are becoming available in software to people, I really am a firm believer that applied people, such as myself, really only tend to use stuff when you get a nice bit of software that'll help you do it. And that's, to me, a big difference between methodologists, you know, [and] everyday folks, is the idea of how much effort you prepared to put into actually making the tool rather than just using the tool. (Lecturer, 6th February 2020)*

So, methods could be seen here as packages of software tools created by experts for others to use. The quotation performs rhetorical work that separates those who develop software tools and those who apply them. This assigns a value to methods as expertly developed tools. It implies that method development in some circumstances is done by specialists which suggests that, when planning engagement around methods development, it might be important to identify methods specialists in particular domains. In this case, identifying developers who make machine learning algorithms in usable packages.

Personal methodological choices could also be about what participants deemed interesting. Some people preferred the idea of focussing on 'big' problems, synonymous with social ones, as opposed to biomolecular – small - problems. So when it came to big social questions, one professor said:

> *And you know, you could see people who've spent their entire life looking at something called the promotor region of a gene. Right? So this tiny bit of DNA, and how it controls the production of, of things like growth hormone, or various other things. And you think, well, you could either go really, really small and really, really detailed biologically, with a view to getting papers in nature, or you know, you could get really, really… you could go for, you know, it's like going from cell out to society and thinking about which of those is going to be more interesting to me. And so, I decided, well, lab work also very labour intensive and you have to be there all the time and that kind of thing whereas you can do data analysis at home. So the choice was kind of staying and being a hardcore biologist or trying to do something that was kind of more society. (Professor, 4th February 2020)*

The professor offers different ways for valuing methods that include what the methods focus on and the labour requirements of methods. Here, then, scale plays an important part in conceptualising the difference between molecular biology and social research. The notion that molecules are small and society is big does a particular kind of scaling, which seems to be based on a Euclidean geometry where discrete objects have local effects, such as DNA and its relation to hormone production, and society implies a much larger, potentially more complex perspective. Thus, in valuing methods in terms of whether they focus on the scale of society or molecules relates to research identity and what is considering interesting. The quotation does work in that the professor implies they do not define themselves as a "hardcore biologist" as that would then mean they would not have an interest in questions that relate to a societal scale.

All these quotations indicate the importance of methods in terms of how researchers position themselves in research – as users instead of developers, as selecting methods that support confidence, as actively choosing particular methodological approaches according to scale. Thus, while methods may be understood as tools, they are bound up with how researchers understand their identities in biosocial research and this needs to be borne in mind when doing engagement work.

7.4.2 Developments in data collection, combination and analysis

This section is primarily focused on the understandings of data emerging from different methods. The following quotations talk about increasing volumes of data, concerns arising from deploying particular methodological assumptions, and making claims about causality.

> *So it's bringing all of us… we have the Soc-B which is the CDT in biosocial where we still have to think about that a lot, because there aren't students, there are people who know all of it. There's no one who knows all of it, but, you know, it's just sort of thinking through the [aspect], we're just going to get bigger with with with omics coming in and with all of this detail, you know, these are the datasets with the order the different amount, differing aspects of social and, you know,*

> *we've got the genetics in there already, but once you got genetics and epigenetics, proteomics, metabolomics You know, it's just a whole task in terms of how to pull that together and think about it. (Professor, 4th February 2020)*

The above quotation highlights issues associated with integration. How is it possible to bring heterogeneous data together and make sense of it? Indeed, this kind of problem may be compounded because the data produced by 'omics is not fully understood, so it becomes difficult to relate that to social outcomes. There is then, a difficulty in corralling and making sense of data emerging through different methods.

The issue of causality was a particular problem discussed in the PhD training and was a topic in a later interview. The professor offered concerns about 'economists' who use instrumentation techniques to establish causality:

> *So, mendelian randomizations basically use an instrument but like all instruments it has to relate sufficiently strongly to both the outcome and not the exposure, and it doesn't, because the outcomes we are interested in are not simply a correlation with genetics. (Professor, 14th January 2020)*

Here, the participant is positioning economic methods as not taking into account biological aspects of phenomena sufficiently well to establish causality. The participant was in favour of establishing causality, but suggested that current approaches of using genes as instruments were flawed because they made assumptions about the links between genetic markers and outcomes that were too bold, or regarding the amount of genetic variation taken into account[79]. In other words, socio-economic research lacked nuance regarding genetic complexity. This links to Martyn Pickersgill's (2016) argument for 'epistemic modesty' when it comes to researchers making claims about social causes, particularly with regard to genetics and epigenetics. Indeed, it is difficult to establish whether the relationship of an epigenetic marker to a disease (is a cause or an effect (e.g. of a disease)). Therefore, while biologists may understand - among themselves - the limits of knowledge and of epigenetics in general, using epigenetic-biological findings as well-defined instruments in statistical methods can lead to problems in subsequent claims of cause and effect in biosocial research.

In cohort and longitudinal studies, the protocols have often been worked up in smaller projects. This meant they had been solved with particular resource to participant ratios:

> *We sort of moved into this little larger scale, large, larger datasets, most of the time you the sorts of studies that were being done, were small scale, they were from people who are volunteering. And there hadn't been much thought to how do you scale up without losing too much information. And the challenges were that the particular community that did that for today's collection wanted was struggling with just a good enough collection from a large set of people. (Professor, 4th February 2020)*

Scale emerges here as a methodological problem, this time with regards to the amount of information per unit. In a study involving fewer participants, it had been possible to generate good

[79] Benzeval (2016) notes that some economic calculations use only one of ten million possible single nucleotide polymorphism (SNPs) variations and, also, that genetics appears to explain just 2% of variance in educational attainment.

quality data. As the study was scaled up, the data collection became “just… good enough” as it was difficult to sustain the collection methods in the larger study. The professor went on to say:

