Equality Diversity and Inclusion in the NHS: A comprehensive analysis report.

Authors : Periera, J.L. and Leary, A. (2024) *Equality Diversity and Inclusion in the NHS. A comprehensive analysis report*. Workforce Intelligence Network NICHE. 24 11 2024

Keywords: Diversity, Inclusion, NHS Workforce, Staff Demographics, Equality, Staff

Abstract:

Background: Recent studies have raised concerns about diversity and inclusion disparities within the National Health Service (NHS) workforce. While several studies have focused on specific aspects, a comprehensive overview across gender, age, ethnicity, sexual orientation, disability status, and religious beliefs within the NHS workforce is needed. This study aims to provide a comprehensive analysis of across these variables.

Methods: Data for this study were obtained from NHS Digital. The methodology is based on the Cross-Industry Standard Process for Data Mining (CRISP-DM) model. Descriptive statistics, exploratory data analysis, trend analysis, comparative analysis, cross-tabulation, and data visualization methods were employed to examine patterns and trends in diversity and inclusion in the NHS workforce.

Results: The analysis reveals significant disparities in within the NHS workforce. Females represent 76% of the workforce, while males represent 24%. However, males are slightly more represented in some of the senior grades, such as consultant (59.8% male) and associate specialist (58.5% male). Males and females are almost equally represented in very senior manager grades (50.1% male). Those who identify as Asian/Asian British and Chinese are more likely to hold consultant and specialty registrar positions compared to other ethnic groups. Specifically, 8.54% of those who identify as Asian/Asian British and 14.53% of those who identify as Chinese hold consultant positions, compared to only 3.19% of those who identify as White and 1.50% of those who identify as Black/Black British. A similar pattern is observed in the specialty registrar grade, where 5.11% of those who identify as Asian/Asian British and 11.42% of those who identify as Chinese occupy this position, while only 2.43% of those identifying as Black/Black British and 1.39% of those identifying as White are represented in this grade. Ethnic minorities have low representation at the very senior manager level. Individuals of White ethnicity constitute 86.1% of the workforce in this grade, while Asian/Asian British represent only 4.1%, with minimal representation from other ethnic groups. From 2009 to 2023, there was a significant increase in the representation of Asian/Asian British and Black/Black British ethnicities in the NHS workforce, rising from 6.9% and 4.8% in 2009 to 13.7% and 8.2% in 2023, respectively. Those who identify as Disabled are less likely to hold consultant and specialty registrar positions compared to their non-disabled counterparts. Specifically, 3.84% of those who identify as non-disabled hold the position of consultant, compared to only 1.43% of those who identify as Disabled. A similar pattern is observed in the specialty registrar category, where 2.38% of those who identify as

non-disabled occupy this position, compared to only 1.19% of those who identify as Disabled.

Conclusions: Despite improvements in equality, diversity, and inclusion within the NHS workforce, significant gender, ethnicity, religious belief, disability and sexual orientation disparities persist, particularly in leadership and senior roles. Continued targeted interventions are crucial.

Introduction

Established 76 years ago, the NHS is the largest employer in the UK and one of the largest employers in the world. According to the NHS Constitution for England (Department of Health and Social Care, 2023), providing high-quality care to the UK population requires maintaining a high-quality workplace. The NHS promises to provide a positive environment for its staff, ensuring that each employee is treated fairly, equally, and without discrimination, and works in an environment free from harassment, bullying, or violence. Unfortunately, the lived reality of these values often differs significantly, negatively impacting both patients and staff. Milner et al. (2020) conducted a research study reporting disparities in ethnicity and gender within NHS employment, particularly regarding prestige, position, and pay. The Equity and Inclusion Working Group (2024) performed the research study "Equity, Diversity, and Inclusion in Neurosurgery: Results of the Society of British Neurological Surgeons (SBNS) Engagement Survey" which highlighted that bullying, undermining, and harassment (BUT) among UK and Irish neurosurgeons strongly impact job satisfaction and career progression. Taylor and Medcalf (2022) conducted research reporting differences in gender, age, and ethnicity across doctors, nurses, midwives, and paramedics.

While several researchers have studied NHS diversity and inclusion, they tend to focus on specific aspects, such as ethnicity and gender disparities within specific professional groups. There is a lack of research providing a broad overview of NHS diversity and inclusion across various demographic variables and professional groups.

This study aims to provide a comprehensive workforce analysis of disparities in gender, age, sexual orientation, religious beliefs, ethnicity, and disability status across different groups of professionals and pay bands. These disparities include differences in representation, pay, career progression, and treatment within the NHS workforce. By identifying and analysing these disparities, the study will present the current state of diversity and inclusion within the NHS, identify areas needing intervention, and provide information and recommendations to NHS leaders to help them improve diversity and inclusivity within the NHS workforce.

Our methodology is based on the CRISP-DM model, a reference model for data mining projects. We used Python and Pandas for comprehensive data analysis, employing pivot tables and data visualization. The analysis identified areas of concern that can assist decision-makers in creating a more inclusive and diverse NHS workforce.

In the next section, we present a systematic literature review on equality, diversity and inclusion in the NHS. Section 3 describes the methodologies adopted for data analysis and visualization. Section 4 presents the descriptive statistics, exploratory data analysis, trend analysis, comparative analysis, cross-tabulation, and data

visualization methods used to examine patterns and trends in equality, diversity and inclusion in the NHS workforce. Lastly, Section 5 discusses the analyses and results.

Literature review

This section presents the results of a systematic literature review on equality, diversity and inclusion in the NHS. We used the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) methodology to facilitate a systematic literature search. The search terms were defined based on an iterative analysis of previous studies. Using the identified keywords, we searched the Scopus database and the Ovid research platform, covering the period from May 2019 to May 2024. The search resulted in 390 published articles (Scopus: 254, Ovid: 136). Following the PRISMA methodology, we excluded duplicate articles, articles written in languages other than English, abstracts from congresses, magazine articles, paid or unavailable articles, and articles not related to the topic. After applying inclusion and exclusion criteria to the abstracts, 20 articles were included in the systematic literature review.

Diversity in the NHS Workforce

Current Demographics

Ethnicity and gender disparities exist in NHS employment in terms of position, prestige, and pay. This highlights the need for consistent collection of race and ethnicity data, as well as targeted initiatives to reduce biases and promote diversity, particularly in decision-making roles. Milner et al. (2020) conducted a study to evaluate race, ethnicity and gender disparities in NHS England employment concerning position, prestige, and pay. The study analysed NHS Digital workforce data from 1,105,390 staff members. The results revealed disparities in the likelihood of being employed as doctors across different ethnic groups. Specifically, 42.9% of Chinese NHS staff are employed as doctors, making them the most likely to hold such positions. In comparison, 28.6% of Asian staff and 17.9% of staff from mixed race or ethnicity backgrounds are employed as doctors. In contrast, only 6.8% of White staff are employed as doctors, indicating they are less likely to hold these positions compared to other ethnic groups. However, White doctors are the most likely to be in the highest-paid positions: 46% of White doctors are consultants, while only 33.4% of Chinese doctors are consultants. Those identified as Black are underrepresented among doctors and consultants: 6.5% of black employees are doctors and 30.6% of black doctors are consultants. Similar results were found for nurses and health visitors, where White people were more represented in the higher pay bands. However, in support staff roles for doctors, nurses, and midwives, Chinese people were overrepresented in the higher pay bands. The study also found that men were more likely to be in higher-paid and prestigious roles across all race-ethnic groups compared to females. Study concluded that the NHS must address these disparities by implementing consistent race and ethnic categories in data collection and promoting equality in hiring and promotions. It emphasized the need

for targeted initiatives to reduce biases and support diversity in decision-making positions. To address these disparities, the NHS must collect data using consistent race and ethnic categories to track changes over time.

Despite improvements from 2011 to 2020, significant gender disparities remain in the United Kingdom (UK) surgical workforce. Newman et al. (2022) conducted a study with the aim of comparing gender diversity across UK surgical specialties. They used NHS Hospital and Community Health Service workforce statistics data from 2011 to 2020 and logistic regression to compare the representation of females in 2020 among surgical specialties and examine the evolution from 2011 to 2020. They used the method of least squares to estimate when female representation of specialty registrants would reach 50% (gender parity) for specialties with less than 40% female representation. They found that general surgery was estimated to achieve gender parity of their specialty registrars by 2028, urology by 2033, neurosurgery by 2064, trauma and orthopaedics by 2070, and cardiothoracic surgery by 2082. They concluded that despite improvements from 2011 to 2020, there still exists a gender disparity in the UK surgical workforce, with significant differences between surgical specialties.

Improving workforce well-being in the NHS requires addressing demographic disparities, structural challenges, and fostering supportive work cultures across healthcare professions. Taylor et al. (2022) conducted a research study aimed at understanding the key demographic and structural features of work, as well as well-being differences, among four healthcare professions within the NHS: doctors, nurses, midwives, and paramedics. The study reviewed data from NHS Digital and other national sources. The findings revealed differences in gender, age, and ethnicity across these professions. Nurses and midwives were predominantly female, while paramedics and doctors had more gender balance. Professions other than doctors had aging workforces. There was greater ethnicity diversity among doctors and nurses. In the service architecture, despite net staffing growth, turnover and retention were problematic in all professions. While 41.5% of doctors were consultants, smaller proportions in other professions held high-grade/band roles, and salaries were higher for doctors. The findings also showed that high job stress was prevalent among all groups, especially midwives and paramedics. Sickness absence rates for nurses, midwives, and paramedics were three times higher compared with the absence rates for doctors. The study concluded that sociocultural factors, known to increase the risk of poor mental health, may explain some of the differences reported between professionals. These factors and service architecture play crucial roles in influencing staff well-being and mental health, necessitating multi-level systems approaches to improve workforce well-being, considering the intersectionality and structural differences between professions. It recommended fostering supportive work cultures and developing inter-professional databases to monitor and improve staff well-being.

Trauma and Orthopaedics (T&O) remains an unpopular career choice among women, necessitating collaborative efforts to improve gender diversity. Malik-Tabassum et al. (2023) conducted a research study aimed at identifying factors influencing the career choices of male and female final-year medical students in Trauma and Orthopaedics and comparing trends of female representation in T&O over the last decade with other surgical specialities. The study used an online survey targeting final-year students who attended nationally advertised T&O courses over a 2-year period. They used data from NHS digital to assess gender diversity in T&O compared with other surgical specialities. Results revealed that a significantly higher proportion of women (65.8%) decided against a career in T&O compared to men (34.2%), citing factors such as gender bias, technical aspects of surgery, unsociable hours, on-call commitments, inadequate undergraduate training, and interest in another specialty. The study concluded that T&O remains an unpopular career choice among women. To improve gender diversity in T&O, collaborative efforts were required from universities, orthopaedic departments, and professional societies to embed cultural changes, improve the delivery of the undergraduate curriculum, and facilitate students' exposure to operating theatres and female role models.

Significant gender and racial disparities exist within the general surgical consultant workforce in England and Wales, alongside an imminent workforce crisis due to the large proportion of senior surgeons nearing potential retirement. Dosis et al. (2024) conducted a research study aiming to describe the composition of the surgical consultant body in England and Wales, quantify levels of inequality within it, and outline future workforce challenges. The observational study analysed data on gender, education, subspecialty, and private practice among 2,682 general surgical consultants. The results revealed significant gender and racial disparities. Among the 2,682 consultant general surgeons identified, only 19% were women, with gender inequality most pronounced in university teaching hospitals and specific subspecialties. Almost 40% of consultants did not obtain their first undergraduate degree in the UK, with even fewer surgeons who studied abroad in university teaching hospitals. Additionally, over 40% of general surgical consultants had been qualified for more than three decades, with no equivalently sized group of younger consultants. The study concluded that gender and racial inequality exists in the consultant general surgical workforce. Furthermore, surgeons in their fourth decade of clinical practice constituted the largest group of current practicing consultants, indicating an imminent workforce crisis for senior physicians if they reduce activity or consider early retirement.

Significant disparities in career progression, pay, and leadership roles persist for ethnic minority urologists in the NHS. Philip et al. (2022) conducted a study aimed at addressing the challenges faced by ethnic minority urologists in the NHS and proposing strategies for improving equity, diversity, and belonging in urology. The study found that over 40% of the NHS doctors come from Black, Asian, and Minority Ethnic (BAME) backgrounds, however, there still exist significant disparities in career

progression, pay, and representation in leadership roles. The study also found that BAME doctors are more likely to work in specialties that have recruitment problems, resulting in higher numbers of BAME staff in specialties such as psychiatry, emergency medicine and elderly medicine in economically and socially deprived areas. To address this problem, the British Association of Urological Surgeons (BAUS) implemented some actions, such as mentorship programs and promoting diversity in leadership. The study concluded that some progress has already been made, however more efforts are needed to create a more inclusive and supportive environment for ethnic minority urologists.

Experiences of inequality and discrimination significantly impact student nurses' professional and career perspectives, highlighting the need for the NHS to ensure equal developmental opportunities for all, regardless of ethnicity. Walker et al. (2024) conducted a research study to understand how nurse experiences on clinical placement differ for ethnic minority and White British groups in NHS hospitals. The study used qualitative thematic analysis of semi-structured interviews from 21 hospital-based student nurses in London NHS hospitals. Results highlighted five main themes: the role of mentors, discrimination and unfair treatment, speaking up/ out, career progression, and consequences of adverse experiences. Ethnic minority students reported significant racism and microaggressions, while White British students also experienced discrimination and inequity due to their age, sex, gender, and sexual orientation. Students from both White British and ethnic minority groups faced barriers to career progression. Ethnic minority students also observed an absence of diverse representation in the senior nursing positions, which did not encourage career progression in the NHS. The study concluded that initial experiences of inequality and discrimination profoundly affect student nurses' professional and career perspective, highlighting the need for the NHS to ensure equal developmental opportunities for all, regardless of ethnicity.

Recruitment and Retention Strategies

Strategies have been proposed to retain nurses, however, there is a lack of evidence supporting their effectiveness, highlighting the need for formal evaluation strategies to determine their impact and aid in improving recruitment and retention in healthcare. Williamson et al. (2022) developed a research study to identify and evaluate initiatives aimed at improving the recruitment and retention of nurses in healthcare and ensuring their effectiveness. They analysed thirteen papers that met their inclusion criteria and found that the key themes for nurse retention included leadership and support, ongoing professional development, recognition, work environment, and flexible scheduling. The study identified a significant gap in the literature, with only one paper reporting a formal evaluation of a retention initiative. The authors concluded that while strategies have been proposed to retain nurses, there is a dearth of evidence supporting their effectiveness. Many of the initiatives

are based on limited resources. It is essential that the future can includes formal evaluation strategies to objectively determine the impact of these initiatives on staff retention and their effectiveness. This approach would provide insights into whether the retention initiatives are working, thereby aiding in the retention of nurses.

Recruitment and selection policies in the NHS create barriers for ethnically diverse candidates, highlighting the need for tools like the Healthcare Workforce Equity + Diversity Lens (HWEDL) to foster inclusive recruitment and address systemic issues. Hammond et al. (2022) conducted a research study to understand the reasons behind the underrepresentation of ethnically diverse candidates in their first NHS healthcare jobs post-qualification and identify any structural or systemic barriers to employment for these groups. The study used semi-structured face-to-face interviews with 12 nurse and physiotherapy recruiting managers from two NHS trusts in London. The analysis was performed using a conceptual lens for healthcare workforce equity and diversity. The results showed that while recruiting managers valued the benefits of an ethnically diverse workforce for their organization and patients, their adherence to organizational policies for recruiting emphasising objectivity and standardisation often acted as constraints to recognizing ethnicity as an important issue in the recruitment process and workforce delivery. Some managers sensed barriers for ethnically diverse candidates but lacked adequate information about workforce diversity and recurring monitoring systems to address these issues. Without that information, there was little reason to try different approaches. The study concluded that these recruitment and selection policies appeared to be creating barriers for ethnically diverse candidates to obtain jobs for which they were trained and qualified. It also concluded that HWEDL is a potential tool to inform and allow more inclusive recruitment practices and raise awareness of these systemic issues.

Career Progression

Bullying, undermining, and harassment (BUH) among UK and Irish neurosurgeons significantly impact career progression and job satisfaction. The study "Equity, Diversity, and Inclusion in Neurosurgery: Results of the SBNS Engagement Survey" conducted in 2024 by the SBNS, aimed to investigate the demographics and experiences of neurosurgeons in the UK and Ireland, particularly focusing on BUH in the NHS and how this can have a detrimental effect on career progression and satisfaction. They conducted an anonymous survey that included 189 respondents, of which 175 were neurosurgeons. The survey revealed that 65% of respondents had experienced BUH, with women more likely to be victims. The results also showed that neurosurgeons from minority ethnic backgrounds and those with certain religious affiliations felt uncomfortable being open about themselves at work and perceived barriers to career progression.

NHS conference panels do not yet reflect the diversity of the NHS workforce, with most senior managers and panellists predominantly being men from Caucasian backgrounds. Prathivadi Bhayankaram and Prathivadi Bhayankaram (2022) presented a research study that aimed to verify whether the NHS conference panels reflect the diversity of the NHS workforce. The authors reviewed all available advertising data from major Royal College conferences in the UK between 2015 and 2019 to see how many of the panellists were male or female and how many were Caucasian or BAME. They found that panellists do not yet reflect the diversity of the NHS workforce, most senior managers and conference panellists remain mainly men from Caucasian backgrounds.

