

Mixed race bodies and biomedicine: the relational politics of blood stem cells

Introduction

Clinical transplantation operates on an understanding of 'compatibility' between patients/donors. This understanding is entangled with ideas of biological relatedness and transmission (i.e., relatedness generates genetic similarity). At scale, transplantation requires large resources - databases or banks of donor tissue - to which donors must be recruited. In the context of blood stem cells, donation rhetoric mobilises a 'vital public' (Strong 2005) of donors and recipients, united by highly embodied relatedness. Like other tissue donation modalities (e.g., blood and organ), this notion of relatedness is informed by ideas of race.

Ideas of racialised difference saturate contemporary biomedicine; genetics and genomics seek to describe, measure and account for differences between bodies, using race and race-like concepts to do so (Bliss 2011; Fujimura and Rajagopalan 2011). In tissue donation systems, the impulse to describe difference with reference to race interfaces with concerns around 'representation'; that is, that databases/banks are genetically (and, thus, 'racially') representative of those whom they intend to serve. Practitioners have sought to improve representation where it is considered skewed (Williams 2018). In western biomedical contexts, this is generally under-representation of people racialised in ways other than white. Efforts to ensure adequate representation can be described as *racialising recruitment*, which invokes an audience's (perceived) racial identity so that appeals, often heavily affective and ethically laden, can be made on the grounds of collective racial identity and relatedness (Williams 2021).

Recently, however, there has been increasing concern with bodies that confound discrete racial categories: that is, people described as mixed race or heritage, multi-racial and similar terms. Those under this umbrella of what critical social science literature describes as *mixedness* present a multi-layered challenge to contemporary biomedicine. Such bodies are seen as relatively (compared to ostensibly 'discrete' racial groups) *genetically complex*, given they inherit genetic profiles from biological parents of different 'genetic backgrounds'; such bodies are also considered *increasingly common* in many western countries as the diasporic consequence of empire and migration. Moreover, especially in the global north, these bodies are not often understood in terms of a collective relatedness, or as forming a social group, population or community, in contrast to those understood in many western societies as *within* a specific racialised community (e.g., the UK's Japanese community).

The paper takes up the wider special issue's invitation to unpick blood's relational politics – its generative capacity for new connections between bodies – whilst inscribing differences between groups. It critically interrogates ideas of the mixed race *body* and its genetic uniqueness or rarity, forged through reproduction across ostensibly stable racial lines. The paper pitches this alongside ideas of mixed race *bodies*, and our capacities for collectivity and attendant registers of relatedness. It acknowledges the highly problematic notion of mixedness as one that can assert troubling biological accounts of race and traces how it is nonetheless enacted in the science of blood stem cell transplantation, reanimating an enduring discursive problematisation of mixed bodies (Caballero and Aspinall 2018). It extends debates about racialising recruitment in biomedicine, demonstrating mixedness' troubling of

biomedicine's standardised approaches to enrolling racially minoritised 'communities'. Through this, the paper offers novel insights into the powerful relational politics of blood which render mixed bodies problematic, whilst part of a broader, growing collective. This novelty comes by centring the mixed race body which has received little attention in the social scientific literature on biomedicine.

The paper begins by describing the racialised, relational politics of blood stem cell transplantation before characterising relevant aspects of critical mixed race studies literature. The paper then draws upon a three-year mixed-methods study of UK blood stem cell donation. It ends by offering questions for a research agenda that confronts the contemporary interface of biomedicine and mixedness.

The racialised, relational politics of transplantation

Blood stem cell (herein, stem cell) transplants are used for patients with blood diseases (e.g., leukaemia), who receive cells donated by a genetically matched donor. Two sources of these cells exist. The first is through donation of what is sometimes called 'bone marrow'. Most stem cells derived this way are collected through a process like blood donation. Patients' full siblings will be checked as a match. If they have no matching full siblings, a donor will be sought through a stem cell register, managed by a stem cell registry. Donors generally join a register through a 'recruitment drive' or media appeal held to encourage would-be donors to provide a saliva sample to be genetically typed and logged on a register. The second source is from umbilical cord blood, milked immediately post-birth from a placenta. The blood has the stem cells extracted. These are genetically typed, frozen in a bank, and logged on the register. This form of umbilical cord blood donation is ostensibly 'public', distinctive from 'private' forms of cord blood banking that have attracted more social scientific attention (Brown and Williams 2015).

An international network of registers predominantly in the global north, comprising data of would-be donors and cord blood units, are searched to locate genetic matches for patients in need, distinguishing stem cell from blood and organ donor systems which operate at national levels. The UK's registers currently comprise ~2.3m donors (Anthony Nolan 2024), around 3% of roughly 74m UK-based 17-60 year-olds, i.e., age limits of UK registers (Office of National Statistics 2023).