> *And what the compromise is that you're not, you know, processing the blood sample straightaway, which is what you're supposed to do in gold standard [research]. So we've already made that compromise. It means there are lots of things now that you that you can't measure. So blood measurements and things have changed so that you can do all these something called omics. You can measure metabolomics and proteomics and that kind of thing. And what we don't know about. If you don't process the blood sample straightaway, you might be affecting kind of a metabolomics measurement. And we don't know how that happens particularly, you don't know kind of how analytes all the things that you might want to measure in a omics panel for example, how that changes over time, compared to if you process the sample straightaway. (Professor, 4th February 2020)*

Uncertainties about data loss, then, can come from the biological samples and selecting particular collection methods. By visiting people at home in a big study, instead of having people come to a clinic, or participants swabbing themselves instead of nurses collecting biological samples means that samples are not analysed quickly, or collections are not standardised, which means the sample will degrade and some biological methods cannot be used reliably. As the biosocial is targeting larger populations of participants – cohort panels have thousands of participants – a challenge is to find ways to sample biological data and it still be good enough quality. There’s a disciplinary tension in collecting biological samples in cohort studies. Some collection protocols can lead to degraded samples that might not be suitable for the more complex, contemporary techniques of biological analysis. At the same time, onerous or technical collection protocols may significantly reduce participant engagement and lead to samples sizes inadequate for social analyses. Thus, cohort collections compromised different disciplinary methods in different ways, but, also, raised the possibility for developing new methods of analysis (e.g. for biologists) that could cope with these lower grade biological samples. This means the mundane issues of, for example, deciding how to collect blood samples become more significant when scaled up to large cohort studies, where biological sample quality and participant engagement may work in opposite directions.

In a discussion of new methods of analysis there was scepticism about the novelty of methods, despite the increases in volume and new forms of data:

> *I think that the main thing that's going on at the moment, I suppose would, we would need to be taking into account is the volume of data. So, huge amounts of data are coming in from all sorts of disciplines and around health and relating to health. And so this is sort of idea of big data. And, and I mean, the, the, the statistical methods that you would use to, to analyse data, whether it's big data, [medical] data. I mean, in the end, often the methods are pretty much the same. So I'm not sure [there’s] massive methodological shifts even though everyone, you know, you hear about machine learning and all this stuff in relation to big data. (Senior Researcher, 24th January 2020)*

This is a broader issue than the biosocial alone, with some claims to methodological innovation being regarded as adaptation rather than innovation (Wiles et al. 2011). In academic papers, novelty is prized and so needs to be claimed, so what constitutes methodological innovation can be seen as doing certain kinds of work in different contexts since “method” is a broad range of practices.

Arising from our discussion of a published paper, one participant mentioned processing infrastructure when it came to dealing with data:

> *this is a smaller University, but in the sense of just having the ability to deal with really, really large amounts of data. And having lots of people analyse and run things at the same time in that sort of infrastructure almost concern that it's, it can become difficult to support that kind of thing. (Professor, 4th February 2020)*

So, modern data and computation can dramatically increase the amount of computing power that is required to do particular analyses. This would ultimately lead to power to do computational research, reserving the biggest, most complex questions for those who had the infrastructure to perform them. Method choices are impacted by infrastructure as well as the mundane.

7.4.3 Leadership and collaboration in biosocial research

Many of the interviews featured exchanges regarding experiences of collaboration with other researchers. This notion is complicated by the idea that many researchers in the biosocial have backgrounds that spanned training in several conventional disciplines, be they medical, biological, sociological, psychological or anthropological. The comments were often directed at ‘others’ rather than people with these kinds of mixed backgrounds.

Several researchers saw method development in terms of methods for collaboration and this could also be related to how researchers viewed interdisciplinary working. Several participants, in senior roles, gave responses that suggested method development can be understood, in one way, as creating multidisciplinary teams of experts. For example, the following quotation is about leadership in terms of drawing together different domain expertise to create novel projects:

> *I'm really draw trying to draw on people within their own disciplines who were doing, and they're kind of more at the cutting edge of what they're doing and bring those together. So I don't know that I personally innovate the methods I try to, to take say, for instance, in everything about evolution measurement, in the really high resolution, high spatial resolution measures, or the individual monitoring that's kind of at the cutting edge of that field, and bring it into what we're doing in epidemiology make that relevant in that field. And the same with epigenetics, you know, working with people at the forefront of psychiatric epigenetics and trying to understand how we can use the best methods that they're using. And employ it in mental health or in a very different type of context. So I don't know that I specifically innovate. I just try to bridge those what people are doing in those fields and bring them together. (Reader, 22nd January 2020)*

In this quotation there is a clear valuing of diverse methods and expertise and the idea that bringing together knowledge from different epistemic spaces can help solve mental health problems. At the same time, it could also be important to lead the overall direction of the research project:

> *I take quite a kind of a narrow-minded approach to the work as I implied when I spoke about the interdisciplinary study on ageing which is basically I try and try and determine the grounds on which the collaboration was going to happen. (Professor, 14th January 2020)*

In this example, a social sciences professor was explaining how they worked with colleagues, often in medical and allied health disciplines. For them, leading the collaboration and prioritising the social findings was the way to establish working collaborations. This partly foregrounds the social science questions, but also values other knowledges, in this case medicine especially, as being in a service relationship to social research (see Barry & Born 2013). What these two quotations highlight is that these researchers are aware of their approach to collaborations and how this relates methods.

7.4.4 Political concerns

Some participants offered detailed responses when talking about issues beyond the academe – such as changes in data, policy or technology, that may affect methods. Here, politics can be formally understood as "relating to government" and as well as to more mundane, everyday politics, such as between disciplines or between research organisations, which might not be related to politics of government, but which might regard issues of knowledge, resources or funding.