Ethnic diversity increased among consultants and Specialty and Associate Specialist (SAS) doctors from 2009 to 2020 in the NHS urology workforce. However, it is still limited in leadership roles, highlighting the need to address barriers to career progression into higher leadership roles. Adasonla et al. (2023) carried out a study to evaluate the impact of strategies to promote ethnic diversity on the NHS urology workforce and the British Association of Urological Surgeons (BAUS) leadership from 2009 to 2020. They used data obtained from the Freedom of Information (FOI) Act request to NHS Digital. They analysed urology consultants, specialist registrars, and SAS doctors. The results showed a significant decrease in White consultant urologists (65.5% to 53.6%) and an increase in Asian/Asian British consultants (26.9% to 36.6%). Black/Black British trainees saw a significant rise from 3.0% to 11.0%, although the representation of Asian/Asian British trainees declined. There was a decrease in the proportion of White urologists occupying BAUS leadership positions (80.6% to 67.6%). They concluded that there are trends toward increasing ethical diversity in all groups, most evident among consultants and SAS doctors, and most limited in the urology leadership. The significance of this was unclear but may reflect the need to address the barriers to career progression into the higher positions of urology leadership.

NHS Trusts should improve ethnic monitoring and reporting to better represent and compare intergroup nuances among ethnic minority nurses to enhance career progression. Isaac (2020) conducted a research study to explore the career progression experiences of Black British-born mental health nurses in the NHS. She conducted qualitative semi-structured interviews with the participants. Unlike other studies, participants disclosed very little information suggesting discrimination as a hindering factor to career progression. The findings indicated that socialised ‘British cultural capital’ represents a strong ‘helping factor’ that overrides the ‘hindering factor’ of their ‘Black ethnic identity’. This showed that NHS Trusts' equal opportunities policy drivers should improve the ethnic monitoring and reporting systems. Thus, their grading structures would be best positioned to represent and compare intergroup nuances between ethnic minority nurses.

Inclusion Practices in the NHS

Ethnic diversity has improved in the English urology workforce and leadership, however significant barriers for minorities remain in reaching leadership roles. Adasonla et al. (2023) conducted a Longitudinal study to evaluate the impact of strategies promoting equitable progression, with respect to ethnicity in the English urology workforce and British Association of Urological Surgeons (BAUS) leadership over an eleven-year period, from 2009 to 2020. Results showed a decrease in White urology consultants from 65.5% to 53.6% and an increase in Asian/Asian British consultants from 26.9% to 36.6%. Similarly, Black/Black British trainees increased from 3.0% to 11.0%, although Asian/Asian British trainees saw a decline. Leadership positions also became more ethnically diverse, with White urologists' representation dropping from 80.6% to 67.6%. The study concluded that diversity has improved, mainly among consultants and SAS doctors. However, significant barriers remain for ethnic minorities in reaching leadership roles, indicating the need for continued efforts to promote an equitable progression in urology.

The National Recruitment Scheme (NRS) has significantly improved the recruitment of Black, Asian, and other minority ethnic pharmacy trainees into sought-after hospital posts, enhancing the diversity of the hospital cohort. Shamim et al. (2023) conducted an observational study to assess the impact of the NRS on the recruitment of Black, Asian, or other minority ethnic pharmacy trainees into the most sought-after posts within the scheme (hospital posts). This observational study analysed anonymised recruitment data between the cohort intakes of 2015–16 and 2020–21, containing 18,283 pharmacy trainees, of whom 4,446 were in hospital positions. The results revealed a significant increase in the recruitment proportions of Asian-Pakistani and Black-African applicants to hospital posts. The study concluded that there has been a significant positive impact on the correlation between the overall number of Black, Asian or other Minority Ethnic applicants and their proportion in hospital since the introduction of the NRS. The makeup of the hospital cohort has increased reflecting the diversity of the overall cohort, and a larger proportion of each ethnic cohort is attaining hospital training places.

Northwest Ambulance Service (NWAS) Women's staff networks significantly improve equality in the ambulance sector through storytelling, community building, and collaborative leadership, resulting in increased membership and impactful change in areas such as sexual safety, maternity support, and feminine hygiene. Gibbs and Smith (2024) conducted a research study aimed at understanding the impact of the NWAS Women's staff networks on promoting and enabling equalities in the ambulance sector. The research utilised a mixed-methods approach, including surveys, observational data, and workshops, analysed through thematic analysis, with focus on experience sharing and emotional community theory. Results showed a 266% increase in network membership within a year, due to consistent events and focus on themes important to staff driven by storytelling, community building, and

collaboration. Key initiatives focused on sexual safety, maternity and parenting support, and feminine hygiene. Participants reported feeling heard and supported, with the network promoting leadership and continuous improvement. They concluded that staff networks provide an important communication and support channel for staff and help to drive genuine and impactful change, emphasising the importance of storytelling, community, safe spaces, and collaborative leadership for success.

Impact of Diversity and Inclusion on Patient Care

Black, Asian and Minority Ethnic (BAME) midwives at University Hospitals Coventry and Warwickshire (UHCW) face significant discrimination and lack career support. Garcha (2022) identified that addressing this disparity requires ethnic representation that aligns with the local community. Garcha conducted a research study to understand the workplace perceptions of BAME midwives. Her study aimed to understand their views and explore their attitudes regarding the working culture at UHCW. She conducted an anonymous survey among 23 BAME midwives, achieving a response rate of 73.9%. The results indicated BAME midwives reported significant levels of discrimination, harassment, bullying, abuse, and a substantial lack of support for career development compared to the White counterparts. Based on the data and existing literature, several recommendations emerged to improve workforce diversity in midwifery. These include:

- Reducing interview bias
- Band 7 and above leaders to undertake unconscious bias training
- Ethnically diverse shortlisting and interview panels
- Mandating unconscious bias training for leaders at Band 7 and above
- Participating in the International Recruitment of Midwives initiative
- Introducing opportunities specifically for BAME staff members

Garcha concluded that improving workplace culture of inclusion and belonging will support midwives in facilitating meaningful healthcare interactions with BAME families. This, in turn, will help reduce many of the barriers these patients face when accessing healthcare.

Collaborative initiatives supporting Black and Minority Ethnic (BME) nurses and midwives in leadership roles significantly enhance career progression, teamwork, and patient care by fostering an inclusive organizational culture and addressing workforce diversity. Adhikari et al. (2023) conducted a study to demonstrate the importance of collaborative initiatives in supporting BME nurses and midwives in achieving leadership positions and career progression. The study also aimed to promote an inclusive organizational culture to increase teamwork and the standards

of service. The study used an action research approach. The program began by collectively exploring participants' understanding of BME workforce development challenges. Then, in a cyclical manner, the study planned and delivered targeted leadership development training and evaluated its effectiveness. The results showed that with support from project facilitators, mentors, and line managers, a considerable number of BME participants achieved career progression. The study also reported that line managers and mentors improved their understanding of workforce diversity, individual potential, unconscious biases, and the importance of an inclusive organizational culture. BME participants reported feeling valued as members of staff, leading to positive relationships in teamwork and improved patient care outcomes. The conclusions emphasized the value of workforce diversity and an inclusive organizational culture for effective teamwork and overall benefit to workforce management. The conclusions also highlighted the importance of collaborative initiatives like this one in delivering better patient care.

Challenges and Barriers

NHS staff in London trusts face high levels of discrimination and harassment, leading to significant mental health and job satisfaction issues, necessitating urgent workplace culture improvements. Rhead et al. (2021) conducted a study to examine the effects of workforce harassment and discrimination on the health of NHS staff in London trusts. They used data from the 2019 Tackling Inequalities and Discrimination Experiences in health Services (TIDES) cross-sectional survey, which included 931 London-based healthcare practitioners. The results revealed that women, Black ethnic minority staff, migrants, nurses, and healthcare assistants were most at risk of experiencing discrimination and harassment. These negative experiences were significantly associated with probable anxiety or depression, moderate-to-severe somatic symptoms, low job satisfaction, and increased sickness absence. The study concluded that NHS staff, particularly those working in London trusts, face unprecedented levels of discrimination and harassment, necessitating immediate interventions to improve workplace culture and support systems. This includes creating safe spaces for staff discussions, implementing unconscious bias training, and promoting diversity and equality at all levels of the NHS.

Discrimination significantly contributes to psychological distress among junior doctors in the UK, impacting workforce retention and diversity in NHS medical leadership. This highlights the need for workshops to address and report workplace discrimination. Hussain et al. (2023) conducted a research study aimed at exploring how race and gender-related discrimination affects the psychological distress of junior doctors in the UK. The study involved a secondary analysis of interview data from a previous UK-based parent study about junior doctors' conditions and working cultures. Thematic analysis of 14 interviews documenting experiences of gender and/or race discrimination were sampled and analysed from 21 detailed interviews

with UK junior doctors. The transcripts revealed various forms of discrimination, from racially charged threats to subtle microaggressions. These experiences led to elevated levels of psychological distress, with participants feeling fearful, undermined, and lacking confidence. The study concluded that discrimination significantly contributes to psychological distress in junior doctors, negatively impacting workforce retention and sustainability. This, in turn, affects diversity and inclusion in the NHS medical leadership. Recommendations included in-person workshops focused on recognizing, challenging, and reporting workplace discrimination to foster a more inclusive and supportive environment.

Literature review summary

The literature review conducted in this study found several key findings. First, there are disparities in equality, diversity and inclusion within the NHS. Despite some improvements, differences persist in positions, career progression, prestige, pay, and leadership roles based on race, ethnicity, sexual orientation, age and gender. Second, workforce well-being is a critical concern, with high levels of stress affecting different professions unevenly. Nurses, midwives, and paramedics experience higher levels of job stress and sickness absence compared to doctors, necessitating improvements in workplace support and addressing demographic inequalities. Third, recruitment and retention strategies lack evidence to support their effectiveness, particularly for candidates from minority ethnicities. Barriers in recruitment and selection processes impede ethnically diverse candidates from obtaining jobs in the fields for which they were trained. Some managers and senior leaders perceived barriers for ethnically diverse candidates but lacked adequate information about workforce diversity and regular monitoring systems to address these issues. This highlights the need for formal assessment, evaluation, and more inclusive recruitment practices. Fourth, career progression is affected by significant gender and racial disparities. Women and ethnic minorities face barriers in accessing leadership positions, which are intensified by experiences of bullying, harassment, and discrimination, further impeding career progression and job satisfaction. Fifth, while progress has been made in increasing diversity, substantial barriers remain for minorities in reaching leadership roles. Initiatives like the NRS and NWAS Women's staff networks have shown improvements in equality through community building and collaborative leadership. Lastly, challenges and barriers, including high levels of discrimination, bullying, abuse, and harassment, contribute to significant mental health issues and low job satisfaction, particularly among BAME staff, directly impacting patient care.

Future research directions based on literature review

The studies included in this literature review point to several promising directions for future research. First, future studies should focus on longitudinal studies to explore the barriers to career progression that exist in the NHS workforce for some groups of individuals and not others. These studies should address the causes that lead to the promotion of diversity and equity in training and senior leadership positions. Second, further research should explore student midwives' experiences to offer solutions to address student attrition. Third, future studies should explore the experiences and reasons that lead some doctors to leave the profession. Engaging with these former doctors will allow researchers to gain insights into the specific barriers and challenges they faced. Understanding these reasons is crucial for identifying barriers, improving retention, policy development, and gaining a comprehensive understanding. Fourth, the differences in gender diversity between surgical specialties have not been previously analysed, and further research is needed to highlight the causes. Fifth, the process of moving from education into employment must be viewed within the broader context of societal ethnic disparities. Sixth, future research should investigate the experiences of student nurses from ethically minoritised backgrounds in trusts outside of London to develop initiatives that effectively address discrimination within the NHS and are widely applicable. Seventh, future research should aim to identify strategies that have successfully increased the recruitment of women in other specialties and examine the impact of those interventions on achieving gender parity in T&O. Eighth, it is essential to conduct longitudinal research to evaluate the effectiveness of potential NHS initiatives in promoting equality in hiring and promotion decisions over time. These longitudinal data may also offer valuable insights into potential racial and ethnic disparities, as well as improvements over time in various aspects of the NHS beyond prestige and pay, including board membership, retention, and pensions. Lastly, future research should conduct formal assessments of retention strategies to objectively measure their impact on NHS staff retention and their overall effectiveness.

Methodology

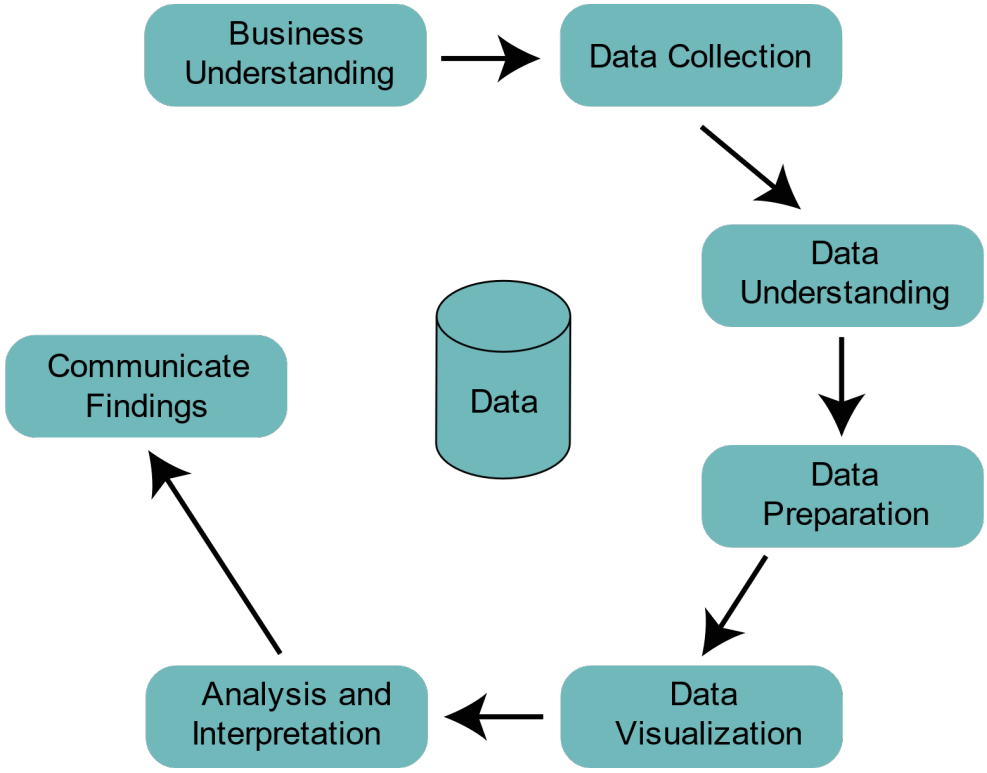
Software and hardware

Data understanding, preparation, and analysis were conducted in Python 3.12, a high-level, interpreted, general-purpose programming language. Pandas, a library built on top of Python, was used for all data understanding, preparation, and analysis. All data analysis was implemented on a computer with an AMD Ryzen 7 5800X, 8 cores, 4.7 GHz, and 32 GB RAM.

Methodology strategy

Our methodology follows the data analysis framework presented in Figure x. We based it on the CRISP-DM model, commonly used in data mining projects, with some changes to adapt it to the needs of this project. CRISP-DM was created in 2000 and is a de-facto and industry-independent process model for data mining projects (Schröer et al., 2021). It comprises six interactive phases: business understanding, data understanding, data preparation, modelling, evaluation and deployment. As illustrated in Figure x, this project utilized the business understanding, data understanding, and data preparation phases. The modelling, evaluation and deployment phases were replaced by data visualization, analysis and interpretation, and communicate findings.

As illustrated in Figure x, the methodology follows a sequence of processes. First, we performed the business understanding phase to gain an overview of the problem. We provided a brief introduction to the topic, explaining its importance and the study's objective. Second, data were collected from NHS digital, explored, and assessed for quality to verify if data cleaning was necessary. Third, the data was described using statistical analysis to determine attributes and their correlations. Fourth, we performed data preparation, we used pivot tables, filtering, grouping, aggregation, and feature engineering. Fifth, data visualization was performed to create a clear, intuitive, and comprehensible understanding of the data. Finally, the most relevant data visualization was analysed and communicated to assist decision-makers in improving equality, diversity and inclusion within the NHS, and subsequently improving interpersonal relationships and work processes.



Problem Understanding

The NHS is one of the largest organizations in the United Kingdom. It has a large workforce with a variety of ethnicities, ages, sexual orientation, religious beliefs, and disability status. Ensuring equality, diversity and inclusion within the organization is essential for the good functioning of interpersonal relationships and organizational operations. However, despite all efforts to ensure diversity and inclusion, some disparities still exist. Therefore, there is a need to use data to generate insights to help decision-makers reduce these disparities. This study aims to verify the current state of the situation, identify areas that require intervention and provide information and recommendations to NHS leaders that allow them to make decisions and improve equality, diversity and inclusivity within the organization.

Data Collection

The data for this study were obtained from NHS Digital, the national provider of information, data, and information technology systems for health and social care in England. The dataset contains detailed information on NHS staff demographics from December 2009 until December 2023, covering a range of important variables for this study. These variables include gender, age, ethnicity, sexual orientations, disability statuses, religious belief, main staff group, staff groups, grade, date, and headcount.

Data Understanding

To understand the data, the first step was to understand the structure of the dataset, the type of variables (categorical, discrete), number of records and basic structure. Afterwards, an initial inspection of the data was performed, which included whether there were any missing values, outliers, inconsistencies, or anomalies. Next, a quick exploratory data analysis was performed, which included summary statistics (mean, median, mode, standard deviation) for discrete variables, and frequency distributions for categorical variables. Finally, a quick data visualisation was performed to understand the relationship between the data and identify patterns.

