

Commentary Article

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A Framework for Archaeological Involvement with Human Genetic Data for European Prehistory

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Abstract: A concern with ethics and commitments to ethical conduct and standards has increasingly been raised within archaeology, recently also concerning aDNA data. We suggest that codes, whether for working with ancient DNA or other archaeological practices, need to be multi-faceted, or layered, to reflect the different situational contexts of research. We further argue for a more reflexive text addressing “issues of attention” or “concerns.” We address a number of concerns that should be considered and balanced against each other in the research process. They include respect, rights, appropriation, access, and collaboration.

Keywords: ethical concerns, aDNA, research contexts, multi-faceted

1 Introduction

As the use of genetic data is becoming more widespread, the ethical implications of generating and analysing these data are also becoming more apparent (e.g., Alpaslan-Roodenberg et al., 2021; Prendergast & Sawchuk, 2018; Wagner et al., 2020). While ancient DNA is also now being extracted from plant and animal remains, and even from the soil, analyses on human remains still have the strongest resonance in popular media and the highest public profile, in turn making ethical awareness of how we produce these data and their eventual use even more important. The data provide evidence of individuals, their personal traits and histories, as well as of wider populations. There are, therefore, special ethical implications of this kind of research. Moreover, while there are many ethical guidelines and codes of conduct for research on human remains (e.g., BABA0, 2019; Cassman et al., 2007; Deutscher Museumsbund, 2013; Marquez-Grant & Fibiger, 2010; SAA, 2021), they do not fully extend to the ever-growing body of biomolecular data, in part because in such codes “human remains” are often more narrowly understood as the macro-physical remains of a person. Moreover, it is essential to differentiate between fossil and archaeological human remains dating back several thousand years and contemporary human remains with living descendants or groups of descendants (Stutz, 2023). In many

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countries, additional regulations for research on soft tissues and DNA sampling of the contemporary population have, therefore, been developed to cover research on the human body in more comprehensive ways. For example, in the UK the Human Tissue Authority is “an independent regulator of organisations that remove, store, and use human tissue for research, medical treatment, post-mortem examination, education and training, and display in public” (<https://www.hta.gov.uk/> accessed 17 Jan. 2023), which covers DNA samples. In France, the study of contemporary human DNA is very restricted and genotyping can only proceed upon the request of a judge (article 16.11 du code civil, https://www.legifrance.gouv.fr/codes/article_lc/LEGIARTI000047569313).

Underwriting modern science is not only respect for individuals and their rights, but also a desire to drive scientific investigations forward and use the full range of techniques available in pursuit of knowledge. Science is a progressive project, and as part of that progress we at times need to reassess whether and how we stay true to our commitment to human dignity, respect, and rights – to be ethical in our disciplinary practices. In this article, we argue that now is a good time to review and consider the ethical challenges of genetic data as they pertain to prehistoric archaeology in Europe. This general need is becoming widely recognised, and proposals for ways forward in terms of professional standards or codes of ethics have been made, usually based on arguments that contend that “the ethics of aDNA research has a particular urgency because of the rapid growth of the field, the social and political impacts of studying ancestry, and the fact that aDNA work analyses once-living people who must be respected” (Alpaslan-Roodenberg *et al.*, 2021, p. 41).

Concerning prehistoric Europe, only a few populations claim direct connections to (and at times descent from) prehistoric human remains. One of these is the case of the Saami, a European indigenous population, who today inhabit the northern latitudes of Norway, Sweden, Finland, and Russia. A very different case is the attempt by various modern New Age groups or Pagans to claim a privileged status concerning prehistoric human remains, in particular in the UK, where various factions have argued that they should be considered to hold rights equivalent to those of indigenous peoples elsewhere (Wallis & Blain, 2011). This has not, however, gained legal recognition. Both groups are excluded from consideration here.

Instead, we want to argue for a common set of ethical concerns relevant to most of the genetic research on prehistoric human remains in Europe, which presents a number of specific characteristics (Stutz *et al.*, 2025). To begin with, with the exception of the Saami, most European citizens do not see themselves as direct descendants of the prehistoric individuals that archaeologists study. There is, however, widespread interest in archaeology rooted in a shared set of values that see heritage as worthy of study and preservation (Kajda *et al.*, 2018). This is backed by national- and European-level legislation concerning protection of and access to heritage, with a strongly developed commercial sector and funded research projects contributing to a substantial, regular increase in knowledge. Much of this is communicated via a burgeoning popular science and media landscape, to which most European citizens have access. The interpretation of Europe’s heritage is, however, complicated by its historically developed association with narratives of national building and national identities, which are now challenged by some developments (e.g., European integration) and in turn strenuously defended by other (e.g., national conservative) interest groups. We take this into account in our discussion of dissemination. While these aspects characterise the European situation in particular, our reflections are also relevant to other world regions with similar constellations of factors.