One participant explained their view on the political behaviour of research councils when it came to epistemic “territories”:

> *we see research councils evolve historically into their particular locations. And I think at certain points the ESRC. [They] saw that, by, or assumed, make a judgement that by incorporating biology, genetics into their remit will put them in a more robust position in comparison with the Biological and Medical Research Councils. I don't know if that's true or not, whether the counterfactual would have been if they hadn't done what they did. But suddenly what's happened with social sciences with their encouragement, that funding has moved very dramatically into that space, so Understanding Society for example is collecting biological materials (Professor, 14th January 2020)*

In this view, as the ESRC has sought to move into biosocial research partly to leverage more funding, they have changed the methodological considerations for social research. This means that, as detailed above, Understanding Society has begun collecting biological samples and operating in an epistemic space between, or including, the biological and social, which has resulted in some of the tensions discussed earlier regarding biological and social methods. This means that institutional politics, in part, shapes methodological practices.

More prosaically, one researcher commented on the importance of funding calls in relation to how people orient their research:

> *I suppose it's the nature of funding calls … research teams wanting to put forward ideas that fit the call. Yeah. And when you know, you have colleagues within an institution that can add a strength to a particular research idea, then I suppose it comes from that as well as findings from that original work of course, but I suppose what what pushes it over the forward is really funding and the need*

funding, and to build on research and I suppose often, some calls are very set, It's researchers have to address that call. (Senior Lecturer, 31st January 2020)

While this is an obvious issue, it is worth highlighting given the shifts in research "territory" discussed in the previous quotation. As particular kinds of data are seen as politically important, this may have implications for the kinds of methods are valued through funding.

The interview data shows the entanglement of methods in biosocial research with other issues, and suggests that those might be explored further with practitioners and stakeholders. There is evidence that methodological choices are bound up with researcher identities. There are different issues with regards to data that is produced through different methods, combining methods and collaborating, as well as how political concerns play a part in shaping the research space. The issue of scale emerges on several occasions, in different ways, and this might be usefully exploited in engagement as a way for researchers to explore ontological assumptions with one another.

7.5 Discussion and directions

7.5.1 Research infrastructure

One of the key findings is the realisation of biosocial research as research infrastructure in the UK. The longitudinal studies discussed above are mostly orientated towards understanding populations and variations within populations. They therefore privilege particular kinds of knowing about society, and about relations between biology, social factors and health. The studies collecting biological data are working at particular biosocial problems, where issues of biosociality (Rabinow 1992) and biosocietal issues (Harrington et al. 2006) are of lower import. There may be an opportunity to support an increased dialogue between the infrastructural and socio-philosophical instantiations of biosocial research.

Cohort studies can be seen as boundary objects: they are like an ideal type of a repository that allows different groups to produce knowledge without requiring an epistemological or ontological consensus (Star and Griesemer 1989). Constantly in the making and unfolding, they act as social objects through which different groups can loop their knowledge production agendas. The production of such datasets therefore seems to be a site of potential ethnographic interest, particularly in light of the difficulties and subsequent cancellation of the Life Study. How these studies produce particular kinds of datasets and continue when other (including expensive/ambitious) ones fail to gain traction is of value. A further suggestion for future work is to examine the histories of projects in detail. One of the participants (not quoted above) explained that a longitudinal study that started as a PhD project in nutrition, had expanded to include psychologists and the epigeneticists in subsequent funding rounds. The ways that projects emerge and take shape and draw in disciplines and resources would shed light on the emergence of contemporary 'big social science' teams.

How various issues are overcome is important in how projects emerge and change and this seems particularly relevant to large longitudinal panels which have, to a certain extent, produced data that is accessible and meaningful to both present and future cohorts of researchers from different research traditions.

7.5.2 Methodological tensions

There are different kinds of methodological problems in the interviews and tensions about how to interpret problems in different disciplines. In some spaces, a mundane procedural problem in one discipline can turn out to seriously affect methodological approaches in other disciplines. Scaling up in one space, such as the cohort size of a particular study and having to decide cheaper, easier ways for blood sample collection can mean that the sample is not good enough for some kinds of biological testing, particularly in the 'omics sciences of genomics, metabolomics and proteomics. There is then a tension about where responsibility lies for developing methods – within the sample collection or within the analytical procedures. It is also apparent that social researchers are aware of some of the non-social consequences of their methodological choices. These tensions might be explored with biologists and biomedical researchers outside of project setting e.g. through NCRM engagement.

Another example regarding methodological tensions regards causality. The two participants who spoke of causality appeared to understand it as a technical methodological problem – that it would be possible to do causal analyses if the instrumentation tools were more nuanced. In contrast, the sociological literature considers causality, or an emphasis on discovering causal relationships, problematic (Meloni et al. 2016: 19). Implicit here, is perhaps the categories of causal and descriptive research, which are not necessarily helpful (Savage and Burrows 2009). Finding ways to support biosocial researchers and consortia to reflect on such tensions and discuss their methodological assumptions may be of interest to NCRM.

7.5.3 Methodological trends

What counts as methodological innovation and what methods were interpreted in a variety of ways by different participants. Therefore, the conversations ranged from the mundane to the existential; from disciplinary knowledge production to collaboration, interdisciplinarity and communication. Methodology is a wide-ranging topic in biosocial research indicating that engagement strategies will need to be structured to take account of this. This may involve offering more clear definitions of what counts as method for the purposes of engagement.

The 'biosocial' is already a large, well-supported interdisciplinary area of research. As represented in the participant sample, there are sociologists, epidemiologists, psychologists and educationalists already working in the area. One interpretation might be that methodological problems are currently relatively well defined and that much of the work is progressing. On the other hand, several participants and contributions to the literature identify that 'biosocial education' needs to happen to nuance the understandings of both natural and social science researchers. This may be an opportunity to conduct engagement work that helps share methodological insights from different projects, including the main methodological issues in biosocial research and future possibilities.