Data Preparation and Transformation

Data preparation is a very important step in data analysis because it ensures that the data are well processed and prepared in a format that leads to more effective, accurate, and insightful analysis and visual representation. It is a fundamental process for creating clear, meaningful, and actionable visualizations. We used pivot tables to summarize and group data based on one or more categorical variables. Filtering was also performed to select rows and columns based on conditions. Time-based filtering was also performed to select specific time periods, for example, years. The group-by function was also used to group variables and calculate aggregated statistics, such as sum, count, and percentage. Feature engineering was also used to create new variables from existing variables, specifically in calculating percentages to study the representation of categories in groups. This dataset did not contain missing data and the nature of the data in question also did not require outlier treatment.

Data Visualization

In the data visualization phase, the complex equality and diversity NHS trusts and core orgs dataset was converted into graphs that were easy and intuitive to understand. This transformation helped to identify patterns and trends that were not obvious through row data analysis. To perform this task, we utilized pie charts to show proportional data, stacked bar charts to compare categorical data across different groups and heatmaps to show areas of higher and lower values within the dataset.

Analysis and Interpretation

In this phase, the results were analysed and interpreted. The findings were contextualised, and the analytical results were related to the objectives and context of the problem. Practical implications of the findings were also identified, which involved drawing conclusions where key insights and trends were identified. Actionable recommendations based on the analysis were made, prioritising actions that could have a significant potential impact on the NHS workforce.

Communicate Findings

The findings from the previous section were used to inform strategic decision-makers within the NHS. The message was tailored to the expertise and interests of the audience. Effective Data Visualisation was used to deliver the message in a clear, simple, and easy-to-interpret way. Actionable Recommendations were also communicated based on the analysis, highlighting, and prioritising those recommendations that would have the greatest impact and feasibility.

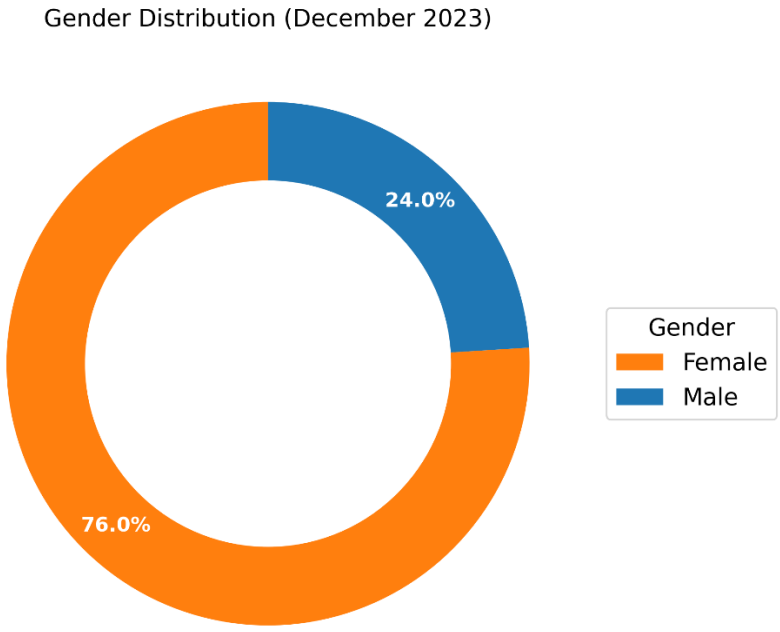
Data Analysis

Gender Representation in the NHS Workforce

This section presents the gender distribution among staff members and their corresponding grades.

Overall Gender Distribution

Figure X illustrates the gender distribution within the NHS as of December 2023. It reveals that females constitute the majority, representing 76% of the NHS workforce, while males represent 24%. This distribution highlights a significant gender disparity within the NHS.



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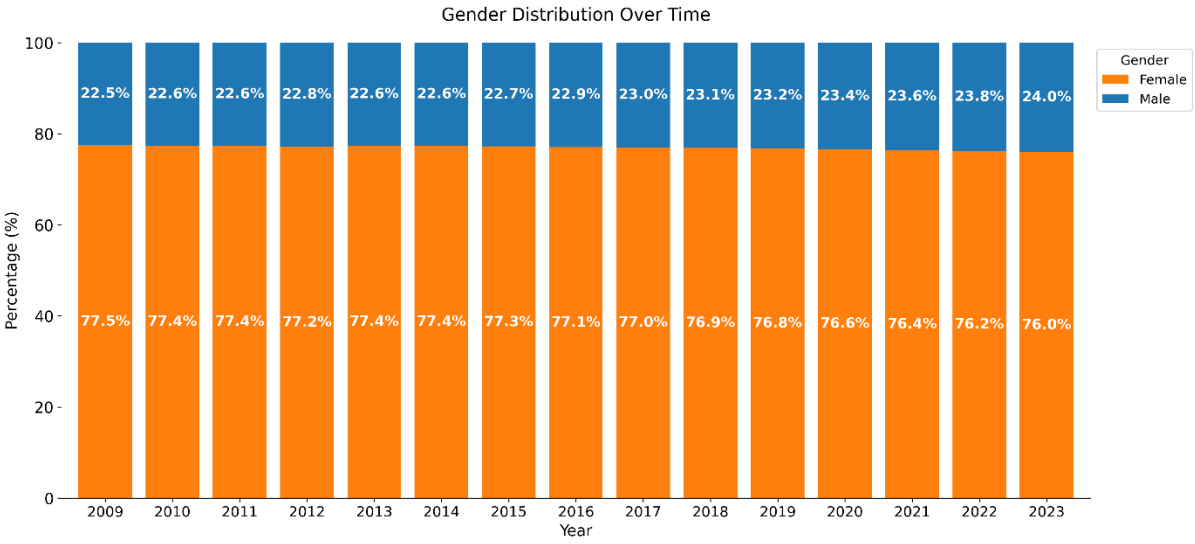
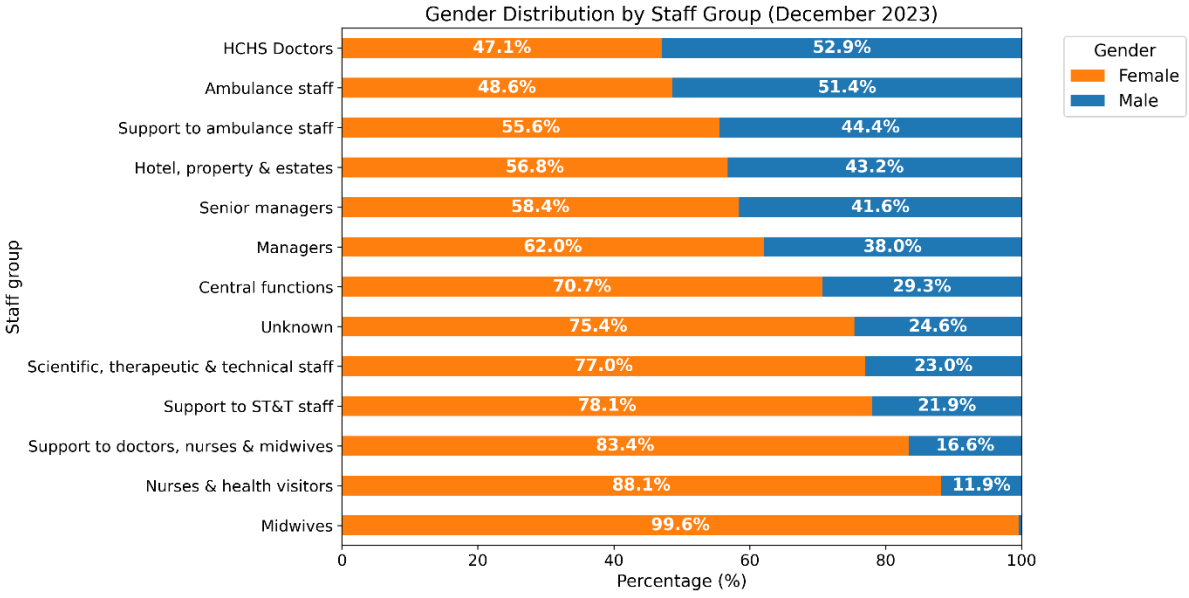
Historical Gender Trends

The representation of men has increased slightly between 2009 and 2023, rising from 22.5% in 2009 to 24% in 2023, as illustrated in Figure x. Correspondingly, the representation of women has decreased from 77.5% in 2009 to 76% in 2023. Despite these changes, the gender disparity remains significantly high.



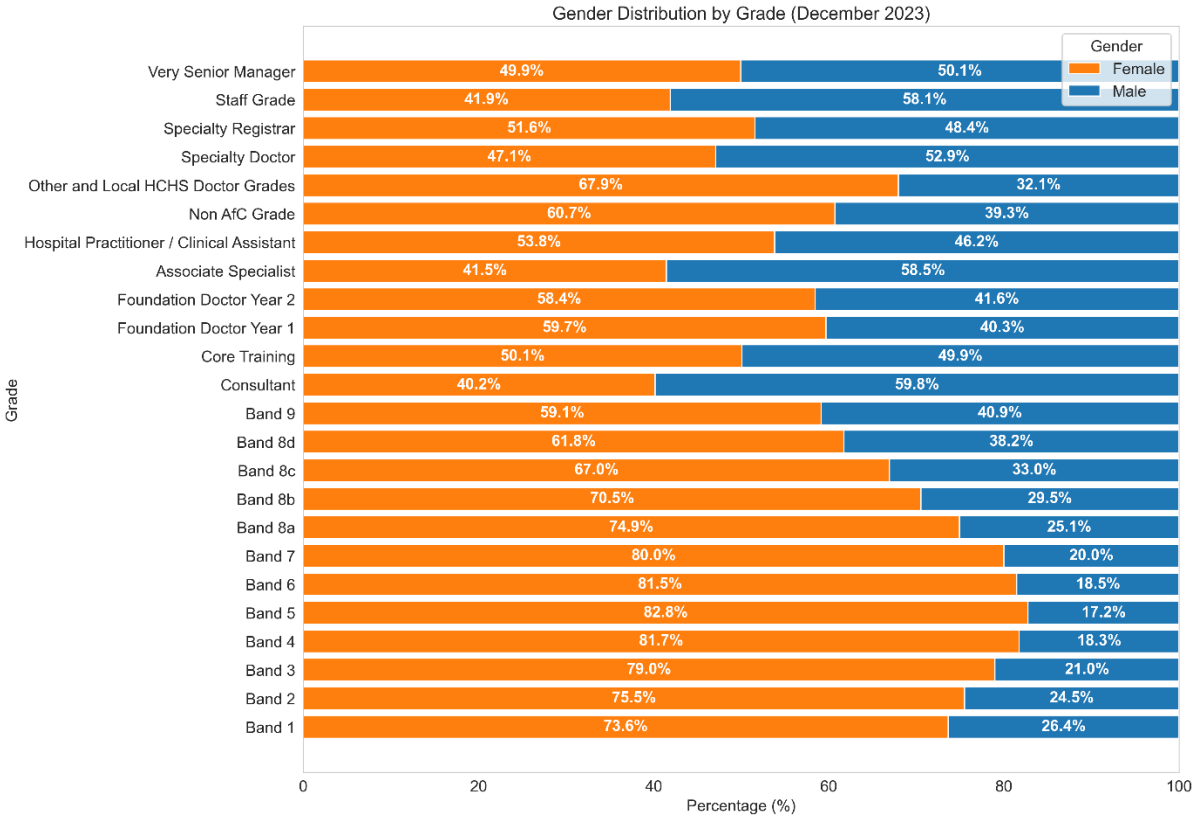
Gender Distribution by Staff Group

The significant gender difference encourages a more detailed analysis of its distribution within each staff group. Figure X presents a visual representation of gender distribution within various staff groups in the NHS. The data indicate a predominant female representation in most staff groups. Nearly all midwives in the NHS are female, representing 96.6% of this staff group. Females are also notably overrepresented in the staff groups of nurses and health visitors (88.1% female) and support to doctors, nurses, and midwives (83.4% female). Conversely, the staff groups of Hospital and Community Health Service (HCHS) doctors (52.9% male) and Ambulance Staff (51.4% male) are the only ones where males are more represented than females.



Gender Distribution by Grade

Females predominate in most grades in the NHS workforce. However, as shown in Figure X, males are more represented than females in certain grades. These include consultant (59.8% male), associate specialist (58.5% male), staff grade (58.1% male) and specialty doctor (52.9% male). Males and Females are almost equally represented in very senior manager grades (50.1% male).



Gender Distribution Across Grades

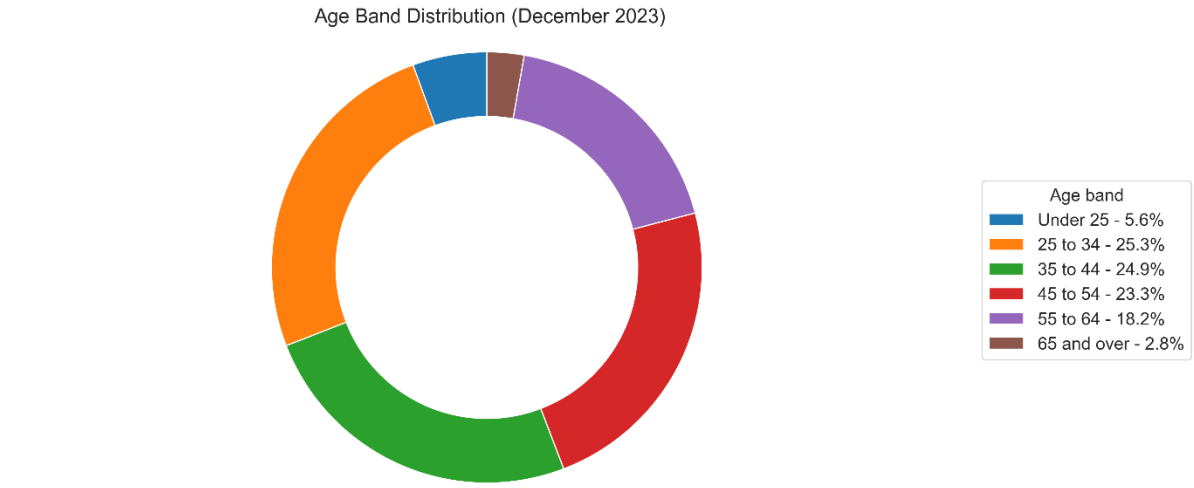
The distribution of females across grades shows that 86.07% of females working in the NHS are concentrated between bands 2 and 7, while only 13.93% are distributed across other grades and specialties, as illustrated in Figure X. Conversely, 67.66% of males are distributed between bands 2 and 7 and 32.34% are distributed across other grades and specialties. It is also worth noting that 10.10% of males occupy the consultant grade, and 4.82% are in the specialty registrar grade, while 2.14% of females occupy the consultant grade and 1.62% occupy the specialty registrar grade. Additionally, 0.35% of males hold very senior manager positions, compared to 0.11% of females.

Age Distribution in the NHS Workforce

This section presents the distribution of age bands within the NHS workforce. It provides insights into how different age groups are distributed across the organization, including within various staff groups and grades.

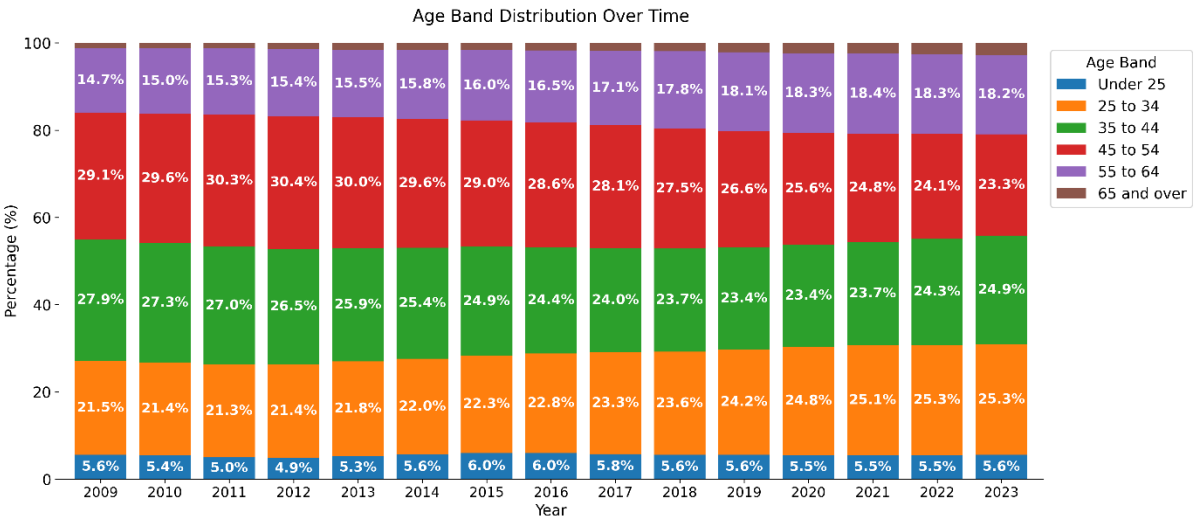
Overall Age Distribution

The youngest age group, those under 25, represents 5.6% of the workforce, as illustrated in Figure X. The 25 to 34 age band constitutes the largest portion of the workforce, at 25.3%. The 35 to 44 age group also represents a significant portion, making up 24.9% of the workforce. The 45 to 54 age group accounts for 23.3% of the workforce. Beyond the age of 54, workforce representation significantly decreases: the 55 to 64 age group represents 18.2%, while those over 64 years represent just 2.8% of the workforce.