It is on this background that we need a discussion of what a framework of concerns should address – and what pitfalls must it avoid. One of the first major challenges is whether ethics can be universal, and what implications and consequences deciding on this might have. This concern is not unique to archaeology and the challenges of formulating shared attitudes in a multicultural world are recognised by wider debates. The aim becomes “to discover a rational basis for a global ethics, which has a universal normative force, but assumes cultural differences” (Winkler, 2022, p. 2).

At one level, ethics, understood as behaviour being guided by moral values, is a universal concept within any research. However, in practical terms, within archaeology there are different understandings of what these values are. For instance, there have been disputes about who sets the standards of ethical behaviour, challenges to taken-for-granted assumptions, and other disagreements that appear to undermine the notion of universalism. This has been most marked in settings where descendant or indigenous communities have claimed direct affiliation or affinity with the remains to be sampled. The formulation of such relatedness takes different forms, for instance through ancestral relatedness (e.g., Nash, 2004; Rasmussen *et al.*, 2015;

TallBear, 2013), belonging to the same faith group (e.g., Bergquist, 2001; Sayer, 2010, pp. 79–94), or shared experiences such as recent conflicts (e.g., González-Ruibal et al., 2015; Steele, 2008). In these cases, concerns are so interwoven with the political present and differences in cultural practices and ontologies that assuming universalism can be detrimental (Tsosie et al., 2021).

We wish to propose that not all aspects of these wider discourses are equally relevant everywhere. In short, we propose to contextualise such debates to make them more relevant and easy to apply. Therefore, this article asks how archaeologists working on data relating to prehistoric Europe can reframe insights from such wider international debates, tailoring them to the specific way archaeologists and people in Europe related to the past. We further propose this can lead to a fruitful reassessment of our current practices in a manner that appreciates and embraces the specific contexts in which archaeology is carried out.

European prehistoric human remains and how to study them, including genetic sampling, have largely been self-determined by the scientific community and its institutions and by governmental departments, including museums. This has produced policies for working with human remains, but apart from stressing respectful handling, the underlying concerns of most guidelines are that human remains are a scarce and non-renewable resource. In terms of ethics, prehistoric archaeological human remains have, therefore, largely been treated as any other archaeological materials (Stutz, 2023, with recent survey for Sweden). Anyone wishing to engage in destructive sampling is generally asked to take only as much material as they need, to avoid double-sampling, and to return any excess. What we wish to argue in this article is that a more encompassing consideration of ethical concerns at all stages of the archaeological process can be of lasting benefit, not only in terms of the curation of our shared heritage, but also in terms of contributing to a scientific practice that is reflexive, accountable, respectful, and inclusive. In addition, it aligns better with, and pays respect to, the different contexts of the research process which may include different stakeholders from museums to science labs.

2 The Basis for a Framework of Ethical Concerns: The Stages of the Archaeological Process

Although ethics should underwrite the entirety of the research process, each stage of this process pose different challenges. These distinct stages may, therefore, provide useful anchoring points for a framework of concerns, with specific questions and considerations relevant for each stage. However, the process should also allow feedback loops and revisits to former stages as a natural outcome to benefit from experiences gained. Thus, while *ethics* refers to general principles about how we handle and use past human material, a *framework of concerns* refers to their practical implementation in concrete phases of the research process. We apply the concept of framework of concerns, since we advocate a reflexive, contextualised approach, rather than ultimate demands that may not be achievable or desirable in every situation.