Like all transplantation, stem cell transplantation rests upon a logic of *histocompatibility* or tissue 'matching' in which humans can be genetically dis/similar. The goal is pairing genetically similar donors and recipients using the system of Human Leukocyte Antigens (HLA). Full siblings stand a one-in-four chance of being a matching donor. Beyond this, histocompatibility is thought most likely between recipients and donors who share a racial background. This racialised understanding is, as I have explored elsewhere (Williams 2021), a highly reductive account of how histocompatibility works. It rests on the fact that individuals inherit HLA types from their biological parents. At scale, we see a relational politics in action: immediate familial heritage expands to an entire 'population' which, vivified by ideas of cross-generational kinship through reproduction, is understood as loosely related (consider, for example, a measure like a 'kinship coefficient' that estimates common ancestry between subjects). In much scientific literature, the idea of 'population' transmutes into race. This results in claims that, for example, Black patients are most likely to find HLA tissue matches from Black donors (Williams 2018). This may bear out, but the stability of

claims to Blackness – what it means to ‘be Black’ – can be seen to shift over time and space such that there is limited utility to invoking race to explicate histocompatibility.

This racialised understanding is prevalent, however. Stem cell registers are thought to under-serve racially minoritised patients who are demonstrably less likely to find matching donors. This is because there have historically been disproportionately few registered racially minoritised donors. The reasons for this are complex and multiple, though are often pinned to an enduring lack of ‘trust’ amongst such individuals. Contemporary manifestations of the UK’s colonial history in its health systems have had an enduring effect on people’s engagement with health services. The COVID-19 vaccination programme provides a recent example. Low uptake precipitated activity to encourage racially minoritised vaccination, acknowledging people’s differing levels of trust in the UK government and health services (Smart et al. 2024).

Uneven entitlement and access to healthcare in the UK is informed by legacies of British empire and commonwealth; British citizenship is itself a contested category denied to many who were subjects of empire (Fitzgerald et al. 2020). Racial under-representation in stem cell donation must be understood in this context. Efforts to engage racially minoritised people in the act of tissue donation – of joining a ‘vital public’ (Strong 2009) – are undertaken in a context where belonging to a wider *civic public* is not a settled matter (see Kim, this issue, for a related exploration of this in South Korean blood donation).

Since the 1990s, concern about racial under-representation on stem cell registers has prompted targeted, *racialising recruitment*. Such recruitment is often led by people who can claim to be from ‘within’ the same community as those to whom they appeal. This status is considered effective in engaging that audience. This is relational work for it invokes a mutual racial position of the recruiter and the potential donor – enacted through creative practice such as talk (e.g., collective pronouns) and locational choice (e.g. places of worship, carnivals and festivals). This allows the making of moral appeals based on racialised grounds: that one *ought* to do something for their community. This *ethico-racial imperative* frames donors as a ‘vital public’ sharing an ‘embodied association elicited through the generalised exchange of body’ (Strong 2009: 173). This imperative is performative, demanding that racially minoritised people participate in the vital public of donation that is currently noted for its absence of them; it simultaneously *produces* racialised vital publics (e.g. Black donors) (Williams 2021).

Mixedness, however, has been little discussed in this context though it presents an important case for thinking through how race and biomedicine interface. Mixed race patients, whose ancestries confound reductive distinctions of racial taxonomy, are seen as problematic for clinicians and registry workers alike. Firstly, they are perceived as more challenging in terms of locating matching donors because of their genetic ‘rarity’. Secondly, they trouble ‘community’-based donor recruitment methods targeting minoritised spaces in a bid to generate racialised vital publics. A common strategy for such recruitment across different donation systems is to target spaces thought likely to attract particularly racialised individuals. For example, the recruitment of Muslim plasma donors through partnering with mosques and ‘community ambassadors’ (NHS Blood and Transplant 2021).

The mixed race body confounds a science of histocompatibility which animates reductive ideas of coherent racialised groups (e.g. the UK’s ‘Muslim’ community) who are understood

to be distantly interrelated, and so more histocompatible. This 'problem' is compounded by the apparent demographic increase of mixed race bodies.

Mixedness: category, problem, community

Notions of 'mixedness' have a history entangled with projects of ordering, distinguishing, and valuing bodies. In different contexts, mixedness (what does (not) constitute a 'mix' in a given space and time?) gestures towards different geographies and histories (e.g., Wade 2004 on Latin America; Lo 2002 on Asia), but always point towards processes of racialisation: categories, types or kinds being merged.

This said, interest in mixedness has recently gained prominence in many global north countries. In part, this is because whilst mixed bodies have existed for as long as the notion of distinct 'races' has, in countries like the UK and the US, the 'mixed'/'multiracial' census category is considered one of the fastest growing racial/ethnic demographics. The claimed increase of mixed *people*, as opposed to the increase of mixed *identity* should be treated with some caution - for example, the UK national census introducing a mixed category in 2001 (Song 2021; Morning 2012) would suggest that mixedness simply did not exist before the 21st century, when it of course did (Caballero and Aspinall 2018; Ali 2012). This notwithstanding, the topic has generated interest amongst social scientists, many ourselves identifying as mixed.