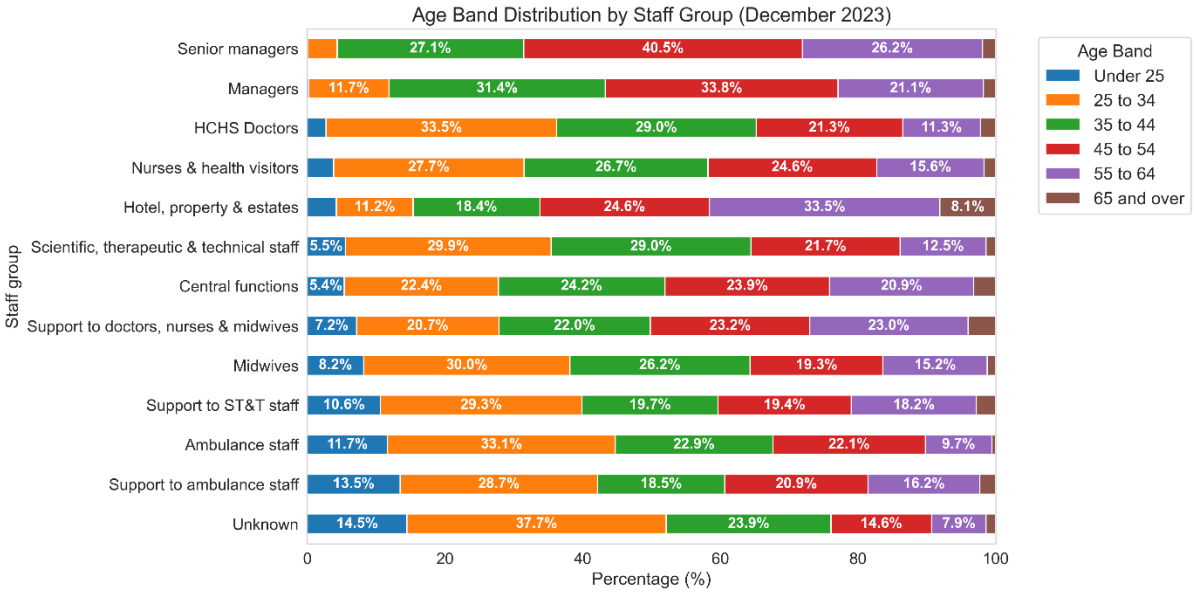
Historical Age Trends

The percentage of the workforce under 25 years old remained relatively stable with minimal variation from 2009 to 2023, registering the same level of 5.6% in both 2009 and 2023, as illustrated in Figure X. The workforce aged between 25 and 34 has shown slight growth, increasing from 21.5% in 2009 to 25.3% in 2023. Conversely, the 35 to 44 age band experienced a slight decline, from 27.9% in 2009 to 24.9% in 2023. The percentage of the workforce aged 55 to 64 years has registered an increase, rising from 14.7% in 2009 to 18.2% in 2023. Lastly, the workforce over 65 years grew from 1.2% in 2009 to 2.8% in 2023.



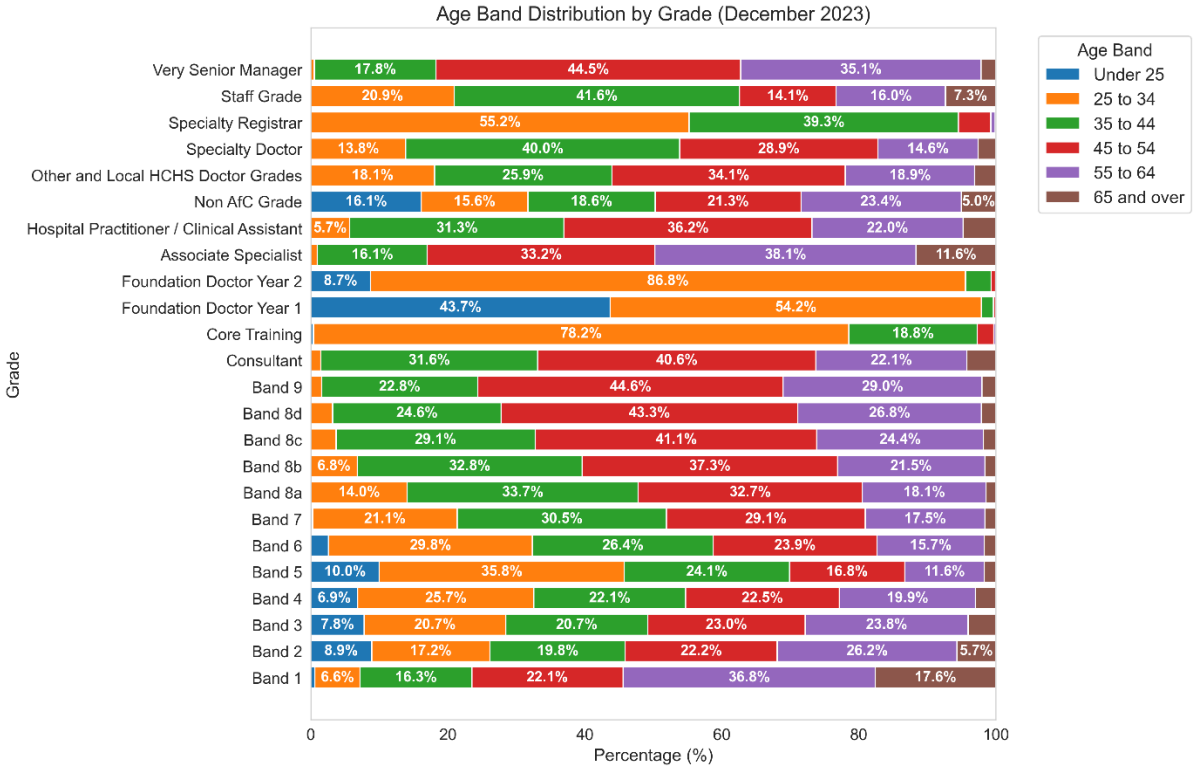
Age distribution by staff group

Younger employees (under 34 years) are the most represented within NHS frontline staff groups, such as HCHS doctors, midwives, ambulance staff, support to ambulance staff, and nurses and health visitors, as illustrated in Figure X. Scientific, therapeutic, and technical staff, along with their support staff, also have a high representation of younger employees. In contrast, older age groups (over 55 years) are more represented within the senior management staff group, as well as in hotel, property, and estates groups, and support roles for doctors, nurses, and midwives.



Age distribution by grade

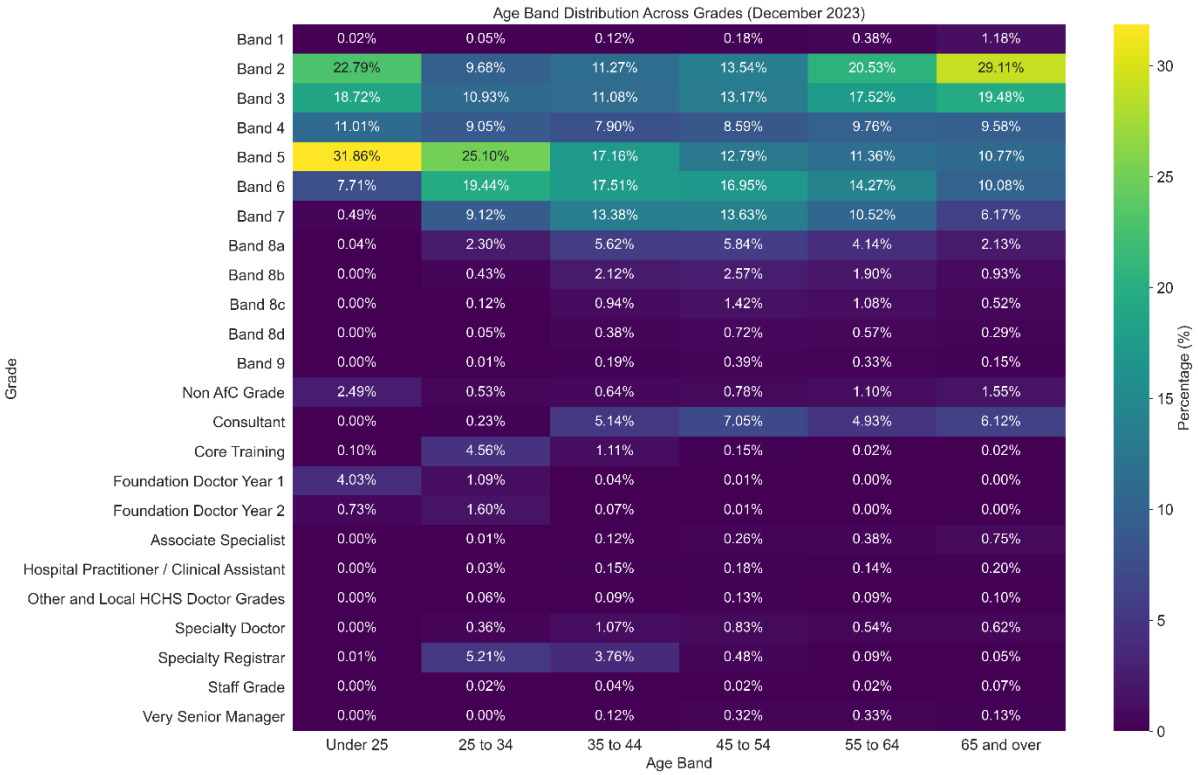
NHS entry-level grades are predominantly represented by younger employees, while senior grades are more represented by older employees. Employees under the age of 34 are most represented within core training, foundation doctor year 1 and foundation doctor year 2, as illustrated in Figure X. Mid-career employees (aged 35 to 54) are predominantly represented within positions such as consultant, band 8, and specialty doctor. In contrast, older employees (aged 55 and over) are more represented within roles such as Band 1, Band 2, Band 9, Associate Specialist, and Very Senior Manager.



Age distribution across grades

As employees age, the distribution of their positions shifts towards higher-grade roles within the workforce. As illustrated in Figure X, a significant portion of younger employees (under 25 years) is distributed across bands 2 to 5, accounting for 84.38% of this age group. Among employees aged 25 to 34 years, 83.38% are distributed across bands 2 to 7. For the 35 to 44 years age group, 87.36% are distributed across bands 2 to 8, and for those aged 45 to 54 years, this figure rises to 89.22%, also within bands 2 to 8. The trend continues with 91.65% of employees aged 55 to 64 years, and 89.06% of employees over 65 years old being in bands 2 to 8.

Notably, employees aged 25 to 34 years show considerable representation in specialty registrar and core training grades. For employees over 35 years, there is significant representation at the consultant grade. An increased presence in bands 7 and 8, as well as in consultant roles, is observed among middle-aged employees (35 to 54 years). In contrast, in older age groups (55 and over) there is a decline in representation in band 5 through 9 as employees age. It is also worth noting that older employees (55 and over) are significantly present in bands 2 and 3.

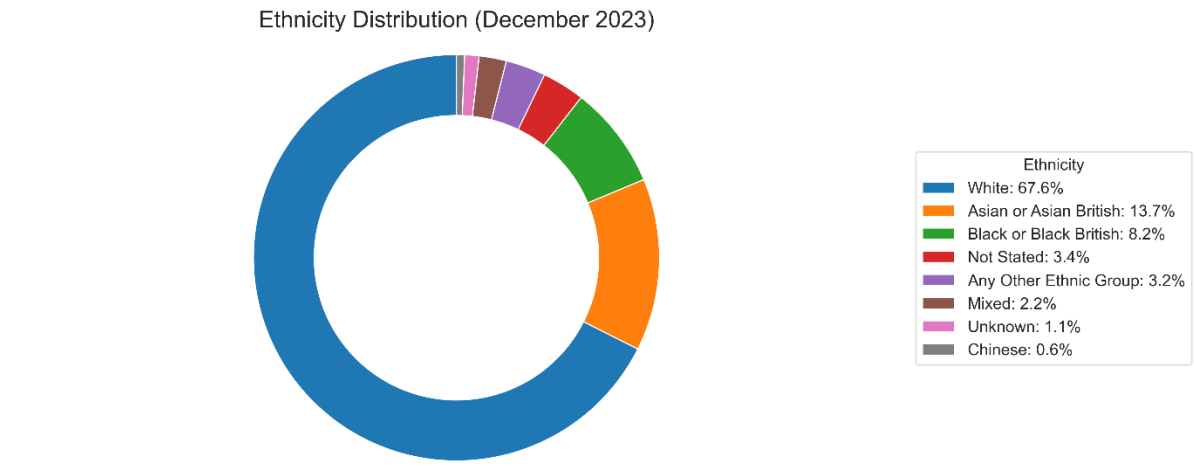


Ethnicity distribution in the NHS workforce

This section presents the ethnicity composition of the NHS workforce.

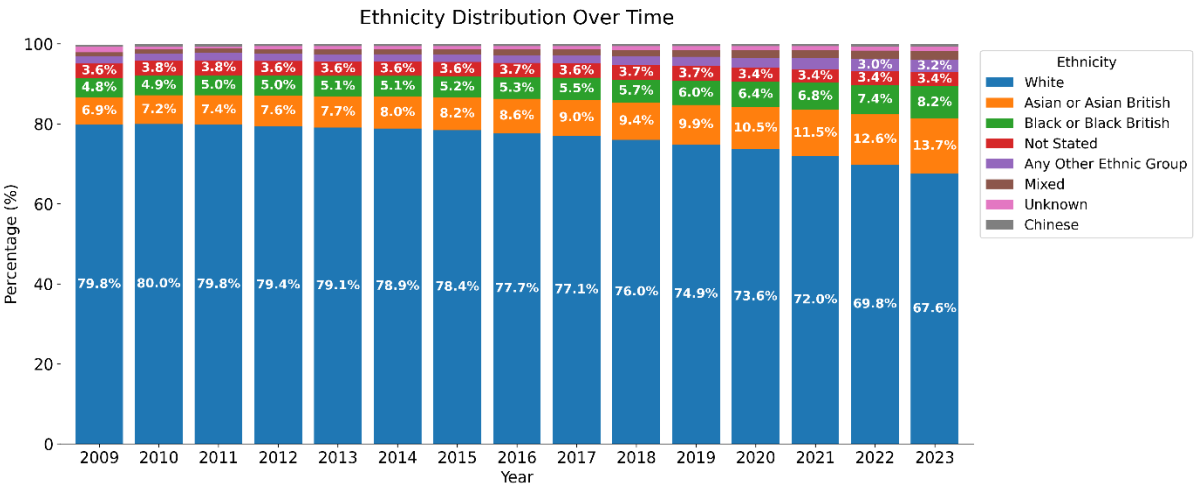
Overall ethnic distribution

The NHS workforce is predominantly comprised of White individuals, who constitute 67.6% of the total workforce, as illustrated in Figure X. The second largest ethnic group is Asian/Asian British, representing 13.7% of the workforce. Black/Black British individuals account for 8.2% of the workforce. A significant portion of the workforce (9.9%) has not stated their ethnicity or belongs to one of the following categories: Any Other Ethnic Group, Mixed, or Unknown. The Chinese ethnic group represents 0.6% of the workforce.



Historical ethnic trends

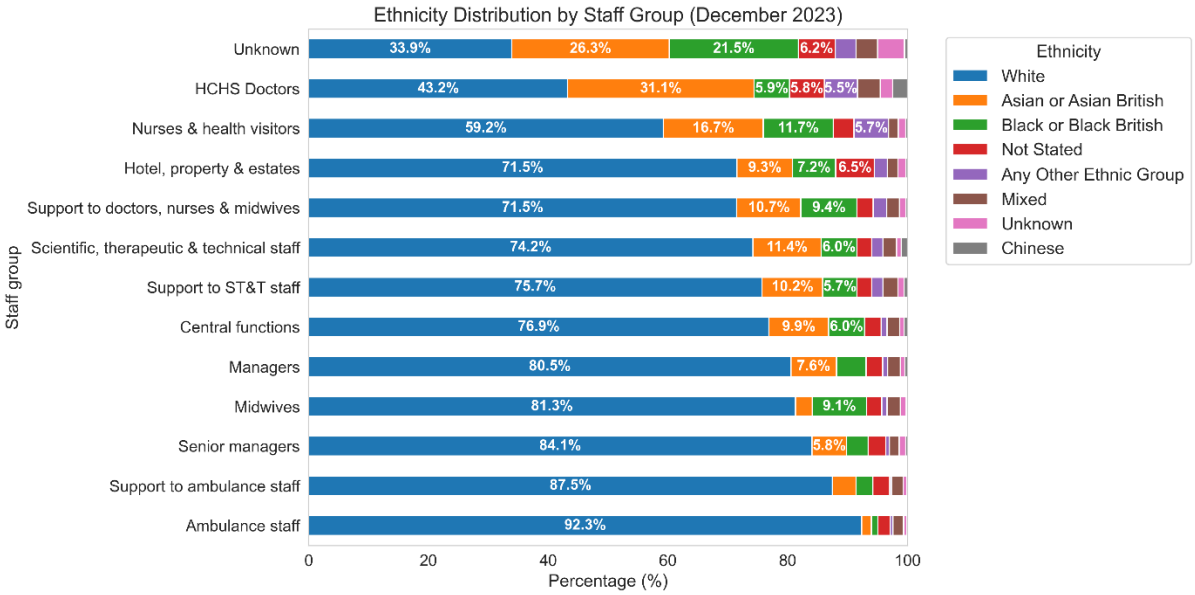
From 2009 to 2023, there was a notable increase in diversity within the NHS workforce. The most significant change was the decrease in the proportion of employees identifying as White, which fell from 79.8% in 2009 to 67.6% in 2023. Simultaneously, there was an increase in the representation of Asian/Asian British and Black/Black British ethnicities, rising from 6.9% and 4.8% in 2009 to 13.7% and 8.2% in 2023, respectively, as illustrated in Figure x.