2.1 Why Sample?

The first stage is the research design, during which robust questions about the purpose of the research must be raised including why new genetic data are needed. This should also include careful consideration of the number of samples needed to contribute meaningfully to the research question; this point is now commonly agreed on (e.g., Sirak & Sedig, 2019). At this stage, researchers should aim to be explicit about prior assumptions, and how these influence the selection of data. The principles of maximal outcome from minimal interference with human remains should be followed. The widespread optimism about the potential of new methods in the early phase meant that aDNA sequencing in itself was considered a goal, because the outcome of prehistoric genomes was yet to be fully understood. Likewise sampling procedures were not fully developed. Thus, the recognition that aDNA is better preserved in petrous bones and the cementum of teeth (e.g., Pinhasi et al., 2015) meant a great leap forward, also in sampling intensity. This was sometimes considered

problematic among museum curators (Källén *et al.*, 2024), even if sampling also became more precise, as fewer samples had to be discarded (Källén *et al.*, 2024). In response, Prendergast and Sawchuk (2018) raised several ethical issues and called for a best practice guide for the sampling of aDNA. They list seven principles, including that “Researchers must [be] specific about project goals, and explicit about proposed sample destruction” (Prendergast & Sawchuk, 2018, pp. 810–811).

2.2 Sampling Process

Moving through the next stage – the preparation for and the sampling itself – any need for collaborative work must be established from the beginning, when possible. Who has rights over remains (and on what basis) needs to be clarified and permissions sought. At this stage, a written letter of agreement should be formulated and signed (a MoU, memorandum of understanding). It should state where data are planned to be first published, and if there are restrictions on further publication until after the first publication. Co-authorships should also be agreed as well as a proposed timeline for the work. During the research phase new samples and collaborators may sometimes be added, and the process is repeated.

Sampling ethics should affect the way samples are prepared, sequenced, and stored. In addition, sampling should be carried out in such a way that it does not preclude future sampling (by the current team or another) for additional analyses. Permission for further sampling should always be secured from the sample holder and cannot be passed on directly between research teams. Procedures should be used that minimise the destructiveness of sampling. When sampling teeth and petrous bones care should be taken to maintain the integrity of the cranium and the teeth for further palaeoanthropological studies or museography purposes. If the cranium is fragmented and the petrous bones are present and accessible, the entire temporal bone can be accessed in the clean lab to subsample the best part of the petrous bone in the least destructive way. Teeth can similarly be removed from the sockets and subsampled in the lab, leaving the crown intact.

Both the research programme and the MoU must specify how destructive sampling is to be minimised, while extracting the maximum information. The ideal scenario is that the research team includes all the necessary expertise to carry out the full suite of desirable analytical methods: aDNA and various isotopic analyses, C14 dating, calculus, and so on. For some samples, such as rare fossil samples, photography and CT scans should be considered mandatory. Full genomic shotgun sequencing is preferred to targeted sequencing or SNP genotyping, or a combination of both methods should be used. However, when ideals meet practice, this comprehensive approach may be beyond the reach of some project budgets, and in any case new analytical methods (e.g., extraction of specific proteins or hormones) are being developed all the time. The MoU should therefore also specify a procedure how and under what circumstances access to samples can be granted to other research teams using different methods (potentially before the original study is fully completed) in a way that avoids double sampling. Thus, a project should only sample for its own research questions, but preferably leave enough sample material to allow others to carry out other types of analysis whenever possible.

The human remains sampled should be treated as valuable resources irrespective of the research outcome, and the information about sampling should be shared as a common good rather than selectively disseminated based on interests. Sirak and Sedig (2019) have, for example, proposed that samples that did not yield sufficient ancient DNA should also be reported and stored. Yet, determining whether skeletal samples will yield usable genetic data is difficult and not always secure. Progress in making visual quality estimations based on previous experiences of negative results have been developed and applied in several labs. Thus, negative results of sampling will, therefore, help to enhance the expertise of the research community on this point.

2.3 Collaboration and Stakeholders

These practices are basic to develop a shared sense of responsibility for human remains. The holders of human remains must be made to feel actively engaged and their separate curatorial roles toward the remains

respected, but there is evidence that this was not always the case during the earlier phase of aDNA research (Källén et al., 2024).

As also suggested by Prendergast and Sawchuk (2018, p. 810–811), museum collaborators should be welcome to contribute intellectually to project development and the interpretation of results. This can be achieved by online meetings before starting the project, and physical meetings when possible. Often, their contribution will take the form of describing and discussing the archaeological context, mostly published in Supplementary Information to the article. It is important that archaeological contexts are systematically described to allow colleagues to use the information comparatively for new projects or for critical discussion (Booth et al., 2021). All parties should agree to terms of collaboration, through the MoU between institutions, rather than individuals. However, when many museum collaborators provide information on samples their main contribution will often be providing high quality contextual information for each sampled individual. Thus, while an MoU remains a necessity, different ways of reaching meaningful collaborations should be explored depending on the resources and interests of the partners.