For the purposes of this paper, it is helpful to focus on two interrelated issues: the 'mixed' body as a problematic 'merger' of other exclusive, natural categories; and the question of whether, in this context, a mixed 'community' – an assemblage of mixed bodies – can be said to exist. Before this, it is important to flag that the emergence of a critical mixed race scholarship revives a question familiar to the wider scholarship of race: in using terms like mixed race, do we 'become trapped in an essentialistic language framework'? (Telles and Sue 2009: 140; also Gunaratnam 2014). Mixedness surely gestures towards a troubling understanding of discrete racial boundaries, so we are wise to treat it with critical attention as an object of study. But this wrangling is a manifestation of how race operates. We trip over race's linguistic reproduction because the notion of mixedness 'hinges on which groups are perceived to be races in the first place' (Morning 2012: 17) and on the 'salient boundaries' (DaCosta 2020: 336) a body might be seen to transgress.

In the UK, the census emphasises the salient boundaries; Asian, Black, and White constitute major categories, the 'mixed' account for mergers between these, with white the assumed fulcrum around which mixedness pivots: white and Black, white and Asian. In the UK, likely because of its colonial history, 'mixed race' is arguably most used to signify mixed Black/white people. Being Welsh and Irish (which, like 'Asian', betray the conflation of geography and nationhood with ideas of racialised difference) does not itself constitute a 'mix' at the bureaucratic level of the census, because in this context the boundary is not salient enough to be breachable. In short, what constitutes a mixed body is tied up in systems of social ordering. Who gets called 'mixed' relies on what comes to constitute difference.

Boundaries of difference are a perennial concern to genetic science. This field has been intellectually wrapped up in the project of inferring, measuring and numerating difference for centuries. Language differs; some researchers opt for that of race and ethnicity, whilst others write of ancestral populations. Yet all enact what Fujimura and Rajagopalan call genome geography: 'bits of genomic sequence become associated with specific geographic locations,

posited as the place of origin of people who possess these bits' (2011: 7). Race in turn becomes a metonymic stand-in for particular genetic polymorphisms. Consider commonplace claims that Black bodies will more likely have higher frequencies of a given polymorphism, such that one could reasonably estimate that the blood belongs to somebody who identifies as Black.

Vitality, human genetic variation studies are shot through with questions of what – or who – constitutes a population, and here, ideas of mixedness are prominent. As one of the canonical works in population genetics puts it:

'When two populations are geographically distant from one another, they tend to be rather different genetically...Later movements may bring two such different populations geographically close to each other. Their mixture will generate a new population, intermediate between the two and probably unique...Black Americans who, in the 300 or more years since they were forcibly taken from Africa to America have received genes from Caucasoid people...at every generation...Today the Black American gene pool is 30% Caucasoid (Cavalli-Sforza et al. 1994: 55)

By such accounts, sufficient mixture eventuates a new population: in this example, the African American population, which is arguably not generally understood today as a 'mixed' category itself. Mixture is a byproduct of reproduction, and is, in this casting, how 'a new population' comes about. The scientific project of understanding human genetic variation is thus one of superimposing history and spatiality onto bodies with a view to clarifying populations.

Like any border, anxieties over racial transgressions are a discursive staple in relation to mixedness. Focusing on the US and Europe, prevention of 'cross-breeding' or 'miscegeny' through the policing of 'interracial' intimacy was driven by fears of diluting the 'pure' white race (Zack 1993, Phoenix and Owen 2000). Also evident was a tangential interest in the mixed subject's welfare. Early 20th century sociologists framed mixed people as marginal and struggling for identity (e.g., Stonequist 1937), whilst later 20th century social policy in the UK focused on the preponderance of mixed children under state care (Caballero and Aspinall 2018). Concerns with the mixed subject's degeneracy – physically and mentally – are occasionally supplanted by more 'positive' readings of the mixed subject as healthfully vigorous and beautiful (ibid.). Yet a seam of pathologisation is still evident in the UK's contemporary cultural sphere with scholarship drawing on the explicitly racist tenor of media coverage of Prince Harry and Meghan Markle (see Spratt 2024, Andrews 2021 for critical accounts of Markle's positionality), and on public commentators' accounts of today's mixed children being 'marooned' betwixt communities (Song 2014), and therefore without their own.

Do mixed people, united by our mixedness (the collective pronoun itself a claim to *a collective*), come to constitute a community? This question is instructive in considering the relational politics of racialising recruitment, which relies on establishing a racialised collective as a vital public. As Ali (2012) writes of the UK in the late 20th century, mixedness was submerged into the singular political category of Black, a collective identity against racism. US histories of 'hypodescent' (i.e., assigning offspring of people from two racial groups to the socially disadvantaged race group) are argued to have generated a similar collectivising reality (DaCosta 2020). In other words, in both the UK and the US, there was historically little oxygen for mixedness as a category.