Ethnicity distribution by staff group

The Ethnicity composition within each NHS staff group predominantly consists of White individuals; however, the proportion varies significantly between different groups, as illustrated in figure x. Ambulance staff, support to ambulance staff, senior managers, managers, and midwives have the highest percentages of individuals of White ethnicity. In contrast, HCHS doctors, nurses, and health visitors exhibit the

lowest percentage of White individuals, demonstrating greater ethnicity diversity within these groups. The Asian/Asian British and Black/Black British groups are the next most represented ethnicities in almost all staff groups, especially among HCHS doctors and nurses and health visitors.



Ethnicity distribution by grade

The distribution of different ethnic groups within each NHS grade provides important insights into diversity and inclusion. This analysis examines the ethnic composition of different ethnic groups at each grade level.

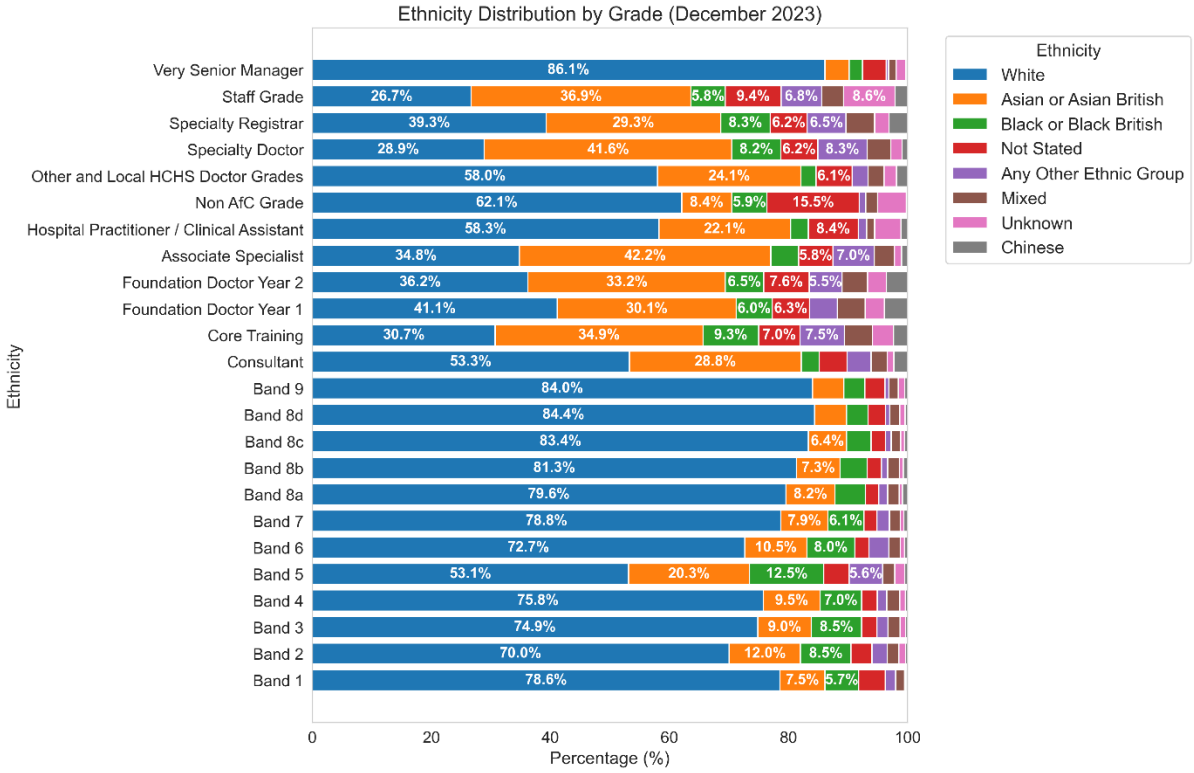
Band 1 to band 9: Individuals belonging to the White ethnicity have significant representation within bands 1 to 9, as illustrated in Figure x. The White ethnicity group constitutes between 70% and 84.4% of the workforce in these grades, except for band 5, where they represent 53.1%. The Asian/Asian British ethnicity is the second most represented, particularly in band 5, where they constitute 20.3% of the workforce. The Black/Black British group is the third most represented, especially in band 5, where they represent 12.5% of the workforce. The Mixed, Any Other Ethnic Group, and Chinese categories are minorities, but still contribute to the ethnic diversity within these bands. Additionally, from band 5 to band 9, there is a noticeable decrease in ethnic diversity; as the band level increases, the representation of the White ethnic group increases.

Hospital practitioner/Clinical pssistant, Non-Agenda for Change (AfC) grade, and Other and local HCHS doctor grades: Although less represented than in the previous grades, the White ethnicity constitutes the majority in the hospital practitioner/clinical assistant, non-AfC grade, and Other and Local HCHS doctor grades. The White ethnicity group makes up between 58% and 62.1% of the workforce in these bands. The Asian/Asian British ethnicity constitutes between 8.4% and 24.1%. Like the previous grades, the Black/Black British, Mixed, Any Other Ethnic Group, and Chinese ethnicities, while less represented, also contribute to the ethnic diversity in these grades.

Consultant, specialty registrar, and foundation doctor year 1 and 2: The grades of consultant, specialty registrar, and foundation doctor year 1 and 2 exhibit high ethnic diversity. The White ethnic group represents between 36.2% and 53.3% of the workforce in these grades. Although less represented, the Asian/Asian British ethnicity accounts for a significant percentage, ranging from 28.8% to 33.2%. As in previous grades, the Black/Black British, Mixed, Any Other Ethnic Group, and Chinese ethnicities, while less represented, also contribute to the overall ethnic diversity within these grades.

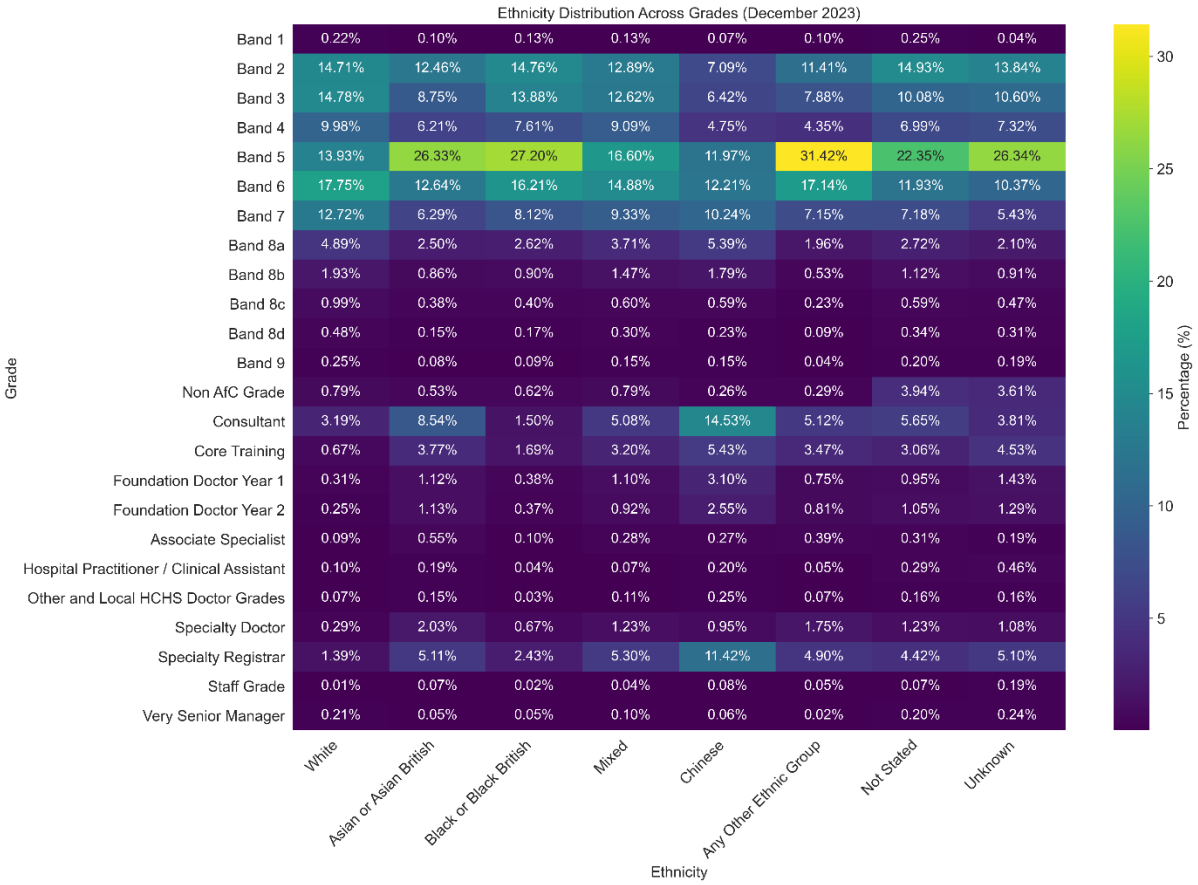
Core training, associate specialist, specialty doctor, and staff grade: The grades core training, associate specialist, specialty doctor, and staff grade also show high ethnic diversity. The Asian/Asian British ethnicity forms the majority in these grades, with the percentage ranging between 34.9% and 42.2%. The White ethnic group represents between 26.7% and 34.8% of the workforce in these grades. Similar to other grades, the Mixed, Any Other Ethnic Group, and Chinese categories, although less represented, also contribute the ethnic diversity of these grades.

Very senior managers: The representation of ethnic minorities decreases significantly at the very senior manager level. Individuals of White ethnicity constitute 86.1% of the workforce in this grade, while Asian/Asian British group represents only 4.1%, with minimal representation from other ethnic groups. This highlights a substantial disparity in ethnic diversity at the highest management levels in the NHS.



Ethnic distribution across grade

Figure X highlights significant patterns in the distribution of ethnicity across different NHS grades. Among individuals identifying as White, 83.9% are represented in bands 2 to 7. Similarly, 87.8% of those identifying as Black/Black British, 75.4% as Mixed, 72.7% as Asian/Asian British, and 52.7% as Chinese fall within this range. It is also worth noting that 8.54% of those who identify as Asian/Asian British and 14.53% of those who identify as Chinese hold consultant positions, compared to only 3.19% of those who identify as White and 1.50% of those who identify as Black/ Black British. A similar pattern is observed in the specialty registrar grade, where 5.11% of those who identify as Asian/Asian British and 11.42% of those who identify as Chinese occupy this position, while only 2.43% of those identifying as Black/Black British and 1.39% of those identifying as White are represented in this grade.

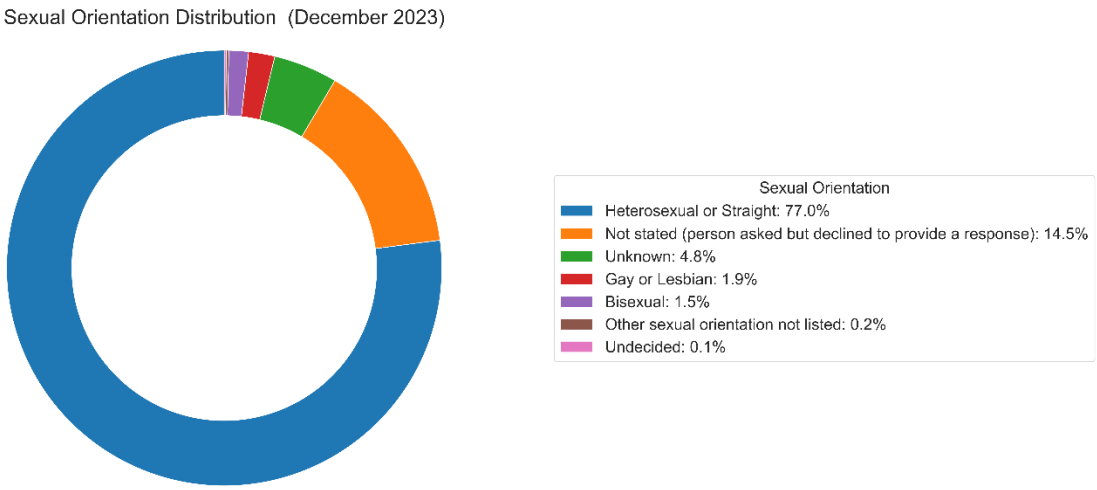


Sexual orientation distribution in the NHS workforce

This section explores the distribution of sexual orientation within the NHS workforce.

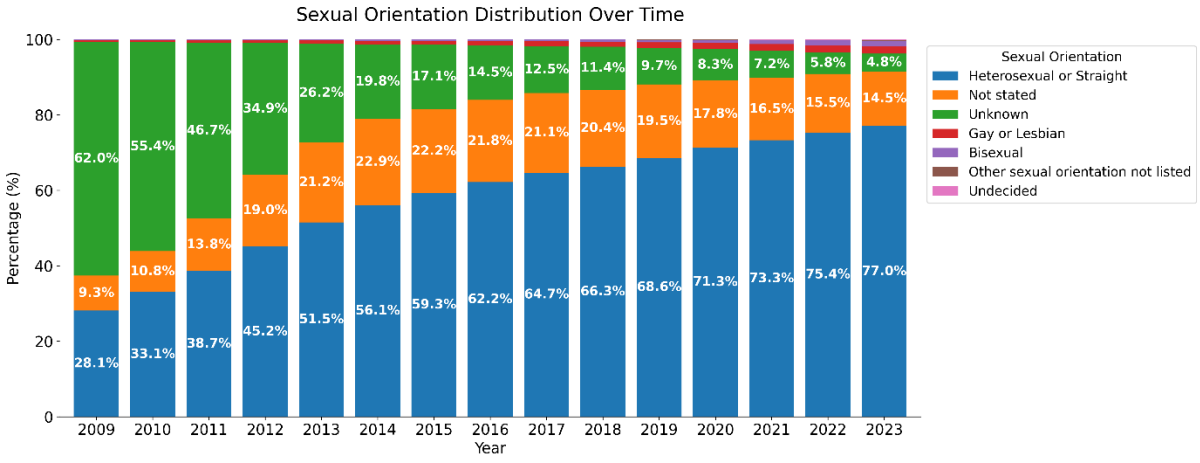
Overall sexual orientation distribution

The majority of the NHS workforce identifies as Heterosexual or Straight, accounting for 77% of the total workforce, as illustrated in Figure x. A considerable percentage of the workforce (14.5%) did not state their sexual orientation, and the sexual orientation of 4.8% of the workforce is unknown. Additionally, those identifying as Gay, Lesbian, Bisexual, Undecided, or Other sexual orientations represent a small percentage of the workforce, accounting for 3.7%.



Historical sexual orientation trends

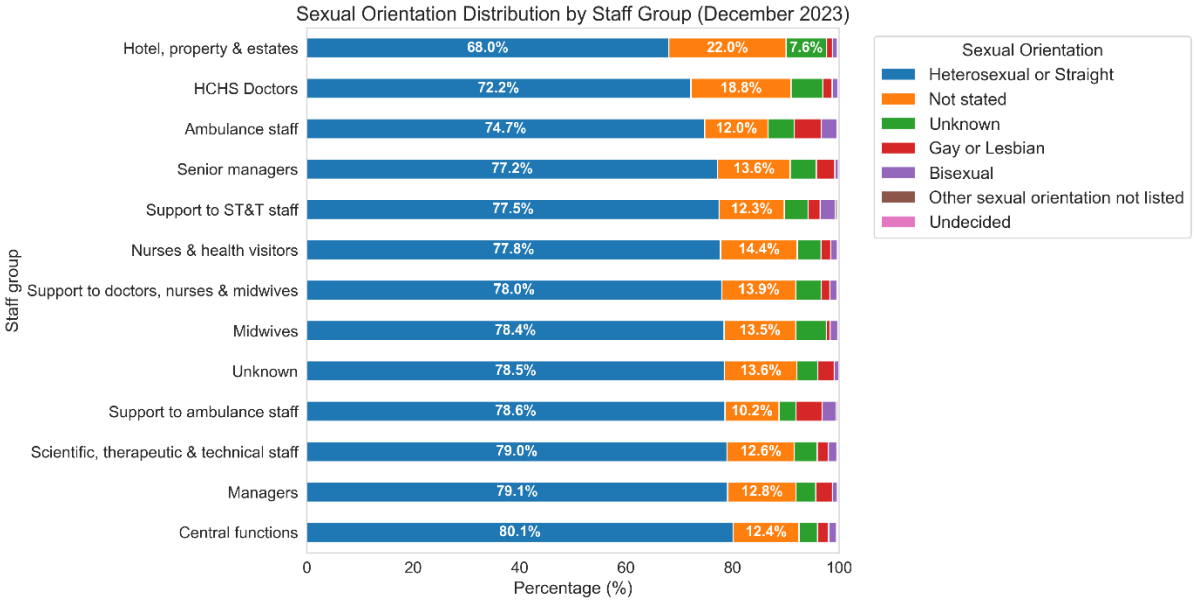
From 2009 to 2023, there has been a noticeable improvement in the availability of information regarding the sexual orientation of the NHS workforce. The percentage of employees whose sexual orientation was unknown decreased significantly, from 62% to 4.8%, as illustrated in Figure X. Additionally, the percentage of employees who did not state their sexual orientation has declined in recent years, from 22.9% in 2014 to 14.5% in 2023. This trend suggests a growing comfort and willingness among NHS workers to disclose their sexual orientation.