7.5.4 Methodological challenge: Scale

As discussed, there is a relatively common sense understanding that the social is seen as 'big' and therefore 'up', and the molecular is seen as 'small' and 'down'. It is possible to unsettle such a view. Drawing on Actor-Network Theory (ANT), for example, would offer a way to rethink this. ANT focuses on relations, rather than objects like society or molecules. Therefore, the network of

relations that exists in order to detect and perceive a single molecule necessitates a range of expensive apparatus, concepts and practices. The detection of molecules could be as a ‘big’ interest; indeed the CERN facility is often seen as an archetype of ‘big science’. In other words, there’s an opportunity for NCRM to support the rethinking of ‘scale’ in the biosocial space and what this may mean for collaboration and methods. Scaling and scales appear to worthwhile interdisciplinary themes to follow up (See e.g. Lobato 2017 and Fukushima 2017).

8 Summary

This document reports on three mini-studies of the interface of health research and social science. Mini-study A, the survey of journals suggests key topics of interest and research areas that contribute to the interface. The key findings were that there is a wide diversity of research areas and topics of interest. Mini-study B, the survey of UK research funders, produced the main finding that collaboration is a key strategy of funding at the interface, indicating that questions and projects that combine health research and social science overlap or fall between funder remits. Mini-study C, focusing on the UK biosocial research, demonstrated that biosocial research is realised in infrastructure that integrates the generation of biological and social data. The interview data indicated important ideas of leadership in large, complex projects; processes involved in valuing methods, how particular methods are privileged through infrastructure and politics; and that questions of scale and ontology may form possible spaces for discussions aimed at incorporating findings from sociological, historical and philosophical traditions.

Taken together, the three mini-studies identified research topics and research areas that could be used to prioritise NCRMs engagement processes (Table 3). The study of research funders suggested the broadest ranges of possibilities, partly because of cross-council and cross-agency public funding arrangements, but also because the non-public funders, such as The Wellcome Trust and The Leverhulme Trust appear to have flexibility in deciding their remits when it comes to health research and social science funding. The study of the biosocial suggested that biosocial infrastructure was perhaps most relevant to quantitative methods, but that philosophical arguments have, to some degree, been replaced by cooperative enterprises such as data archives and a multidisciplinary handbook.

Table 3. Research topics and research areas at the interface.

Mini-study	Research topics	Prominent research areas
Interdisciplinary journals	General; ageing; alcohol and drugs; mind and mental health; environs; AIDS and HIV; disciplinary contributions; health promotion and communication; disabilities; violence.	Public health, occupational health and environmental health, Social psychology, Sociology and political science, Social work Medicine (misc.)
Research funders	Communities and environment Antimicrobial resistance, Food and nutrition, one health, epigenetics public health, mental health, health inequalities, lifecourse, health data, economics and market,	Medical sciences, social sciences, biological sciences, arts and humanities

	ageing, methodology, health and socioeconomic relationships, health inequalities, musculoskeletal conditions, bioethics	
Biosocial research	*Biological and social factors and health*	Social statistics, Demography, Social epidemiology, Epidemiology, Molecular biology (epigenetics) Research infrastructure Also: Anthropology Evolutionary genetics Behavioural ecology Sociology Medical sociology Evolutionary psychology

8.1 Informing engagement

8.1.1 Age and society

Ageing and the ageing society has emerged in all the studies. It points to age-related research a dominant focus across publications, funders and biosocial research. Temporal and life course understandings are embedded in much biosocial research infrastructure and longitudinal studies. This predicts that age and ageing would be an inclusive dimension around which to structure engagement, though it would likely need another intersecting theme to narrow it down.

8.1.2 Collaboration

A key finding is that there is high level of collaboration at the health research and social science interface. This was anticipated, given the complexities of health-related challenges, but the extent of research areas contributing to publications and the organisations contributing to funding programmes is wide. The research infrastructures, then, indicate particular emphases in large collaborations. There was involvement of biosocial scholars with NCRM's phase III (Chandola, 2021) so the biosocial and methods infrastructures have a linked history. The biosocial research infrastructures are more orientated to population health, social epidemiology and relations between the environment and genome. The questions asked are largely formulated in terms of health. Although the research areas do not necessarily need ontological or epistemological consensus to use these resources, it indicates a different attitude has emerged with respect to health-related challenges and collaboration across research areas than had been prevalent, at

least in the last quarter of 20th century. These developments indicate a recognition that more collaboration is required.
This is an important trend that may facilitate increased engagement via methods. There may be opportunities for interdisciplinary training, such as valuing other perspectives/approaches e.g. benefits of opening up and benefits of reductionism, leadership of methods, and the findings that are emerging from such enterprises.

8.1.3 Methods

The diversity of research areas implies a diversity of methodologies and methods, from genetics, to biological sampling and archiving, data linkage, to philosophical debate and cultural analyses.

It is likely that individual projects crossing multiple research areas, will experience specific issues regarding collaboration around methods, and so local working practices will be developed. Engagement may be useful to generate a resource of methodological issues and their resolutions. This would also be useful to researchers considering work at the health and social sciences interface to prepare for the kinds of working practices that may be required.

8.2 Future work

The report offers insights of the interface of health research and social science. A central aim was to attempt to both give an overview and to detail an area of research in this space. In order to inform NCRM"s engagement strategy, the approach emphasised the organisational and infrastructural elements of research at the interface. More detail could be developed on epistemological and methodological questions. This may form part of the engagement strategy and can be taken into NCRM's engagement work at the interface of computation and social science.

As shown by mini-studies A and B, the health research and social science interface is diverse and multifaceted. While the report primarily identified public health, sociology, social work and psychology as the key contributors, research at the interface involves many different research traditions. Finding strategies for engaging less well represented methods and research traditions may be important. The apparently low representation of veterinary and animal sciences may be an area to cultivate alongside capitalising on more established overlaps like public health and social epidemiology. In order to find a way through this highly developed space, a selective and targeted approach, with clearly defined rationales for engagement and clearly defined themes relating to method, is like to be productive.