With the emergence of a multi-racial movement in the US (Root 1992), and the discursive (if not demographic) explosion of mixedness in the UK as a category that took on more currency generally, came concerns about the eroding solidarity and political strength of a broader non-white collective (Telles and Sue 2009, Ali 2012). Scholars also asked whether a sense of mixedness not simply as *category*, but as *community* could be said to exist (DaCosta 2020). However, the perception of problematic mixed community-lessness rests on 'ideas of race that result in 'communities' defining themselves in such exclusive and purist terms' (Ali 2012: 177). Any sense of collectivity is surely tempered by the reality that 'the socioeconomic location, opportunity structures, and politics of mixed-race people are decidedly diverse' (Rockquemore et al. 2009: 25).

The remainder of this paper is concerned with how communities and the bodies that make them up, are constituted - by whom, and to what end. In biomedical contexts, targeting or recruiting particular racialised groups is its own strategy concerned with how most effectively to reach and engage these groups. In this work, imaginaries of the given community are constituted. What happens, though, when mixedness, which disrupts the already unstable work of constituting racialised community, is invoked so that an appeal for participation can be made to it? The remainder of this paper explores this question, considering how mixedness is mobilised in biomedical recruitment, particularly as it relates to stem cell donation.

Methods

This paper draws upon data from a three-year study of racially minoritised recruitment to stem cell donor registers in the UK. Data include documentary material from two sources: (i) UK policy reports since 2010, a date marked by the emergence of the UK Stem Cell Strategic Forum which was tasked with streamlining UK stem cell provision in the UK. An unusual body with few comparators globally, the Forum drew together leading clinicians, scientists and charities in the area, and authored influential reports that still inform public funding decisions regarding UK stem cell policy; (ii) Transcripts of government debate taken from the UK governmental record about UK stem cell provision. A search from 2000 onward was undertaken to capture the lead up to the emergence of the Stem Cell Strategic Forum.

The paper considers (iii) media reportage of mixed race stem cell donor recruitment, via a dataset of discussion of mixed race stem cell donation in UK regional and national print press media since 2000 to capture the emergence of discourse around mixedness' demographic 'boom'. This wider media search is included because of the need to take media seriously in unpacking how publics engage with tissue donation (see Williams 2022).

The paper also presents (iv) data from interviews from individuals involved in three mixed race 'patient appeals', including patients and family members ($n=7$). Patient appeals occur when patients without existing matching donors seek to recruit more donors to the register in hopes of finding their own match, organising local donor drives and often using social and traditional media. Patient appeals are prominent features of stem cell registries, who often support appeals and link patients with journalists. Patient appeals tend to disproportionately feature racially minoritised patients, which I have unpacked in more detail elsewhere (Williams 2022). Appeal interview data are supplemented with (v) regional/national print press and broadcast activity related to two of the appeals, as well as their internet activity, including any blogs, websites, and activity on YouTube, Facebook and Twitter (now 'X'), which was manually collected or scraped using digital tools.

A supplementary file details policy documents (Table 1), governmental record and traditional media search processes, an overview of patient appeals (Table 2), and patient appeal media (Table 3).

Analysis adopted an abductive approach (Timmermans & Tavory 2012), based on an 'inferential process' informed by the author's knowledge of literature in the empirical area. Codes included the pathologisation of mixedness and the related 'genetic rarity of mixed bodies'. These and other themes were applied using NVivo for government policy and debate transcripts, as well as traditional media relating to patient appeals. Social media data from the appeals underwent descriptive statistical analysis to measure frequency, and content was read in Microsoft Excel and, where relevant, added to the NVivo outputs which collated themes from interviews/media.

Ethical approval was secured from the author's institution. Interview data are anonymised. Social media content presented is reworded per an ethical fabrication framework (Markham 2012) to retain tone and meaning whilst removing back-searchability and risk of reidentification.

Mixed race bodies: problematically rare, increasingly common

Accounts often set individual patients' challenging genetic rarity against mixedness as an increasingly common feature of UK demography (and consequently an increasingly common patient feature and, thus, problem for clinicians and registry workers locating matches). The seeming contradiction – being rare *and* common – makes sense when considered within the dual register of the rare individual body's blood, and the multiple bodies forged, as the following empirics demonstrate, as a vital public.

Consider a piece in the national tabloid *Daily Mirror* newspaper explaining that "[w]hen a patient is of mixed race it makes it harder to find the right donor, like looking for a needle in a haystack" (Daily Mirror 2006); or a story about one patient's search for a stem cell donor from national news outlet ITV (2015): "But the search is made more difficult due to [the patient's] mixed race background. [Their mother] is black British while [their father] is white British, which means [the patient] is three times less likely to find a 'perfect' (HLA) match". The product of this merger is a rarer HLA type with troublingly poorer odds of locating a matching donor.