A further important step in minimising double sampling is to ensure general accessibility, for example through coherent and systematic terminology in labelling. Some inconsistencies and “ageing” of information are unavoidable. However, researchers need to ensure that their raw data are as usable as possible, allowing others to pursue different research questions. As the volume of data increases all the time and includes ever wider groups of potential users, it will be increasingly necessary to consult different sets of specialists about their needs (e.g., Pasquetto et al., 2017; Richards, 2022, p. 4).

Finally, once sampled data have been published and made available open access in databases like European Nucleotide Archive, they are free for all to reanalyse and produce new interpretations and potentially new kinds of evidence without having to seek any further permission and without including the sample providers as co-authors. However, where further information about samples are needed, co-authorship is recommended.

2.4 How are Data Disseminated and Used?

Ethical concerns are also attached to the various forms of dissemination. This is given greater space here, as it is not commonly addressed in comparable guidelines and codes but is particularly pertinent for the European case, which is historical burden of political misuse (Kristiansen, 2022, p. 14–16). Here, inclusivity and consultancies with “owners” are important, which should be covered by the MoU. But there is also a duty of care in terms of interpretations and how the supporting data are disseminated, including appreciating what makes these outcomes accessible and useful for various groups, and also how it may be misused, even if much of this is beyond the control of the research teams. From the start, aDNA created high levels of both scientific and public interest, as it provided a new type of evidence that opened new doors to the past (Krause & Trappe, 2019, 2021; Kristiansen, 2022; Reich, 2018). It has since then been supported by considerable funding and public prestige (Jones & Bösl, 2021, pp. 22–58). This has led to a concern amongst archaeologists about the interpretations and communication of aDNA studies (e.g., Booth, 2019; Frieman & Hofmann, 2019; Furholt, 2018; Ion, 2017; Pyburn, 2023; Samida, 2020), including calls for care in the terminology used to characterise archaeological groups and cultures (Eisenmann et al., 2018). The risk of conflating prehistoric cultures with genetically defined ancestry groups has also been pointed out (Frieman & Hofmann, 2019; Furholt, 2018). It represents an area in need of more research rather than taken for granted interpretations (Kristiansen, 2022, pp. 37–43).

To this should be added the need for scrutiny of value-laden interpretations especially in how data about the pigmentation of people’s skin, eyes, or hair are communicated, as well as other value judgements about appearance, such as notions of “typical” males or females (e.g., Burmeister, 2021). Where such aspects are highlighted in press releases and articles, genetic information has the potential to become highly political. Therefore, care should be taken to avoid headlines or titles that can be appropriated for political misuse. While similar potential abuses also apply to some other forms of data (a classic example is the long-discredited

osteological focus on skull morphology as indicators of racial purity and cognitive capacities), ancient DNA analyses involve specific challenges because of their easy misappropriation for nationalistic and racist narratives (Saini, 2019), or for those centred on national identities, family structures, or gender roles (e.g., Bonacchi *et al.*, 2018; Nash, 2012). A major objective of aDNA is identification of relatedness among ancient individuals and between modern and ancient individuals. As such, it can easily be co-opted to support contemporary interests including politicised narratives of ancestry and blood lines, for example justifying the occupation of certain territories (e.g., Abel & Frieman, 2023). The point is not to avoid addressing potentially controversial topics, such as appearance, but to develop clear strategies of how to frame such findings, and how to react to any challenges that may arise, such as misuse by politically motivated groups.

Clear communication on these matters is challenging, and sometimes unpredictable. While different models of participation, including public involvement at all stages of the scientific process from developing questions through to interpreting results, have been debated in archaeology generally (e.g., Colwell-Chanthaphonh & Ferguson, 2008; articles in Kowal *et al.*, 2023; Moschenska, 2017; Schut *et al.*, 2015), the complex nature of archaeogenetic work tends to be seen as preventing similar engagement. Most dissemination is a one-way, top-down process (often via the intermediary of university press offices) with little opportunity for dialogue or further contextualisation.

The appropriateness of this strategy needs to be more widely reflected. This requires greater understanding about patterns of communication in the public domain (e.g., Bonacchi, 2018; Källén *et al.*, 2019; Källén, 2025), so that scientific projects can develop a clearly defined impact assessment for their outreach work and an agreed strategy of how to respond when research data are used in socially divisive ways. Such strategies should be discussed and agreed upon between all project participants before dissemination occurs, to provide a (potentially targeted) response when and where appropriate.