The study has predominantly focused on academic research and there exists a range of non-academic actors in the space. It may be a role of the engagement programme to try to draw in more non-academic actors in to discuss methodological issues and innovations.

Overall, the report highlights the diversity of the health research and social science interface. It is a well-developed area and there appears to be considerable existing collaboration. Specific, targeted engagements around specific topics of interest, methods and methodological questions should develop an understanding methodological trends, training needs and capacity building requirements.

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10 Appendices

10.1 Appendix I: Top thirty “Health social science” journals by h-index.

Rank	Journal title	h-index
1	Social Science and Medicine	229
2	Journals of Gerontology - Series B Psychological Sciences and Social Sciences	142
3	Journal of Studies on Alcohol and Drugs	122
4	Tobacco Control	117
5	Social Psychiatry and Psychiatric Epidemiology	116
6	American Journal of Community Psychology	109
7	Health and Place	101
8	AIDS Care - Psychological and Socio-Medical Aspects of AIDS/HIV	92
9	Sociology of Health and Illness	92
10	American Journal of Health Promotion	87
11	Journal of Learning Disabilities	86
12	Journal of Urban Health	86
13	Health Promotion International	82
14	Violence and Victims	82
15	Journal of Health Communication	81
16	Future of Children	80
17	Alcohol	78
18	Ageing and Society	77
19	British Journal of Social Work	77
20	Trauma, Violence and Abuse	77
21	Substance Use and Misuse	76
22	AIDS Education and Prevention	71
23	Disability and Society	71
24	Journal of Aging and Health	71
25	Archives of Gerontology and Geriatrics	70
26	Drug and Alcohol Review	70
27	Journal of medical ethics	69
28	Human Ecology	67
29	American Journal of Health Behavior	64
30	Community Mental Health Journal	63

10.2Appendix II: Journal scope text

Ageing and Society

Ageing & Society is an interdisciplinary and international journal devoted to the understanding of human ageing and the circumstances of older people in their social and cultural contexts. It draws contributions and has readers from many disciplines including gerontology, sociology, demography, psychology, economics, medicine, social policy and the humanities. Ageing & Society promotes high-quality original research which is relevant to an international audience to encourage the exchange of ideas across the broad audience of multidisciplinary academics and practitioners working in the field of ageing.

AIDS Care - Psychological and Socio-Medical Aspects of AIDS/HIV

AIDS Care provides a forum for publishing in one authoritative source research and reports from the many complementary disciplines involved in the AIDS/HIV field. These include, among others: psychology, sociology, epidemiology, social work and anthropology, social aspects of medicine, nursing, education, health education, law, administration, counselling (including various approaches such as behavioural therapy, psychotherapy, family therapy etc). AIDS and HIV infection, the planning of services, prevention and the fear of AIDS affects many echelons of society ranging from individuals, couples and families through to institutions and communities. A particular aim is to publish work emanating from many centres and in so doing address the global impact of AIDS.

AIDS Education and Prevention

Presenting state-of-the-art research and information, AIDS Education and Prevention is a vital addition to the library collections of medical schools, hospitals, and other institutions and organizations with HIV/AIDS research programs. The journal integrates public health, psychosocial, sociocultural, and public policy perspectives on issues of key concern nationally and globally. Included are: * Reports on innovative epidemiological studies. * Analyses of the full range of risk behaviors and processes. * Close examinations of the challenges facing particular communities. * Descriptions of leading-edge education and prevention initiatives. * Empirically based reviews of the efficacy of existing programs. * Special supplements providing in-depth coverage of essential topics.

Alcohol

Alcohol is an international, peer-reviewed journal that is devoted to publishing multi-disciplinary biomedical research on all aspects of the actions or effects of alcohol on the nervous system or on other organ systems. Emphasis is given to studies into the causes and consequences of alcohol abuse and alcoholism, and biomedical aspects of diagnosis, etiology, treatment or prevention of alcohol-related health effects. Intended for both research scientists and practicing clinicians, the journal publishes original research on the neurobiological, neurobehavioral, and pathophysiological processes associated with alcohol drinking, alcohol abuse, alcohol-seeking

behavior, tolerance, dependence, withdrawal, protracted abstinence, and relapse. In addition, the journal reports studies on the effects alcohol on brain mechanisms of neuroplasticity over the life span, biological factors associated with adolescent alcohol abuse, pharmacotherapeutic strategies in the treatment of alcoholism, biological and biochemical markers of alcohol abuse and alcoholism, pathological effects of uncontrolled drinking, biomedical and molecular factors in the effects on liver, immune system, and other organ systems, and biomedical aspects of fetal alcohol spectrum disorder including mechanisms of damage, diagnosis and early detection, treatment, and prevention. Articles are published from all levels of biomedical inquiry, including the following: molecular and cellular studies of alcohol's actions in vitro and in vivo; animal model studies of genetic, pharmacological, behavioral, developmental or pathophysiological aspects of alcohol; human studies of genetic, behavioral, cognitive, neuroimaging, or pathological aspects of alcohol drinking; clinical studies of diagnosis (including dual diagnosis), treatment, prevention, and epidemiology. The journal will publish nine issues per year; the accepted abbreviation for Alcohol for bibliographic citation is Alcohol.

American Journal of Community Psychology

The American Journal of Community Psychology publishes original quantitative, qualitative, and mixed methods research; theoretical papers; empirical reviews; reports of innovative community programs or policies; and first person accounts of stakeholders involved in research, programs, or policy. The journal encourages submissions of innovative multi-level research and interventions, and encourages international submissions. The journal also encourages the submission of manuscripts concerned with underrepresented populations and issues of human diversity. The American Journal of Community Psychology publishes research, theory, and descriptions of innovative interventions on a wide range of topics, including, but not limited to: individual, family, peer, and community mental health, physical health, and substance use; risk and protective factors for health and well being; educational, legal, and work environment processes, policies, and opportunities; social ecological approaches, including the interplay of individual family, peer, institutional, neighborhood, and community processes; social welfare, social justice, and human rights; social problems and social change; program, system, and policy evaluations; and, understanding people within their social, cultural, economic, geographic, and historical contexts.