Elsewhere, mixed bodies are described as 'rare', and mixedness as making things 'complicated'. For example, a piece describing the case of a child struggling to find a match on the register in newspaper *The Independent*:

Things become even more complicated for people of mixed-race backgrounds, where the blending of Britain's gene pool – considered by geneticists as something that will improve the overall health of our society – makes the search for a suitable transplant fiendishly complex. [...M]ost donated organs need to come from donors that are both the same blood type and tissue type, otherwise the body's immune system will kick in and reject the organ. We inherit blocks of tissue type from both our parents, which means mixed-race children often have much more complex or rarer tissue types than the national average. (Taylor 2010)

The journalist's explanation of histocompatibility and rejection pivots on the child who represents what is framed as ongoing 'blending' of the UK 'gene pool'. Whilst normally improving society's 'overall health', per narratives of mixing as generative of healthful vigour (Caballero and Aspinall 2018), this is set against the 'fiendishly complex' or 'rarer' quality of mixed race people's tissue types.

This reportage characterises wider media discourse of mixed race patient bodies as problematically rare. It also echoes political discourse at the turn of the millennium. During this period, appetite to address inequity in access to stem cell transplantation in part manifested in consideration of a relatively novel source of stem cells: umbilical cord blood. Cord, which by this point had a clinical evidence base as a source of stem cells, was being collected in the UK in a pilot scheme (Donaldson et al 2000). By the 2000s, substantial government investment in cord blood was being considered.

Buttressing this move to invest in cord blood were concerns about mixed race patients. In the below extract from the parliamentary record, where investment in large-scale cord blood banking in the UK was discussed, a parliamentarian made mention of a member of his constituency:

A constituent of mine... was of mixed parentage and died of leukaemia because she could not find a suitable bone marrow match.... The cord blood bank... would give a lot of hope to people of mixed parentage who face these life-threatening diseases with, sadly, little hope of finding a suitable donor. (HC Deb 17 October 2008)

The intervention, like the pieces described above, energises an account of the troublesome mixed race body having 'little hope'. Such bodies' fatal fortunes are cast without work (here, an investment in cord blood) to improve them. The constituent, who passed away for lack of a stem cell match, is effectively a cautionary tale of the biomedical challenge of mixedness.

The mixed race patient, then, became an important justification for stem cell investment in the UK, forming part of the rationale to expand stem cell banking. This was evident not just in drawing on individual stories of loss as in the parliamentarian's words above, but on statistics and predictive demographic rises. A landmark 2010 government report published by those involved in maintaining the UK's supply of stem cells analysed matching odds by ethnic group, demonstrating the poor matching odds for mixed race patients in need of a stem cell transplant in quantitative terms:

*data on matching rates suggests that **Caucasian patients are more than twice as likely (88%) to locate a suitably matched donor than mixed race patients (40.7%)**...domestically sourced donors and cord blood donations reflect the unique genetic diversity of the UK population in a way that registries in other countries cannot. This is particularly important in light of **the growing mixed race population in the UK.** (Stem Cell Strategic Forum 2010: 18-25, my emphasis)*

The concern around such patients with low matching odds was framed in the report as part of the rationale for increased UK government investment in both adult 'donors' onto the existing stem cell registers, and in cord blood banking. Importantly, addressing this imbalance in

access (caused by the UK's genetic diversity, embodied especially in the mixed race patient) needed to lean into that same genetic diversity, by recruiting more mixed race donors, now a particularly cherished commodity. Woven into this discursive shift towards mixed race bodies as a point of concern was acknowledgement of a demographic turn to mixedness: 'the growing mixed race population in the UK'. These bodies – each *uncommon* in their unique genetic constitution – were becoming more *common*.

By the time of the same group's report a decade later, a sense of the UK's mixed ethnic future had solidified.

*“The UK population is relatively diverse...The chance of finding a well-matched donor varies significantly among the different minority ethnic groups, with mixed ethnicities being the hardest to match. **With increasing population diversity in the UK in the future, there will be further growth in the complexity of HLA types in the general population.**” – Stem Cell Strategic Forum 2022: 10, my emphasis*

Statutory leadership was grappling with 'growth of complexity' in the UK population's genetics, embodied in 'mixed ethnicities'. Registers of adult donors and cord blood donation needed to take this into account.

Over this period, as racial representation became of concern, different actors emerged: predominantly small charities who tasked themselves – often because loved ones could not locate matching donors – with recruiting more people of their own racial backgrounds. Importantly, they mobilised a mutual racial identity with their audience of interest, and a shared ethical investment in the act of registering. Invoking an *ethico-racial imperative* (Williams 2021; Smart et al. 2024) in this way relies upon generating the shared ground on which both recruiter and audience can stand, as the asked are invited to join the vital public of donors.