In addition, the increasing affordability of aDNA data may bring more stakeholders onto the scene. As aDNA analysis comes within the reach of smaller, regional, and local museums, who may have human remains in their collections, but no trained specialists among their staff, more involved collaboration is required. They do not just need guidance on how to sample, but also on framing questions and interpreting results, including a clear appreciation of the limitations of genetic data. This kind of communication and support places considerable demands on the scientific collaborators of such endeavours.

3 A Proposal for a Framework of Ethical Concerns

The core ethical principles reflected through these stages of the archaeological research process tend to be largely similar: consultation, regulations, minimising damage, sharing, involving stakeholders, dissemination of results, and responsible engagement in public discourse. In our recommendation, we aim to stay close to the consensus that emerges from these but to add matters of “local” concern to them. We argue that without such reflections there is a risk for these principles to remain aspirations that do not easily translate into actual practice. On this basis, we propose five topics of ethical concern for European prehistoric archaeology.

3.1 Respect

The importance of respect is widely acknowledged, even if it remains an elusive concept. We shall clarify what meaning we assign to it in an archaeogenetic and osteological context. As regards human remains, arguments about respect are primarily focussed on the dignity of the deceased (e.g., Scarre, 2003; Tarlow, 2006) or on respecting people who have feelings of attachment to the remains. Both concerns are culturally specific and vary depending on notions of relatedness to past humans. In most European contexts, respect for prehistoric human remains is largely due to their age and evidential potentials (as witnesses of past times), rather than genealogical claims or the dignity of ancestors. Wider concerns should now include the societal impact of

genetic data and their interpretations on potential audiences and consumers. More work is needed on how respect should be expressed and how the proper forms and formulations should be agreed upon (Stutz et al., 2025).

Respect should be given both to the human remains *per se* and to the individuals, communities, or institutions that they belong to. This means that all local rules and regulations governing the samples and their storage should be followed. The MoU signed between the sample providers and the labs conducting the research should specify the samples concerned, the scope of the study, the methodology, when the samples will be returned or stored after the study, how they will be made available to others, and how the results will be disseminated. A different form of respect takes precedence when dealing with samples that particular communities may claim (e.g., Fleskes et al., 2022; Hudson et al., 2020), although this is rare for prehistoric remains in Europe.

In a European framework of Ethical concerns Respect should be based on the recognition of past humanness and the importance of remains as historical data and evidence. It should also concern itself with all forms of practices and interactions informing the scientific process, including dissemination.

3.2 Rights

Today most nation-states have legislation protecting cultural heritage and rights to heritage, including archaeology, while also adhering to international conventions or regulations to secure such rights more universally. Such rights take various forms and are grounded in different kinds of claims. In terms of ancient DNA, rights can be allocated based on assumptions of ownership or rights to knowledge (e.g., Porsdam & Porsdam Mann, 2021). In practice, this means that the “rights to do” need to be granted to the researcher. Yet other kinds of rights (legal, moral, customary, traditional) need to be recognised as well and allocated in a transparent manner. Without such recognition, efforts focused on rights may backfire or risk essentialising deeply complex matters. Potential conflicts between different rights claim must be recognised and sympathetically addressed, even if such cases are not common in a European context.

In a European framework of Ethical concerns Rights should be understood to potentially go beyond legal claims. Sampling and analysing human remains should be based on having been granted the right to do so. Archaeologists (whether acting as sample discoverers, sample providers, or curators) should not automatically assume they have rights, and they should not assume they can adjudicate between different rights claim. They should be cautious about offering data in support of such claims by others.

3.3 Collaboration

It is important to recognise that collaboration can take different forms and be incorporated into the research process at different stages. Typically, collaborations take place around sample provision and during dissemination; collaboration on final interpretation will typically include the primary research group, even if all co-authors are presented with the results before publication and thus can make comments. The sample providers are typically other archaeologists or museum staff, with collaboration including the sharing of essential insights into contexts and making contributions to the wider interpretation. Yet other stakeholders may also become involved. The description of the work and the expectations of the collaboration should be made clear in the MoU.

Collaboration works best if it is based on early engagement with sample providers and other stakeholders. If communities are represented by research boards or similar institutions, these should be consulted. It is the joint responsibility of geneticists, curators, and archaeologists to ensure that stakeholder groups are identified and engaged.

In a European framework of Ethical concerns Collaboration should be embraced as a genuine part of the research process. Different forms of collaboration suited to stakeholders' varied needs and expertise should be explored.