American Journal of Health Behavior

The American Journal of Health Behavior seeks to improve the quality of life through multidisciplinary health efforts in fostering a better understanding of the multidimensional nature of both individuals and social systems as they relate to health behaviors. The Journal aims to provide a comprehensive understanding of the impact of personal attributes, personality characteristics, behavior patterns, social structure, and processes on health maintenance, health restoration, and health improvement; to disseminate knowledge of holistic, multidisciplinary approaches to designing and implementing effective health programs; and to showcase health behavior analysis skills that have been proven to affect health improvement and recovery.

American Journal of Health Promotion

The editorial goal of the American Journal of Health Promotion is to provide a forum for exchange among the many disciplines involved in health promotion and an interface between researchers and practitioners.

Archives of Gerontology and Geriatrics

Archives of Gerontology and Geriatrics provides a medium for the publication of papers from the fields of experimental gerontology and clinical and social geriatrics. The principal aim of the journal is to facilitate the exchange of information between specialists in these three fields of gerontological research. Experimental papers dealing with the basic mechanisms of aging at molecular, cellular, tissue or organ levels will be published. Clinical papers will be accepted if they provide sufficiently new information or are of fundamental importance for the knowledge of human aging. Purely descriptive clinical papers will be accepted only if the results permit further interpretation. Papers dealing with anti-aging pharmacological preparations in humans are welcome. Papers on the social aspects of geriatrics will be accepted if they are of general interest regarding the epidemiology of aging and the efficiency and working methods of the social organizations for the health care of the elderly.

British Journal of Social Work

Published for the British Association of Social Workers, this is the leading academic social work journal in the UK. It covers every aspect of social work, with papers reporting research, discussing practice, and examining principles and theories. It is read by social work educators, researchers, practitioners and managers who wish to keep up to date with theoretical and empirical developments in the field.

Community Mental Health Journal

Community Mental Health Journal is devoted to the evaluation and improvement of public sector mental health services for people affected by severe mental disorders, serious emotional disturbances and/or addictions. Coverage includes: nationally representative epidemiologic projects intervention research involving benefit and risk comparisons between service programs methodology, such as instrumentation, where particularly pertinent to public sector behavioral health evaluation or research.

Disability and Society

Disability & Society is an international disability studies journal providing a focus for debate about such issues as human rights, discrimination, definitions, policy and practices. It appears against a background of constant change in the ways in which disability is viewed and responded to. The journal publishes articles that represent a wide range of perspectives including the importance of the voices of disabled people. Disability & Society invites papers where definitions of disability are acknowledged to be relative and segregated approaches are seen as inadequate and unacceptable - placing greater emphasis on inclusion. Perspectives

are also invited which critique ways in which policy intentions may or may not have the desired effects in the everyday lives of disabled people. Disability scholars engage and identify with other oppressed groups and the journal leads the way in forging new paths for disability studies.

Drug and Alcohol Review

Drug and Alcohol Review is an international meeting ground for the views, expertise and experience of all those involved in studying alcohol, tobacco and drug problems. Contributors to the Journal examine and report on alcohol and drug use from a wide range of clinical, biomedical, epidemiological, psychological and sociological perspectives. Drug and Alcohol Review particularly encourages the submission of papers which have a harm reduction perspective. However, all philosophies will find a place in the Journal: the principal criterion for publication of papers is their quality.

Future of Children

The Future of Children journal offers comprehensive, cross-disciplinary articles focusing on issues related to children. Published twice per year, it seeks to promote effective policies and programs for children by providing policymakers, service providers, the media, and others interested in children's issues with timely, objective information based on the best available research. Each journal issue examines a single topic of importance to children from a multidisciplinary perspective. The first issue was released in 1991 by the Packard Foundation. Since 2004, Princeton University and the Brookings Institution have been publishing The Future of Children.

Health and Place

The journal brings together international contributors from geography, sociology, social policy and public health. It offers readers comparative perspectives on the difference that place makes to the incidence of ill-health, the structuring of health-related behaviour, the provision and use of health services, and the development of health policy. At a time when health matters are the subject of ever-increasing attention, Health & Place provides accessible and readable papers summarizing developments and reporting the latest research findings.

Health Promotion International

Health Promotion International contains refereed original articles, reviews, and debate articles on major themes and innovations in the health promotion field. In line with the remits of the series of global conferences on health promotion the journal expressly invites contributions from sectors beyond health. These may include education, employment, government, the media, industry, environmental agencies, and community networks. As the thought journal of the international health promotion movement we seek in particular theoretical, methodological and activist advances to the field. Thus, the journal provides a unique focal point for articles of high quality that describe not only theories and concepts, research projects and policy formulation,

but also planned and spontaneous activities, organizational change, as well as social and environmental development.

Human Ecology

Journal of Medical Ethics is a leading international journal that reflects the whole field of medical ethics. The journal seeks to promote ethical reflection and conduct in scientific research and medical practice. It features articles on various ethical aspects of health care relevant to health care professionals, members of clinical ethics committees, medical ethics professionals, researchers and bioscientists, policy makers and patients. Subscribers to the Journal of Medical Ethics also receive Medical Humanities journal at no extra cost. JME is the official journal of the Institute of Medical Ethics.

Journal of Aging and Health

The Journal of Aging and Health is a peer-reviewed, interdisciplinary forum for the presentation of research findings and scholarly exchange in the area of aging and health. Manuscripts are sought that deal with social and behavioral factors related to health and aging. Disciplines represented include the behavioral and social sciences, public health, epidemiology, demography, health services research, nursing, social work, medicine, and related disciplines. Although preference is given to manuscripts presenting the findings of original research, review and methodological pieces will also be considered.