These efforts constitute an audience to whom appeals can be made, drawing on cultural tropes, like where and how particular racialised communities spend time. Gurdwaras, mandirs and mosques, it is assumed, draw South Asians; Caribbean carnivals or specific music events (e.g., hip-hop or grime) are presumed to attract Black footfall. These reductive assumptions cannot capture the heterogeneity of Black and Asian taste, culture, and practice. They demonstrate, however, how signifiers of racialisation – like cultural consumption or religion – allow settled if highly problematic, potentially inaccurate accounts of the lived experience of particular racialised people, that allow them to be circumscribed as *communities* (Hall 1992). In this context, mixedness presents a significant practical challenge to the now-standard practice of racialising recruitment given the seeming inability to pitch mixed bodies as belonging within an apparently discrete racial group, of common place and taste, to whom appeals can be made. In other words, recruitment's essentialising effort to articulate particular racialised communities effectively precludes mixedness.

The mixed body as placeless and beyond community

Patient appeals are attempts centred around one patient whose story is featured on social and traditional media to draw attention to stem cell donor registration. Appeals can generate enormous spikes in donor registrations, and occur when a patient has not found a match on the register and is attempting to elicit registrations. Because of HLA's exacting matching

requirements, appeals work by attracting large amounts of registrations, in anticipation that one may be the patient's required HLA type. At any one time in the UK, multiple patient appeals are ongoing; these are disproportionately focused on racially minoritised patients, many identifying as mixed race. Appeals are catalysed by a patient/family themselves, supported by a registry to expand media exposure.¹ A focus on them highlights some of the practical responses to the dominant conception of mixedness as a problem for the stem cell registries trying to find matches for patients.

Appeal 1, for a young woman, garnered significant media attention. A news article about the appeal describes the challenge confronting mixed race patients, rehearsing the discursive thread of genetic complexity discussed above. Interspersed with words from an individual involved with the appeal, it describes the 'practical issues' associated with attempting to find mixed race donors.

*"When you have a mixed-race person, it's extremely difficult to find a donor for them." They tend to have a more complex blood type, and there are practical issues, too. The potential pool of donors is smaller, and recruitment can be difficult. **An Ashkenazi patient who needs a match can hold a drive at a synagogue, but mixed-race people are more dispersed.** "There's Chinatown and there's Japan-town, but there's no mixed-race-town" (media coverage, appeal 1, my emphasis)*

The piece flags the stem cell registers' paucity of mixed race donors, and that recruitment of such donors is 'difficult'. The quoted interviewee acknowledges the approach of much racialising recruitment, which employs a racialised understanding of place (e.g., going to areas with an expected density of particular racialised people); whilst one might seek Chinese donors in 'Chinatown' (itself a reductive, if pragmatic, assumption), there is no apparent equivalent material concentration of mixed people through which to access this evidently crucial vital public.

A research interview with the father and aunt of a child at the centre of appeal 2 describes a similar issue:

***Father:** But if you look at where people come from and attribute that to race, there is a link to geography...Africans come from Africa, Jamaicans come from Jamaica, English people, supposedly, come from England, **but mixed-race people don't have a place.** ...there's no geographical community... (research interview, appeal 2)*

¹ For more about appeals and their comparability to other forms of patient-led activity intended to stimulate donation like medical crowdfunding, see Williams 2022 which also discusses the tension between the focus of the appeal (the patient) who is statistically highly unlikely to locate their HLA match through the appeal, and the innumerable potential future beneficiaries of their appeal. When registering in response to an appeal, one may go on to be anybody's donor. This is distinctive from circumstances where somebody donates with the recipient already having been determined (e.g., a sibling-to-sibling related stem cell donation, or 'directed' kidney donation)

Invoking the same framing of mixed people not having a place, he describes this as the absence not only of place but of a 'geographical link' to 'their community'. The same participant, who was interviewed alongside his sister (the patient's aunt) went on to describe their inability to 'target' activity on those more likely to have a compatible tissue type for his daughter.

***Father:** ...my first question to [my daughter's consultants] was, is there a specific geography we can search for? And they said no. Because her HLA type could come from anywhere, literally....Which is why we then just said, "okay, we're going to do the biggest appeal that we can have"...They said that her donor could come from anywhere in the world.*

***Aunt:** Anywhere. So we couldn't actually target a community, a geographic area, we had to just blanket. (research interview, appeal 2)*

Like other interviewees, they sought information from their consultant about HLA frequencies in people from different geographies, to help them target particular audiences. Clinicians could offer no advice on where the search might be directed (it 'could come from anywhere'), prompting a generalised or 'blanket' appeal, hopefully capturing the apparently more numerous, albeit far more dispersed mixed audience, rather than adopt a directed approach towards a presumed set of ostensibly discrete racial communities (the standard tack of racialising recruitment).