Sexual orientation by staff group

In all staff groups, the majority of NHS workers identify as Heterosexual, with the highest proportion in central functions (80.1%) and the lowest in hotel, property, and estates (68%), as illustrated in Figure x. A significant proportion of the workforce in each staff group has not stated their sexual orientation or have an unknown sexual

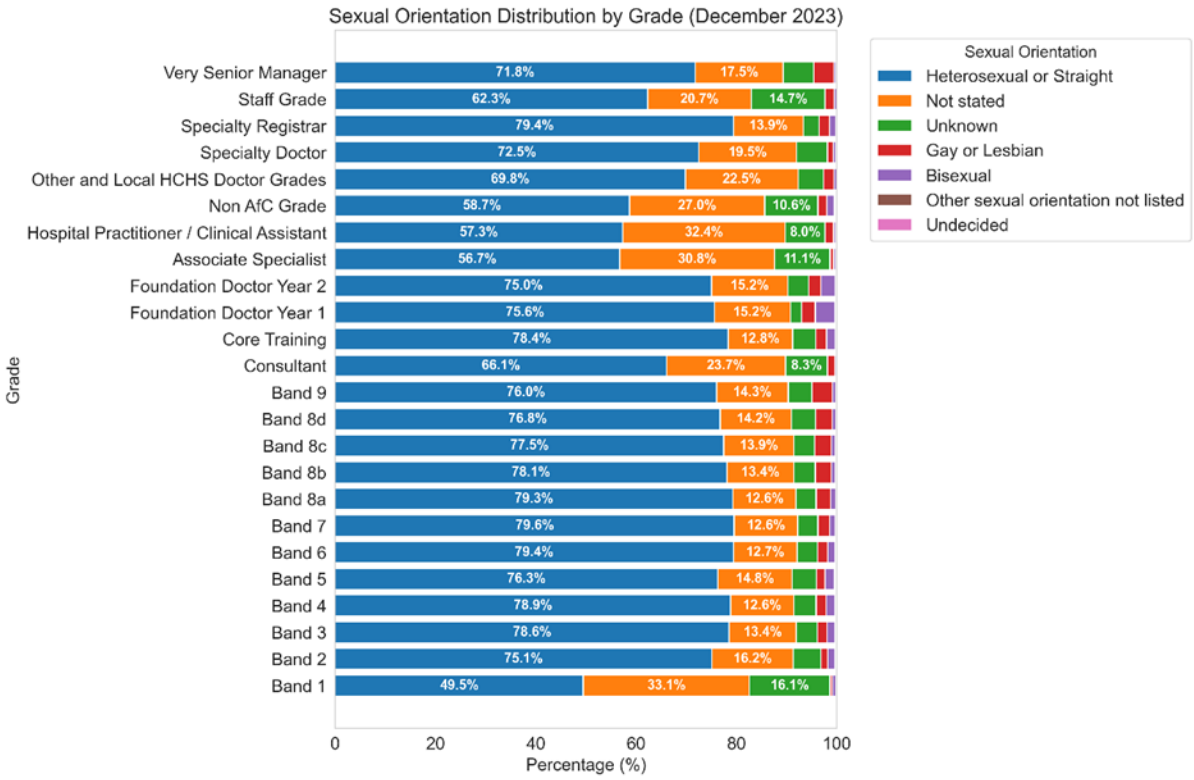
orientation, a trend observed across all staff groups. The support to ambulance staff group has the highest proportion of individuals identifying as Gay or Lesbian (5.1%). The percentage of staff identifying as Bisexual is relatively small in all staff groups, with the highest proportion found among ambulance staff (3%). The proportion of staff identified as Undecided or with a sexual orientation not listed is minimal across all staff groups, remaining below 0.5%.



Sexual orientation by grade

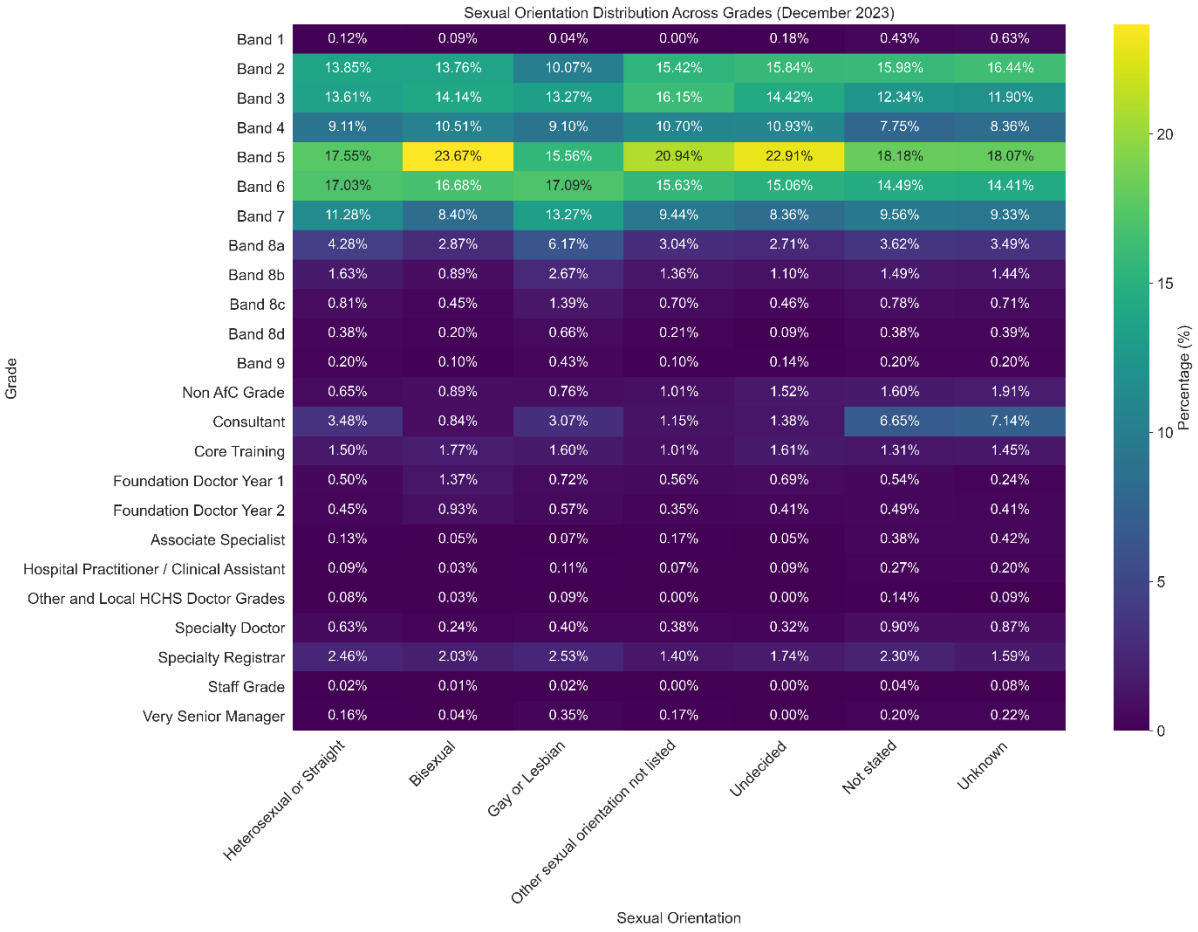
All grades are predominantly represented by individuals who identify as Heterosexual or Straight, as illustrated in Figure X. Heterosexual or Straight individuals are most represented within band 7 (79.6%) and a less represented within band 1 (49.5%). A significant percentage of the workforce in each grade either did not state their sexual orientation or has an unknown sexual orientation, a trend observed across grades. Notably, 33.1% of the band 1 workforce did not state their sexual orientation, and 16.1% of the band 1 workforce's sexual orientation is unknown.

Individuals who identify as Gay, Lesbian, or Bisexual have low representation across all grades. Those who identify as Gay or Lesbian are most represented within band 9 (4.1%) and least represented within band 1 (0.5%). Individuals who identify as bisexual are more represented within foundation doctor year 1 (3.9%) and least represented within the consultant grade (0.3%). Individuals who identify as Undecided or with other sexual orientations not listed have minimal representation in all grades, ranging from 0.1% to 0.3%.



Sexual orientation across grades

In Figure X, the distribution of sexual orientation across different grades reveals significant patterns. Among those identifying as Bisexual, 87.16% are represented within grades bands 2 to 7. Similarly, 82.43% of individuals identifying as Heterosexual or Straight, and 78.36% of those identifying as Gay or Lesbian, fall within the same range. Notably, 3.48% of those who identify as Heterosexual or Straight and 3.07% of those who identify as Gay or Lesbian hold the grade of consultant, while only 0.84% of those who identify as Bisexual occupy this grade. The same pattern is observed in the specialty registrar category: 2.46% of those who identify as Heterosexual or Straight and 2.53% of those who identify as Gay or Lesbian occupy this grade, compared to only 2.03% of those who identify as Bisexual.

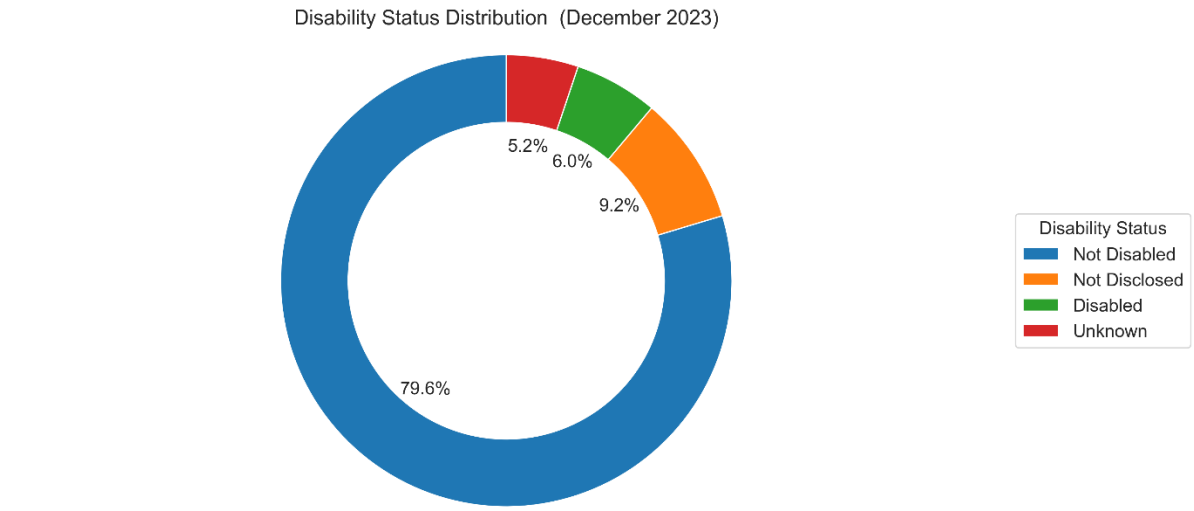


Disability status in the NHS workforce

This section discusses the disability status of NHS employees.

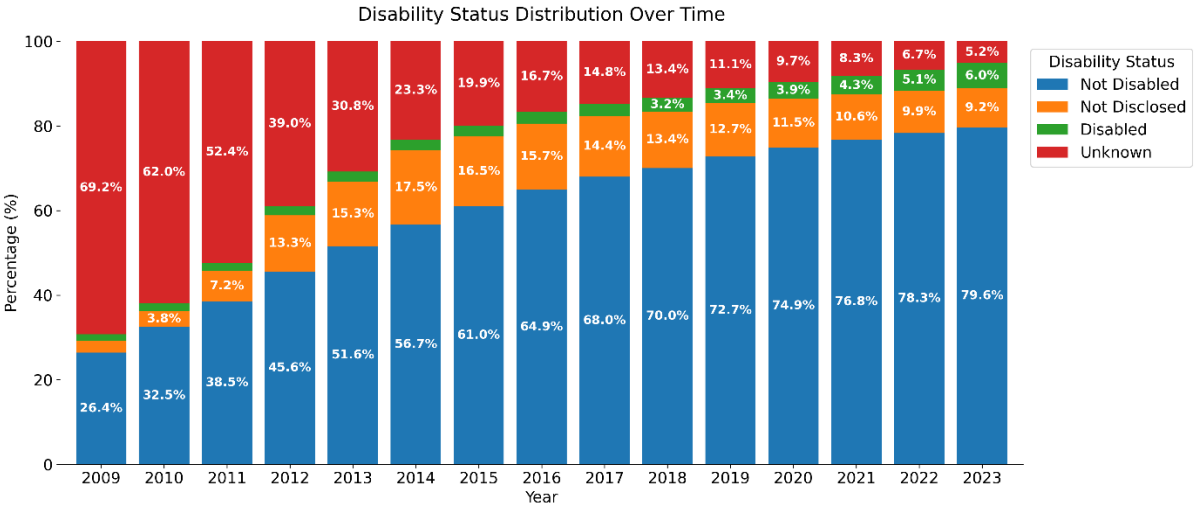
Overall disability status distribution

Employees who reported having a disability represent 6% of the workforce, as illustrated in Figure x. The majority of the NHS workforce, 79.6%, identifies as Non-Disabled. A notable percentage of the workforce, 9.2%, chose not to disclose their disability status, while the disability status of 5.2% of employees remains unknown.



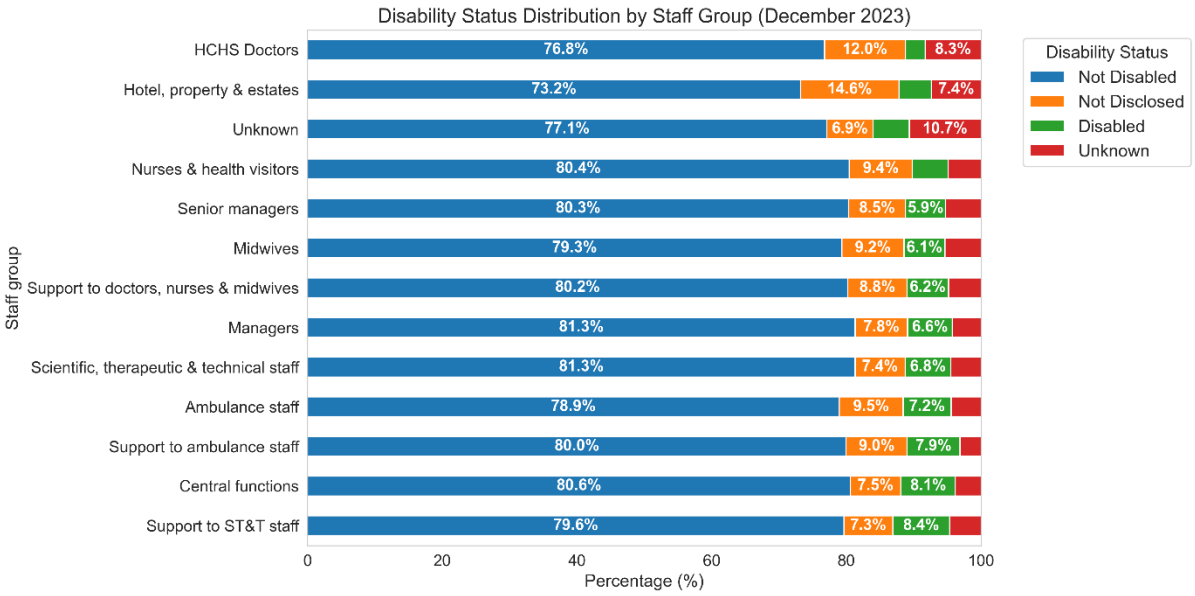
Historical disability status trends

Between 2009 and 2023, there has been a significant improvement in the availability of information regarding the disability status of the NHS workforce. The percentage of employees whose disability status was unknown decreased significantly, from 69.2% to 5.2%, reflecting improved data collection, as illustrated in Figure x. Additionally, the percentage of employees who did not state their disability status has declined in recent years, from 17.5% in 2014 to 9.2% in 2023. This trend indicates a growing comfort and willingness among workers to disclose their disability status.