3.4 Access

Principles of open access are central to research and cover museum archives and stores as much as databases and publications. These are not only central principles for scientific quality control, but also for applying different research questions to the data. To fulfil commitments to open access, it is not sufficient that data are openly available, they also have to be useful to others, including others with different research agendas and expertise.

In a European framework of Ethical concerns, Access should cover physical, intellectual, and affective access. Attention should be given to facilitating access for differently positioned stakeholders, including those from outside academia. Researchers should work to establish best-practice protocols for data, including ensuring their longevity.

3.5 Dissemination, Outreach, and Public Involvement

Given the considerable attractiveness of archaeogenetic results for the media, we note the central role that an explicit and agreed-upon dissemination strategy should play in collaborative research endeavours. For this to be effective, we need to become more aware of both the diversifying number of stakeholders and their needs and expectations, as well as the way communication patterns work.

In a European framework of Ethical concerns, Dissemination should aim at diverse stakeholders, including outside academia. Projects should pay attention to the intention of different media and their reporting patterns and actively counter any form of misappropriation of research as far as possible. They must avoid overselling, resist pressure from outside the discipline, and understand how interpretations may be used in contemporary identity politics.

4 Conclusion: A Layered, Situational Code of Concerns for European Prehistory

In this article, we have suggested that codes of conduct, whether for working with ancient DNA or other archaeological practices, need to be multi-faceted, or layered, to reflect the different situational contexts of research. We further argue that a “code of conduct” can be interpreted as a top-down authoritative statement aimed at policing practices, rather than a tool for generating reflexivity. The latter is much needed at this stage of a new scientific practice. We, therefore, propose to replace the wide calls for a universal code of ethics for aDNA research with a more reflexive text addressing “issues of attention” or “concerns” (see also Fleskes *et al.*, 2022). We have argued for a number of concerns that should be considered and balanced against each other in the research process. They included respect, rights, appropriation, access, collaboration, and dissemination. We have summarised our strategy in Figure 1. Our focus on Europe illustrates some of the shortcomings (and complexities) surrounding global initiatives and the striving towards shared standards, as for prehistoric Europe there are usually no clearly defined descendant groups to involve in decisions for this remote past. However, this does not make the past less political.

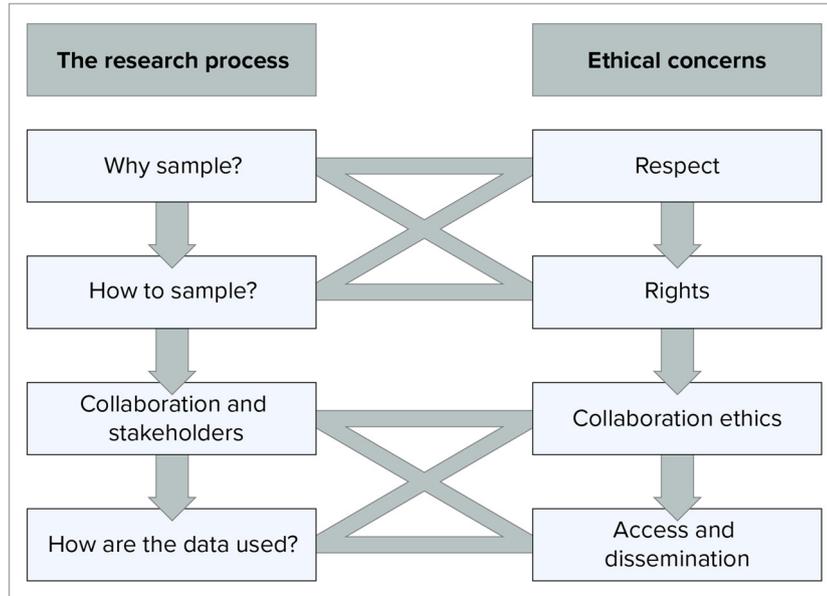


Figure 1: Summary diagram of how the research process interacts with ethical concerns.

A wider aim in writing this article is to inspire project leaders, stakeholders, researchers, and other participants in upcoming projects to address each step in the research process separately and with care. Although ethics should underwrite the entirety of the research process, its different stages pose different challenges, and this provides an opportunity to address relevant questions systematically. The core ethical principles of consultation, adhering to regulations, minimising damage, sharing, involving stakeholders, dissemination of results, and responsible engagement in public discourse remain similar, but matters of “local” concern must be added for each case. We argue that without such reflections there is a risk for these principles to remain aspirations that do not easily translate into actual practice.

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