Journal of Health Communication

Journal of Health Communication: International Perspectives is the leading journal covering the full breadth of a field that focuses on the communication of health information globally. Articles feature research on: • Developments in the field of health communication; • New media, m-health and interactive health communication; • Health Literacy; • Social marketing; • Global Health; • Shared decision making and ethics; • Interpersonal and mass media communication; • Advances in health diplomacy, psychology, government, policy and education; • Government, civil society and multi-stakeholder initiatives; • Public Private partnerships and • Public Health campaigns. Global in scope, the journal seeks to advance a synergistic relationship between research and practical information. With a focus on promoting the health literacy of the individual, caregiver, provider, community, and those in the health policy, the journal presents research, progress in areas of technology and public health, ethics, politics and policy, and the application of health communication principles. The journal is selective with the highest quality social scientific research including qualitative and quantitative studies.

Journal of Learning Disabilities

The Journal of Learning Disabilities (JLD), a multidisciplinary, international publication, presents work and comments related to learning disabilities. Initial consideration of a manuscript depends upon (a) the relevance and usefulness of the content to the readership; (b) how the manuscript compares to other articles dealing with similar content on pertinent variables (e.g., sample size,

research design, review of literature); (c) clarity of writing style; and (d) the author's adherence to APA guidelines. Articles cover such fields as education, psychology, neurology, medicine, law, and counseling.

Journal of Medical Ethics

Journal of Medical Ethics is a leading international journal that reflects the whole field of medical ethics. The journal seeks to promote ethical reflection and conduct in scientific research and medical practice. It features articles on various ethical aspects of health care relevant to health care professionals, members of clinical ethics committees, medical ethics professionals, researchers and bioscientists, policy makers and patients. Subscribers to the Journal of Medical Ethics also receive Medical Humanities journal at no extra cost. JME is the official journal of the Institute of Medical Ethics.

Journal of Studies on Alcohol and Drugs

The Journal of Studies on Alcohol and Drugs began in 1940 as the Quarterly Journal of Studies on Alcohol. It was founded by Howard W. Haggard, M.D., director of Yale University's Laboratory of Applied Physiology. Dr. Haggard was a physiologist studying the effects of alcohol on the body, and he started the Journal as a way to publish the increasing amount of research on alcohol use, abuse, and treatment that emerged from Yale and other institutions in the years following the repeal of Prohibition in 1933. In addition to original research, the Journal also published abstracts summarizing other published documents dealing with alcohol. At Yale, Dr. Haggard built a large team of alcohol researchers within the Laboratory of Applied Physiology—including E.M. Jellinek, who became managing editor of the Journal in 1941. In 1943, to bring together the various alcohol research projects conducted by the Laboratory, Dr. Haggard formed the Section of Studies on Alcohol, which also became home to the Journal and its editorial staff. In 1950, the Section was renamed the Center of Alcohol Studies.

Journal of Urban Health

The Journal of Urban Health is the premier and authoritative source of rigorous analyses to advance the health and well-being of people in cities. The Journal provides a platform for interdisciplinary exploration of the evidence base for the broader determinants of health and health inequities needed to strengthen policies, programs, and governance for urban health. The Journal publishes original data, case studies, commentaries, book reviews, executive summaries of selected reports, and proceedings from important global meetings. It welcomes submissions presenting new analytic methods, including systems science approaches to urban problem solving. Finally, the Journal provides a forum linking scholars, practitioners, civil society, and policy makers from the multiple sectors that can influence the health of urban populations.

Journals of Gerontology - Series B Psychological Sciences and Social Sciences

The Journals of Gerontology® were the first journals on aging published in the United States. The tradition of excellence in these peer-reviewed scientific journals, established in 1946, continues today. The Journals of Gerontology Series B® publishes within its covers the Journal of Gerontology: Psychological Sciences and the Journal of Gerontology: Social Sciences.

Social Psychiatry and Psychiatric Epidemiology

Social Psychiatry and Psychiatric Epidemiology is intended to provide a medium for the prompt publication of scientific contributions concerned with all aspects of the epidemiology of psychiatric disorders - social, biological and genetic. In addition, the journal has a particular focus on the effects of social conditions upon behaviour and the relationship between psychiatric disorders and the social environment. Contributions may be of a clinical nature provided they relate to social issues, or they may deal with specialised investigations in the fields of social psychology, sociology, anthropology, epidemiology, health service research, health economies or public mental health. We will publish papers on cross-cultural and trans-cultural themes. We do not publish case studies or small case series. While we will publish studies of reliability and validity of new instruments of interest to our readership, we will not publish articles reporting on the performance of established instruments in translation. Both original work and review articles may be submitted. 90% of authors who answered a survey reported that they would definitely publish or probably publish in the journal again.

Social Science and Medicine

Social Science & Medicine provides an international and interdisciplinary forum for the dissemination of social science research on health. We publish original research articles (both empirical and theoretical), reviews, position papers and commentaries on health issues, to inform current research, policy and practice in all areas of common interest to social scientists, health practitioners, and policy makers. The journal publishes material relevant to any aspect of health from a wide range of social science disciplines (anthropology, economics, epidemiology, geography, policy, psychology, and sociology), and material relevant to the social sciences from any of the professions concerned with physical and mental health, health care, clinical practice, and health policy and organization. We encourage material which is of general interest to an international readership. The journal publishes the following types of contribution: 1) Peer-reviewed original research articles and critical or analytical reviews in any area of social science research relevant to health. These papers may be up to 9,000 words including abstract, tables, and references as well as the main text. Papers below this limit are preferred. 2) Peer-reviewed short reports of research findings on topical issues or published articles of between 2000 and 4000 words. 3) Submitted or invited commentaries and responses debating, and published alongside, selected articles. 4) Special Issues bringing together collections of papers on a particular theme, and usually guest edited.