The mixed race body, then, cast historically as a problem, is presented as similarly problematic: mixed race bodies are becoming more numerous, meaning more mixed race patients requiring matching donors. Efforts to target such potential persons to join the vital public of mixed race stem cell donors is compounded by the apparent genetic complexity of mixedness and the absence of a collective to whom appeals might be made. Mixed bodies trouble the standardised approach to enrolling racially minoritised 'communities' into a vital public of donors. The rest of this section considers attempts made to overcome this strategic challenge.

In a national radio interview, the man at the centre of appeal 3 is asked to explain why he is looking for a donor. He describes how he has operationalised his own genetic history in his recruitment approach.

...you have to...look into your own genetic history and heritage....I'm actually of what's called Macanese descent...a mixture of Chinese and Portuguese. [I'm] melded even further with Irish and English, so I'm quite a – I wouldn't win Crufts, just put it that way – a bit of a mongrel! [laughter]...So [a genetically matching donor is] very, very hard to find, but they are out there...we will keep looking...[and I] focus my efforts on helping everyone, and then occasionally run the odd campaign whether it's the Macanese community, the Portuguese and Chinese community. That's where I can best improve my odds

Referring to the dog show, Crufts, which judges dogs based on conformation to breed standards, the man extends the metaphor to his own 'mongrel' constitution. Though in jest, pitching his body as outside a discrete 'type' speaks to the broader narrative of the mixed race

body between – and outside – typical racial groupings, simultaneously animating a biologised rendering of race. His understanding of this informs his recruitment approach.

Sat at home in an interview broadcast on national television, he displays results of a consumer DNA ancestry test.

...80% of my genetic make-up hails from my British-Irish ancestry, but 20% comes from Southeast Asia...this is information that I can actually use to target my own campaign to best improve the odds of me finding that particular genetic match.

The pair then peruse a world map. He describes post-war Macanese mass migration to the US, and they discuss what this means.

Interviewer: *And that's really crucial...because those people that moved and emigrated to parts of...America will be people that have that mix of Macanese and more Caucasian background.*

Patient: *Absolutely...It's the second, third and fourth generations of Macanese diaspora, like myself, who offer me the greatest hope of finding that particular stem cell donor match...*

Interviewer: *So this search really does need to go global now.*

During his appeal, the man visits a US-based Macanese community organisation to generate registrations. His story appears in the community group's newsletters, with instructions of how to join the US stem cell register. Locating an audience to whom an appeal can be made, then, relies on the man mobilising any genetic information he can retrieve about himself. Diasporic histories are invoked in a bid to locate individuals deemed more likely to be his match.

Returning to appeal 1, which used multiple social media platforms, demonstrates another attempt to reach relevant audiences. Social media platforms were framed as opportunities to reach mixed race audiences without having to locate a particular place where such people are anticipated to gather physically. A 2-minute video shared on Facebook (accruing ~100,000 views) and YouTube (~200,000) was partially reproduced in television news items with news organisations within and beyond the UK. In it, the patient's family talk from their home. Overlaid with pictures of the woman with family and friends, her family speaks:

Mother: She has an aggressive form of leukaemia and she will need a bone marrow transplant...The donor will need to be a genetic match to her and, as you can see, I am Thai and her dad is Italian. This is going to be very, very difficult as only 3% of people who are on the worldwide registry are of mixed raced origin...

Brother: If we'd had some luck, this would have all been easy and I would have been a match...We're now appealing to anyone, especially those of mixed race, to sign up...to potentially help...

A similar video, spoken in Thai, including pictures of the woman in Thailand, is another prominently engaged-with video. This version (~700,000 views on Facebook) demonstrates how the family sought to reach apparently discrete racialised audiences to extend the appeal to them.

Moreover, whilst reflecting during a research interview on how they used social media to try to reach their audience, a family member describes ‘creat[ing] a whole list of all mixed ethnicity celebrities and people...we mass tweeted them and emailed them’. Contacting public figures was hoped to generate a response then visible to the individual’s followers, who might then also engage with the content. Analysis of Twitter activity of accounts associated with the appeal reveal that of 48 public figures from whom the appeal sought attention three or more times, 23, nearly half, might identify, in some form, with the label of being ‘mixed’ (see Table 4, supplementary file). These public figures were tweeted multiple times regarding the appeal drawing upon individuals’ own racial identity:

@NorahJones to save the life of my friend #appealhashtag, we need people with your unique ethnic mix.

@KimKardashian cuz you have a mixed race family, please RT to help save my friend’s life. #appealhashtag

Srsly, imagine if @ZaynMalik actually is the match for [patient] #appealhashtag. He’s the correct mixed race profile!

@MaggieQ My friend is a halfie like you & she needs a mixed race donor! #hapa #appealhashtag

Such comments of course reinforce highly biologized understandings of race in potentially troubling ways (e.g., the term ‘halfie’, an adjective that appeared in the data set several times, suggests a liminal subject position of the mixed race person between two “whole” racial categories). This effort garnered little attention from public figures. The interviewee notes ‘[it] had very little success...you’re just one of thousands or millions of people trying to contact a celebrity’. However, the strategy reveals how such individuals became a proxy for an imagined wider mixed race public, with appeals construing registration as an act of duty towards a particularly racialised community of which the asked is anticipated to be a part.