Disability status by staff group

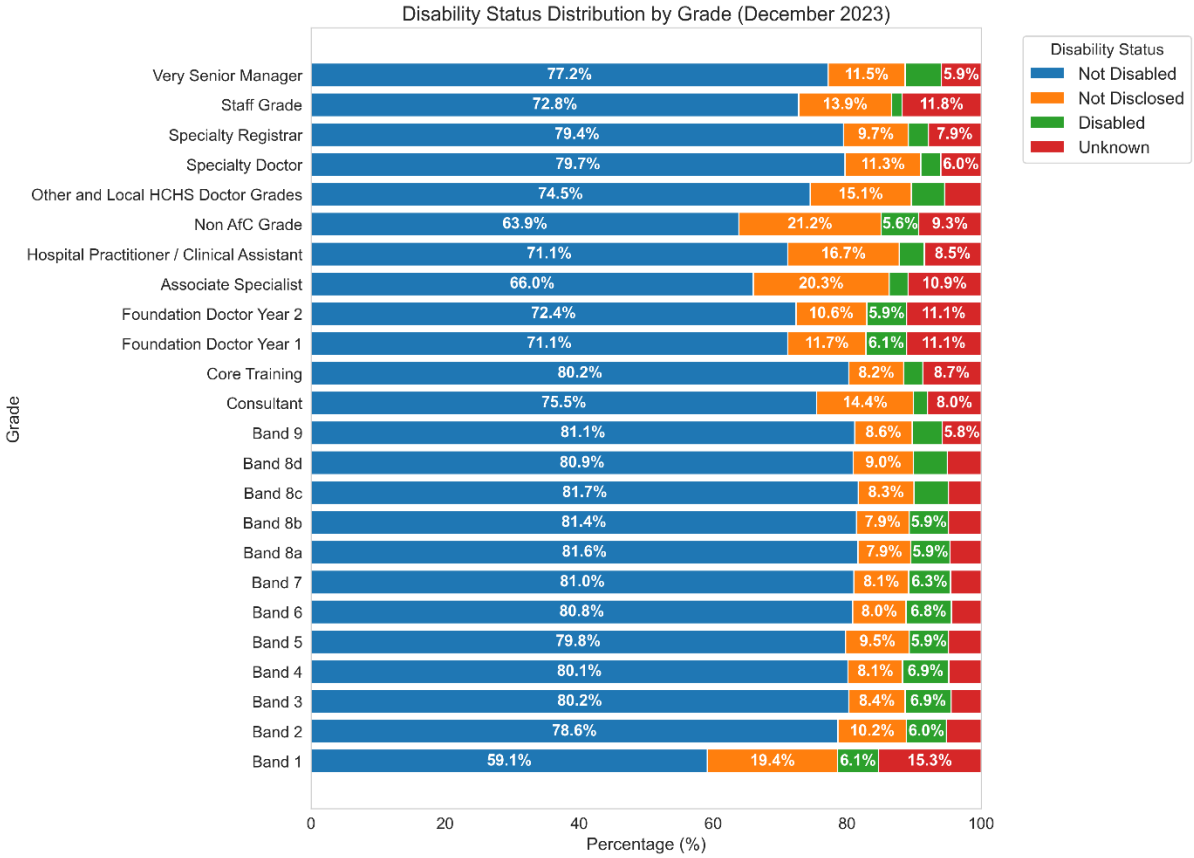
Within each staff group, employees who identify as Disabled represent between 2.9% and 8.4%. Most staff within each group are Non-Disabled, representing between 73.2% and 81.3% of the staff groups, as illustrated in figure x. Employees who chose not to disclose their disability status represent between 6.9% and 14.6% across all staff groups. Additionally, the disability status of 3.1% to 10.7% of employees remains unknown within these staff groups.



Disability status by grade

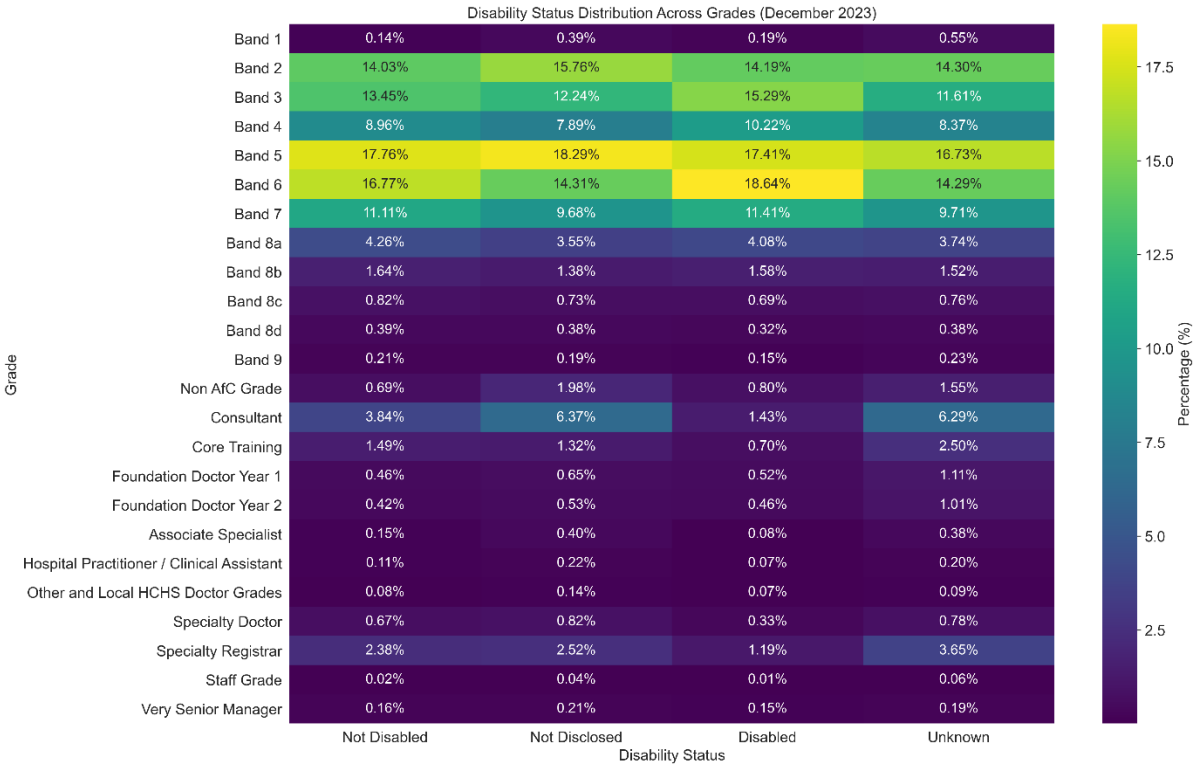
Across all grades, the proportion of NHS workers who identified as Disabled is relatively low compared to those who identified as Non-Disabled, ranging from 1.6% to 6.9% for Disabled and from 59.1% to 81.7% for Non-Disabled employees within each grade, as illustrated in Figure x. However, it is important to note that a significant percentage of workers do not disclose their disability status, with rates varying between 7.9% and 21.2% within each grade. Additionally, the percentage of individuals whose disability status is unknown varies between 4.5% and 15.3%.

The grades with the highest percentage of individuals identifying as Disabled are found in bands 1 to 8b, as well as in Foundation Doctor Years 1 and 2, where the rates range from 5.9% to 6.9%. In contrast, staff grade, consultant, and associate specialist grades record the lowest percentage of workers identified as disabled, with 1.6% in staff grade, 2.1% in consultant, 2.8% in associate specialist grades. It is also worth noting that band 1, associate specialist, and non AfC grades register a large percentage of individuals who did not disclose their disability status, with rates of 19.4%, 20.3%, and 21.2%, respectively.



Disability status across grades

As illustrated in Figure X, the distribution of disability status across different grades reveals that 82.08% of those who identify as Non-Disabled are represented between bands 2 and 7, while 87.16% of those who identify as Disabled fall within this range. It is also worth noting that 3.84% of those who identify as Non-Disabled hold the position of consultant, compared to only 1.43% of those who identify as Disabled. A similar pattern is observed in the specialty registrar category, where 2.38% of those who identify as Non-Disabled occupy this position, compared to only 1.19% of those who identify as Disabled.

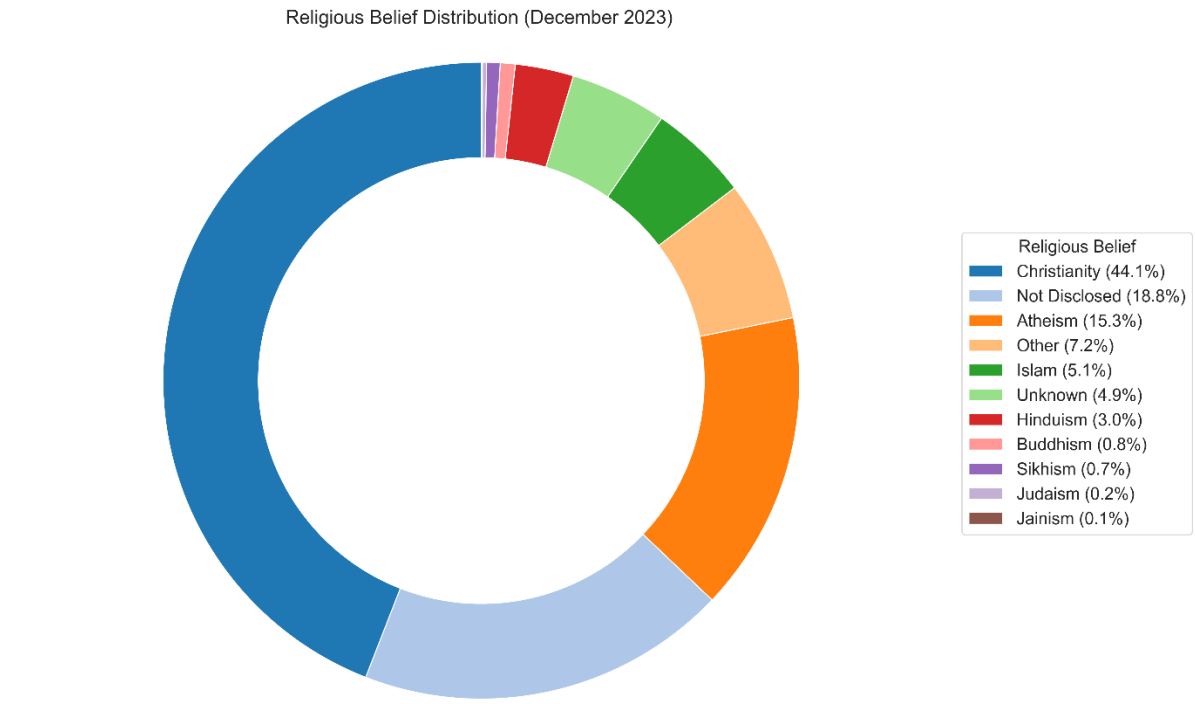


Religious belief distribution in the NHS workforce

This section explores the religious beliefs within the NHS workforce.

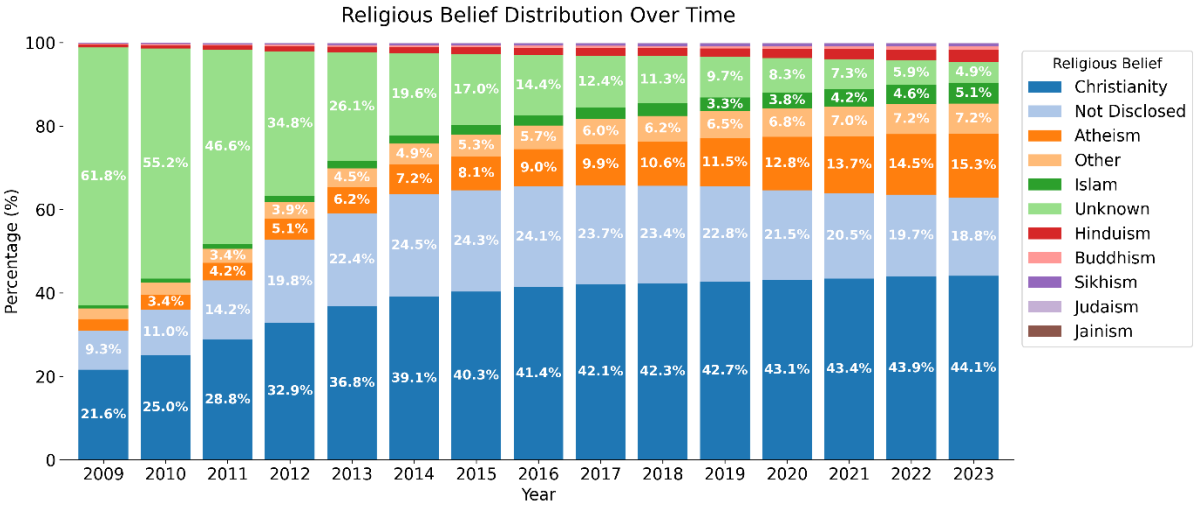
Overall religious belief distribution

Christianity is the most represented religion, with 44.1% of the workforce identifying as Christian, as illustrated in Figure X. A significant portion of the workforce (18.8%) chooses not to disclose their religious belief. Atheists represent 15.3% of the workforce. Islam is represented by 5.1% of the workforce, and Hinduism by 3%, marking them as minority religions. Buddhism, Sikhism, Judaism, and Jainism account for 0.8%, 0.7%, 0.2%, and 0.1% of the workforce, respectively, also marking them as minorities religions. Additionally, 7.2% of the workforce identified as having a religion other than those listed.



Historical religious belief trends

Between 2009 and 2023, there has been a significant improvement in the availability of information regarding the religious beliefs of the NHS workforce. The percentage of employees whose religious beliefs were unknown decreased substantially, from 61.8% to 4.9%, reflecting improved data collection, as illustrated in Figure x. Additionally, the percentage of employees who did not state their religious beliefs has declined in recent years, from 24.5% in 2014 to 18.8% in 2023. This trend suggests a growing comfort and willingness among workers to disclose their religious belief status.

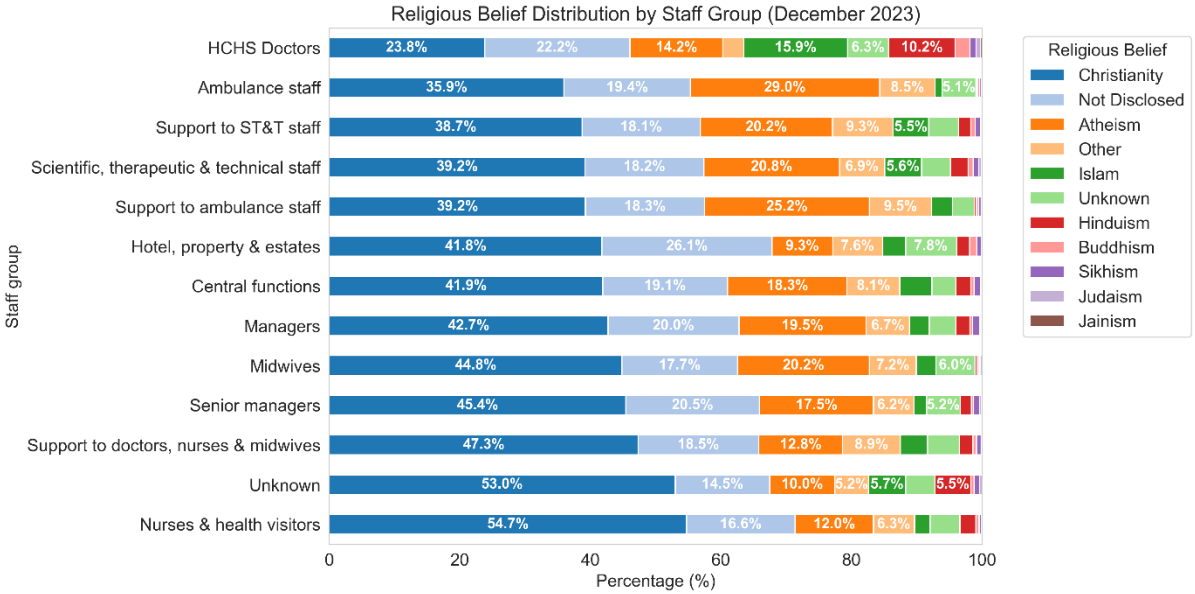


Religious belief by staff group

HCHS doctors exhibit the highest religious diversity among NHS staff groups, with 23.8% of this staff group identifying as Christian, 15.9% as Muslim, 14.2% as Atheist, and 10.2% as Hindu, as illustrated in Figure X. The other religious belief within this staff group are minorities or unknown.

Christians are the predominant religious group across all staff groups; however, their prevalence varies. Nurses and health visitors have the highest representation of Christians (54.7%), followed by support to doctors, nurses and midwives (47.3%), senior managers (45.4%), and midwives (44.8%). The proportion of the workforce not disclosing their religious beliefs is significant across all groups, ranging from 14.5% to 26.1%, indicating that a substantial percentage of the workforce prefers not to disclose their religious beliefs.

Atheism is strongly represented among ambulance staff (29%) and support to ambulance staff (25.2%). Religions such as Islam and Hinduism have varying representation across staff groups. For example, Islam and Hinduism are notably represented among HCHS doctors, with 15.9% and 10.2%, respectively. Sikhism, Buddhism, Judaism, and Jainism are the least represented religions across all NHS staff groups, representing between 0.2% to 2.3% of the staff groups.



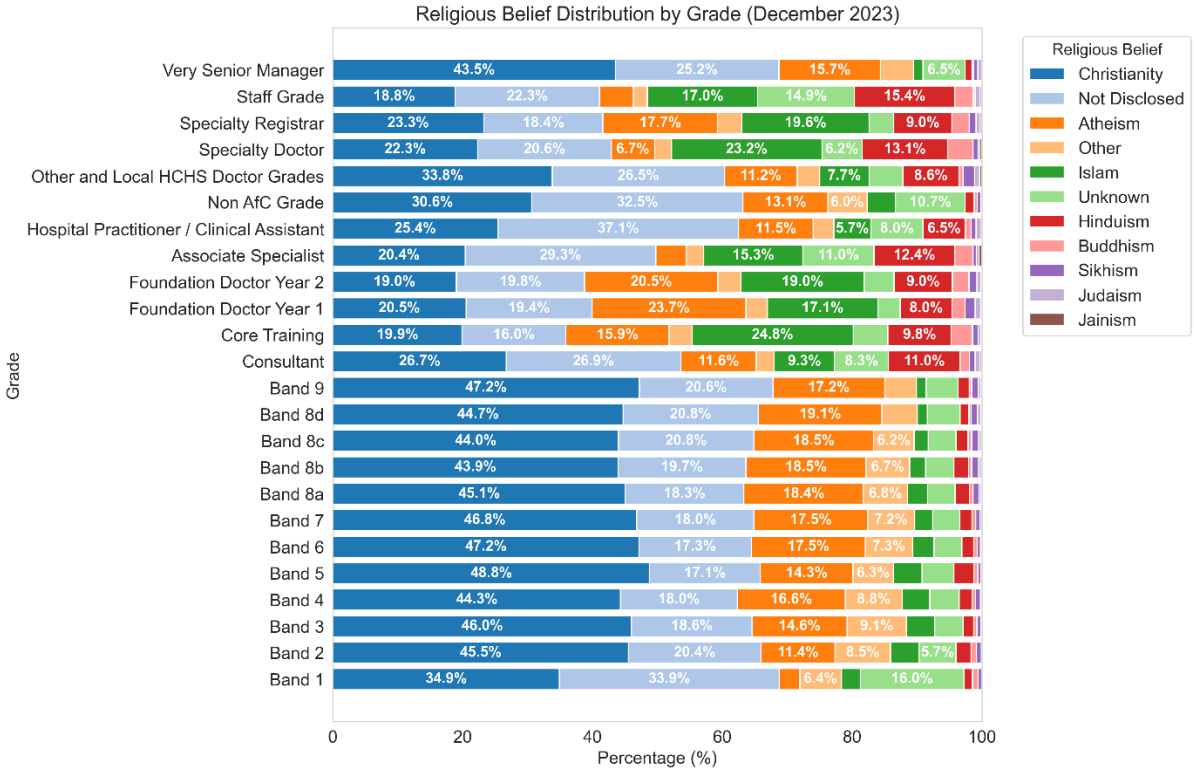
Religious belief by grade

Christianity is the predominant religion within most grades, particularly in bands 2 to 9, as well as in the very senior manager grade, with percentages ranging from 43.5% to 48.8%, as illustrated in figure X. In contrast, staff grade, foundation doctor year 2, and core training have the lowest percentage of individuals who identify as Christian, at 18.8%, 19%, and 19.9%, respectively. It is also worth noting that across all staff groups, a significant percentage of the workforce has decided not to disclose their religious beliefs, with the highest percentage found in the hospital practitioner/clinical assistant staff group (37.1%) and the lowest in core training (16%).