Sociology of Health and Illness

Sociology of Health & Illness is an international journal which publishes sociological articles on all aspects of health, illness, medicine and health care. We welcome empirical and theoretical contributions in this field in the form of original research reports or review articles. In addition to the six regular issues published each year, subscribers receive a further special issue. These themed issues aim to identify and contribute to new areas of debate and research in the discipline and each issue is devoted to an important topic of current interest.

Substance Use and Misuse

For over fifty years, Substance Use & Misuse (formerly The International Journal of the Addictions) has provided a unique international multidisciplinary venue for the exchange of original research, theories, policy analyses, and unresolved issues concerning substance use and misuse (licit and illicit drugs, alcohol, nicotine, and eating disorders). Guest editors for special issues devoted to single topics of current concern are invited. Topics covered include: Clinical trials and clinical research (treatment and prevention of substance misuse and related infectious diseases) Epidemiology of substance misuse and related infectious diseases Social pharmacology Meta-analyses and systematic reviews Translation of scientific findings to real world clinical and other settings Adolescent and student-focused research State of the art quantitative and qualitative research Policy analyses Negative results and intervention failures that are instructive Validity studies of instruments, scales, and tests that are generalizable Critiques and essays on unresolved issues Authors can choose to publish gold open access in this journal.

Tobacco Control

Tobacco Control is an international peer-reviewed journal covering the nature and consequences of tobacco use worldwide; tobacco's effects on population health, the economy, the environment, and society; efforts to prevent and control the global tobacco epidemic through population-level education and policy changes; the ethical dimensions of tobacco control policies; and the activities of the tobacco industry and its allies.

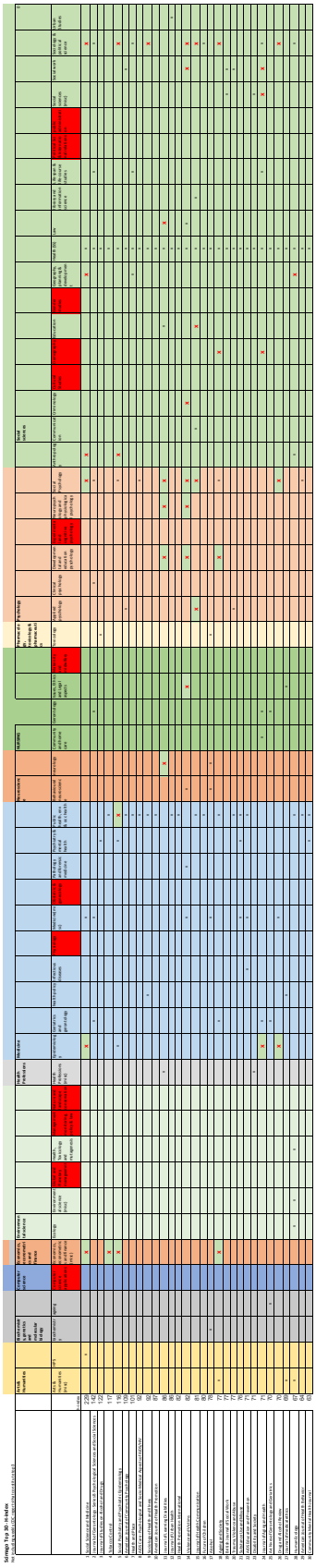
Trauma, Violence and Abuse

Trauma, Violence, & Abuse (TVA) is devoted to organizing, synthesizing, and expanding knowledge on all forms of trauma, abuse, and violence. This peer-reviewed, online journal is practitioner oriented and will publish only reviews of research and law review articles. TVA is dedicated to professionals and advanced students who work with any form of trauma, abuse, and violence. It is intended to compile knowledge that clearly affects practice, policy, and research. TVA publishes reviews of research studies. We also publish legal analyses, which include reviews of case outcomes, laws, or the research upon which the analyses are based. Reviews must be based on a sufficient number of studies to justify synthesis. Reviewed literatures may come from the social or behavioral sciences or the law.

Violence and Victims

Violence and Victims is a peer-reviewed journal of theory, research, policy, and clinical practice in the area of interpersonal violence and victimization. The journal seeks to facilitate the exchange of information on this subject across such professional disciplines as psychology, sociology, criminology, law, medicine, nursing, psychiatry, and social work. Special emphasis is given to the reporting of original empirical research on violence-related victimization within and outside of the family, the etiology and perpetration of violent behavior, health care research related to interpersonal violence and to trauma, legal issues, and implications for clinical and community interventions. Development and validation of new assessment and treatment methods are also given high priority.

10.3 Appendix III: Picture of the journal rank and subject classification database.



10.4 Appendix IV: Example of schedule for semi structured interview

- New biomarkers but unstandardized (measurement) protocols
- Missing data, even more in Longitudinal studies

Interview schedule (date)

STS questions – knowledge, innovation and method.

Current area/discipline

1. What domains and disciplines do you consider yourself to work in?
2. What research methods do you use?
3. Do you consider yourself to have developed any particular methods?

Changes to current area

4. What are the key recent changes in your areas of research?
    a. Policy, data, technology, other
5. What are the key anticipated changes in your areas of research?
    a. Policy, data, technology, other
6. How are you responding to these in your research?
7. Who else are you aware of who is responding to these changes?
8. How are these other people responding to these changes?
9. Why are they responding in this way and not others?

Methods

10. What new methods and methodologies are emerging in your areas?
11. How are these addressing the problems?
12. How do these changes alter knowledge production?
13. How do they alter interdisciplinarity and collaboration?
14. What are the challenges of methodological innovation?
15. Why do you think these methods are important? And not, say, other options…

Future

16. What is the future for research method development in your areas?
17. What new things do you anticipate?

What are the changes in Society, policy, technology and data that may impact?