Discussion

Mixedness is cast in this biomedical context as a problem. The individual mixed body’s genetic rarity amongst growing numbers of such bodies vivifies long-standing societal anxieties over mixedness, which presents a challenge for the dominant contention that populations-cum-communities are valuable resources for recruitment.

Recruitment work – by attempting to engage people in the vital public of donation –always try to locate an audience. The audience of racialising recruitment is called upon to reckon relationally in terms of their race. As detailed above, this holds in the context of mixed patients who seek to make appeals to an audience. However, standard ways of targeting, built

on presumptions about the geographies and tastes of this or that racialised 'community', are troubled; there is an apparent absence of concentrations of mixed bodies in one geographic space, so we see attempts to mobilise knowledge of diasporic patterning (appeal 3's Macanese outreach to locate those with similar familial migration histories to his own). We also see attempts to draw on particular components of one's own mixedness (appeal 1's attempts to reach directly to Thai audiences).

Importantly, whilst they draw donors onto registers for future patients, appeals tend not to locate matches for the featured patients themselves. As of writing, the patient behind one appeal died without a match, another remains searching, whilst the other relapsed and died some time after a transplant from a surprising match: a donor identifying as white. Ultimately, racialised assumptions about their likely 'match' did not bear out, casting further light on the challenge of biomedical recruitment of mixed race people, wherein matching odds are inferred by race. This underlines the ethical tensions of patients being disproportionately burdened with the labour of recruitment themselves, as they seek to redress structural inequities that enabled a public health resource to under-serve them to begin with (Williams 2022).

The biomedical problem of 'under-representation' has been addressed through making appeals to seemingly well-defined audiences (e.g., the "Black community"); in the context of human tissue donation, establishing a vital public of donors is effectively subdivided in particular racialised vital publics. We see the racialised, relational politics of blood at work. Stem cell donor recruitment donation draws on notions of 'community' that package individuals together, eliding difference (Hall 1992) whilst drawing on the obligations that stem from apparent similarity – the duty of community. In this context, mixedness presents a double bind: the mixed race body has a *problematically rare genetic profile*. Secondly, these *bodies* are *increasingly demographically common*. Yet this does not mean that being mixed renders one part of a community - at least not one defined by physical proximity, shared practices and tastes. This problematisation reanimates the pathologising discourse of mixedness as a challenge to be overcome.

Conclusion

Stem cell donation is an instructive case of blood's racialised, relational politics. Under-representation, understood as the consequence of 'mistrust' borne of Empire's legacy, is responded to through efforts of racialising recruitment. The vital publics being invoked appear multiple and, at times, contradictory: a cosmopolitan, international mixed races community is of interest, as well as would-be donors with much the same combination of 'races' as the patients in need of transplant. Moral obligations and affective relations conjured stand to be powerful, as donors are sought, so that requests might be made of them to act for others like themselves (Williams 2021).

This study departs from existing literature by revealing how mixed bodies in particular (rather than racially minoritised bodies generally) are enrolled in contemporary biomedical projects. It demonstrates how mixedness troubles our understanding of race's interface with biomedicine. This novelty is also an opportunity to stake out contours for the underexplored relationship between mixedness and biomedicine. The paper offers some initial questions for further interrogation.

First, how are ideas of complexity or rarity enacted in different biomedical domains grappling with ideas of mixedness? Rarity might be problematic in the domain of histocompatibility, yet is a valued quality for banking/recruitment. Might we see this elsewhere? For example, following the taste for rarity in biomedical collections, might we anticipate especial valuing of mixed bodies' 'rare' genetic profiles in research biobanks? Moreover, how do different biomedical technologies transform what constitutes mixedness? Contemporary molecular technologies allow (not necessarily reliable!) statistical inference of affiliation to particular population groups, complicating which bodies cross salient lines of racial difference. One's HLA type might be seen to reveal an unexpected genealogical story in the context of tissue donation. These 'new routes to mixed "roots"', as DaCosta (2022) puts it regarding direct-to-consumer genetic testing, may be opening up mixedness. How are these questions inflected by local histories of racialisation? For example, offspring of European colonisers and Indigenous persons, as in the Latin American category of mestizo (the largest population category in much of the region), or in Southern Africa where countries have long recognised a 'coloured' category. Both contexts have their own histories of European colonialism, prompting questions of how rarity, pathology and value in relation to mixedness are articulated.

Understanding mixed race bodies in contemporary biomedicine is a vital pursuit, and the above questions offer an initial agenda for this work, which stands to disrupt enduring understandings of race and biomedicine's interaction. Such research could also offer insights into how a demographic future of mixedness that the western world considers itself hurtling towards, might be transforming biomedicine itself.

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