Atheism is also notably represented, particularly in foundation doctor year 1 (23.7%) and foundation doctor year 2 (20.5%). The grade with the lowest representation of Atheism is band 1 at 3.2%. The "other" and "unknown" categories have moderate representation across all grades, except for band 1, where the percentage of individuals with unknown religious beliefs is 16%.

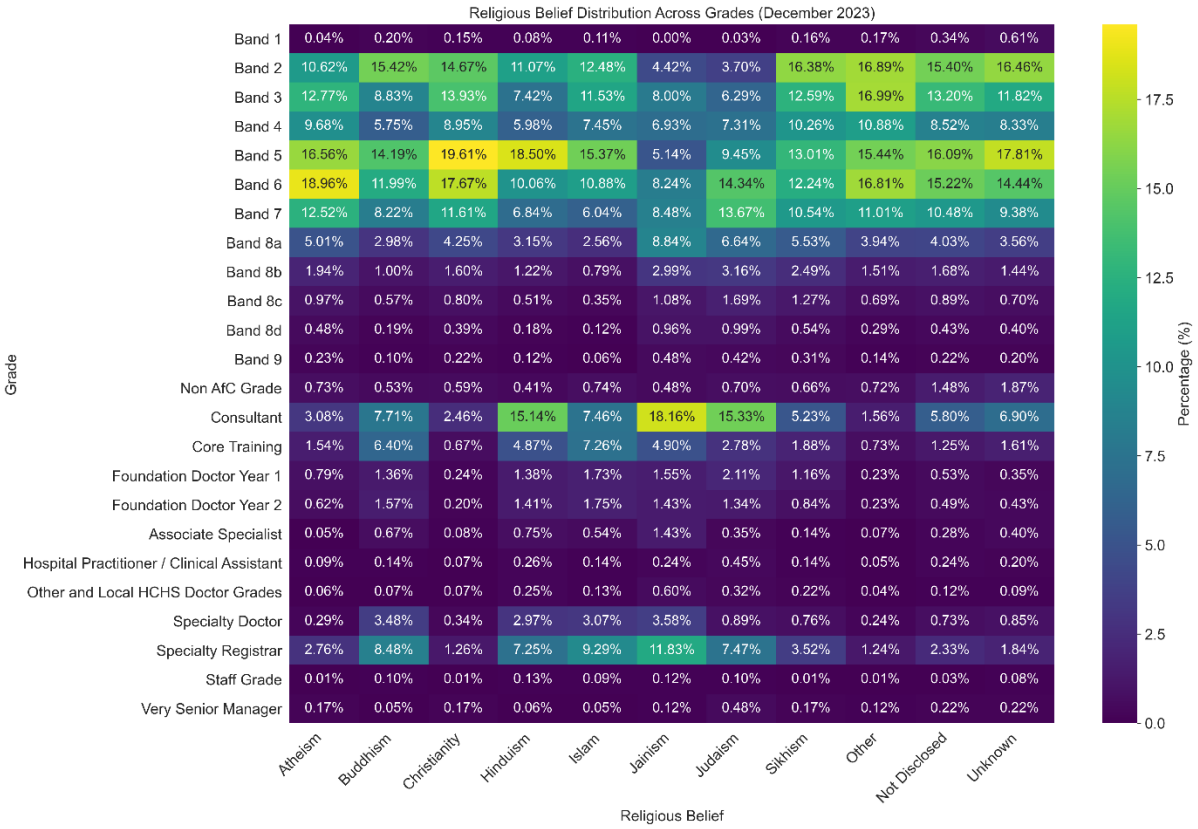
Islam is most represented in core training (24.8%) and among specialty doctors (23.2%), with the least representation among very senior managers, band 8d, and band 9, with only 1.5%. Hinduism has low representation across bands 1 to 9 but is notably present among staff grade (15.4%), specialty doctors (13.1%), and associate specialists (12.4%).

Sikhism, Buddhism, Judaism, and Jainism are minority religions with smaller percentages across all grades. Sikhism is most represented in the Other and Local HCHS doctor grades at 1.8%. Buddhism has its highest representation among specialty doctors at 3.9%. Judaism is most represented in foundation doctor year 1 at 0.9%, and Jainism in the Other and Local HCHS doctor grades at 0.4%.



Religious belief across grades

In Figure X, the distribution of religious belief across different grades reveals significant patterns. Among those identifying as Christian, 86.44% are represented in bands 2 to 7. Similarly, 81.11% of individuals identifying as Atheist, 75.02% as Sikh, 64.4% as Buddhist, 63.75% as Muslim, 59.87% as Hindu, 54.76% as Jewish, and 41.21% as Jain fall within the same range. It is also worth noting that 18.16% of those who identify as Jain, 15.33% as Jewish, 15.14% as Hindu, 7.71% as Buddhist, and 7.46% as Muslim hold the position of consultant, compared to only 5.23% of those who identify as Sikh, 3.08% as Atheist, and 2.46% as Christian. A similar pattern is observed in the specialty registrar category: 11.83% of those who identify as Jain, 9.29% as Muslim, 8.48% as Buddhist, 7.47% as Jewish, and 7.25% as Hindu hold this position, while only 3.52% of those who identify as Sikh, 2.76% as Atheist, and 1.26% as Christian occupy this position.


Religious Belief Distribution Across Grades (December 2023)
Grade
Band 1 0.04% 0.20% 0.15% 0.08% 0.11% 0.00% 0.03% 0.16% 0.17% 0.34% 0.61%
Band 2 10.62% 15.42% 14.67% 11.07% 12.48% 4.42% 3.70% 16.38% 16.89% 15.40% 16.46%
Band 3 12.77% 8.83% 13.93% 7.42% 11.53% 8.00% 6.29% 12.59% 16.99% 13.20% 11.82%
Band 4 9.68% 5.75% 8.95% 5.98% 7.45% 6.93% 7.31% 10.26% 10.88% 8.52% 8.33%
Band 5 16.56% 14.19% 19.61% 18.50% 15.37% 5.14% 9.45% 13.01% 15.44% 16.09% 17.81%
Band 6 18.96% 11.99% 17.67% 10.06% 10.88% 8.24% 14.34% 12.24% 16.81% 15.22% 14.44%
Band 7 12.52% 8.22% 11.61% 6.84% 6.04% 8.48% 13.67% 10.54% 11.01% 10.48% 9.38%
Band 8a 5.01% 2.98% 4.25% 3.15% 2.56% 8.84% 6.64% 5.53% 3.94% 4.03% 3.56%
Band 8b 1.94% 1.00% 1.60% 1.22% 0.79% 2.99% 3.16% 2.49% 1.51% 1.68% 1.44%
Band 8c 0.97% 0.57% 0.80% 0.51% 0.35% 1.08% 1.69% 1.27% 0.69% 0.89% 0.70%
Band 8d 0.48% 0.19% 0.39% 0.18% 0.12% 0.96% 0.99% 0.54% 0.29% 0.43% 0.40%
Band 9 0.23% 0.10% 0.22% 0.12% 0.06% 0.48% 0.42% 0.31% 0.14% 0.22% 0.20%
Non AfC Grade 0.73% 0.53% 0.59% 0.41% 0.74% 0.48% 0.70% 0.66% 0.72% 1.48% 1.87%
Consultant 3.08% 7.71% 2.46% 15.14% 7.46% 18.16% 15.33% 5.23% 1.56% 5.80% 6.90%
Core Training 1.54% 6.40% 0.67% 4.87% 7.26% 4.90% 2.78% 1.88% 0.73% 1.25% 1.61%
Foundation Doctor Year 1 0.79% 1.36% 0.24% 1.38% 1.73% 1.55% 2.11% 1.16% 0.23% 0.53% 0.35%
Foundation Doctor Year 2 0.62% 1.57% 0.20% 1.41% 1.75% 1.43% 1.34% 0.84% 0.23% 0.49% 0.43%
Associate Specialist 0.05% 0.67% 0.08% 0.75% 0.54% 1.43% 0.35% 0.14% 0.07% 0.28% 0.40%
Hospital Practitioner / Clinical Assistant 0.09% 0.14% 0.07% 0.26% 0.14% 0.24% 0.45% 0.14% 0.05% 0.24% 0.20%
Other and Local HCHS Doctor Grades 0.06% 0.07% 0.07% 0.25% 0.13% 0.60% 0.32% 0.22% 0.04% 0.12% 0.09%
Specialty Doctor 0.29% 3.48% 0.34% 2.97% 3.07% 3.58% 0.89% 0.76% 0.24% 0.73% 0.85%
Specialty Registrar 2.76% 8.48% 1.26% 7.25% 9.29% 11.83% 7.47% 3.52% 1.24% 2.33% 1.84%
Staff Grade 0.01% 0.10% 0.01% 0.13% 0.09% 0.12% 0.10% 0.01% 0.01% 0.03% 0.08%
Very Senior Manager 0.17% 0.05% 0.17% 0.06% 0.05% 0.12% 0.48% 0.17% 0.12% 0.22% 0.22%
Atheism
Buddhism
Christianity
Hinduism
Islam
Jainism
Judaism
Sikhism
Other
Not Disclosed
Unknown
Religious Belief
Percentage (%)
17.5
15.0
12.5
10.0
7.5
5.0
2.5
0.0

Discussion

Summary of key findings and interpretation

Gender

The gender distribution within the NHS workforce as of December 2023 reveals a significant gender disparity. Females constitute most of the workforce in the NHS, representing 76% of the workforce, while males represent only 24%. However, male representation has seen a slight increase, rising from 22.5% in 2009 to 24% in 2023. Females dominate most staff groups, almost all midwives are female (96.6% female), with females also heavily represented among nurses and health visitors (88.1% female) and those providing support to doctors, nurses, and midwives (83.4% female). Conversely, males are more represented in staff groups such as HCHS doctors (52.9% male) and ambulance staff (51.4% male). Although females are the majority in the NHS workforce, males are more represented in senior grades, such as consultant (59.8% male) and associate specialist (58.5% male), and almost evenly represented among very senior managers (50.1% male), indicating that men occupy a larger share in some of the senior medical NHS grades.

Age

The age distribution within the NHS workforce reveals a diverse representation across different age bands. NHS workers under 25 years old represent 5.6% of the workforce. Those aged 25 to 34 years represent 25.3%, the age group from 35 to 44 years represents 24.9%, and those aged from 45 to 54 years represent 23.3%. The age group from 55 to 64 represents 18.2% and those above 65 years represent 2.8% of the workforce. The age distribution within the NHS workforce has changed from 2009 to 2023. There has been an increase in the proportion of younger workers (25-34 years old) from 21.5% to 25.3%, as well as an increase in older workers (55-64 years old) from 14.7% to 18.2%. In contrast, the proportion of workers aged 35-44 and 45-54 has decreased, from 27.9% to 24.9% and from 29.1% to 23.3%, respectively. Additionally, younger employees (under 34 years) are more commonly found in frontline staff groups, while older employees (over 55 years) are more prevalent in senior positions.

Ethnicity

The ethnicity distribution within the NHS workforce reflects a predominantly White composition, with 67.6% of the workforce identifying as White. Asian/Asian British workers represent 13.7% of the workforce, Black/Black British represent 8.2% and Chinese workers represent 0.6%. A substantial portion of the workforce (9.9%) has not stated their ethnicity or belongs to one of the following categories: any other

ethnic group, mixed, or unknown. From 2009 to 2023, ethnic diversity within the NHS workforce has increased. The proportion of those identifying as White decreased from 79.8% to 67.6%, while those identifying as Asian/Asian British increased from 6.9% to 13.7% and those identifying as Black/Black British increased from 4.8% to 8.2%. Ethnic diversity decreases from Band 5 to Band 9, with higher bands showing increased representation of White individuals and decreased representation of minority ethnic groups. Those who identify as Asian/Asian British and Chinese are more likely to hold consultant and specialty registrar positions compared to other ethnic groups. Specifically, 8.54% of those identifying as Asian/Asian British and 14.53% of those identifying as Chinese are consultants, while only 3.19% of White and 1.50% of Black/Black British occupy this position. Similarly, 5.11% of those identifying as Asian/Asian British and 11.42% of those identifying as Chinese occupy specialty registrar grades, while only 2.43% of those identifying Black/Black British and 1.39% of White individuals hold this position. The representation of ethnic minorities decreases significantly at the very senior manager level within the NHS. White individuals represent 86.1% of the workforce in this grade, whereas Asian/ Asian British individuals account for just 4.09%. Other ethnic groups have even less representation, highlighting a significant disparity in ethnic diversity at the highest management levels within the NHS.

Sexual orientation

The majority of workforce identifies as heterosexual or straight (77%), with 14.5% not stating their sexual orientation, and 4.8% being unknown. Those identifying as gay, lesbian, bisexual, undecided, or other sexual orientations represent 3.7% of the workforce. Between the years 2009 and 2023, there has been a significant improvement in the availability of sexual orientation data, with the percentage of employees whose orientation was unknown dropping significantly from 62% to 4.8%. Additionally, the percentage of staff who did not disclose their orientation fell from 22.9% in 2014 to 14.5% in 2023. Those who identify as Bisexual are less likely to hold consultant and specialty registrar positions compared to the other sexual orientations. Specifically, 3.48% of those who identify as Heterosexual or Straight and 3.07% of those who identify as Gay or Lesbian hold the grade of consultant, while only 0.84% of those who identify as Bisexual occupy this grade. The same pattern is observed in the specialty registrar category: 2.46% of those who identify as Heterosexual or Straight and 2.53% of those who identify as Gay or Lesbian occupy this grade, compared to only 2.03% of those who identify as Bisexual.

Disability status

Employees reporting a disability represent 6% of the workforce. Additionally, 9.2% of employees have not disclosed their disability status, and for 5.2%, their disability

status is unknown. From 2009 to 2023, the availability of sexual orientation data has significantly improved, reducing the percentages of employees with unknown disability status from 69.2% in 2009 to 5.2% in 2023. Those who identify as Disabled are less likely to hold consultant and specialty registrar positions compared to their non-disabled counterparts. Specifically, 3.84% of those who identify as non-disabled hold the position of consultant, compared to only 1.43% of those who identify as Disabled. A similar pattern is observed in the specialty registrar category, where 2.38% of those who identify as non-disabled occupy this position, compared to only 1.19% of those who identify as Disabled.

Religious belief

Christianity is the most represented religion in the NHS workforce, comprising 44.1%, followed by Atheism (15.3%), Islam (5.1%), and Hinduism (3%). Minority religions include Buddhism (0.8%), Sikhism (0.7%), Judaism (0.2%), and Jainism (0.1%). Improvements in data collection have significantly reduced the percentage of the workforce with unknown religious belief status, from 61.8% in 2009 to 4.9% in 2023. HCHS doctors exhibit the highest religious diversity among NHS staff groups, with 23.8% identifying as Christian, 15.9% as Muslim, 14.2% as Atheist, and 10.2% as Hindu. Atheism is strongly represented among ambulance staff (29%) and support staff to ambulance staff (25.2%).

Study limitations

As with all research studies, this work has some limitations. First, the variables of religious belief, disability status, and sexual orientation had incomplete data in 2009, with significant improvements only in recent years. A high percentage of unknown responses during this earlier period makes it difficult to understand the distribution of these variables over time. Second, this study does not compare the proportion of the categories for the variables gender, age, ethnicity, sexual orientation, disability status, and religious belief with data from the United Kingdom population, which limits the ability to determine whether these categories are representative of the overall population. Third, the data on sensitive variables such as ethnicity, sexual orientation, and disability status are often self-reported, which may be subject to response bias. Respondents may underreport or overreport their status due to privacy concerns or social stigma. Fourth, a significant portion of the workforce has decided not to disclose information about religious belief, disability status and sexual orientation, potentially leading to the underrepresentation of certain groups and affecting the accuracy of the analysis. Fifth, most of the analyses are based on cross-sectional data, capturing a snapshot in December 2023. This limits the ability to draw conclusions about trends and changes over time. Lastly, this study relies solely on quantitative data for analysis, which might not capture the qualitative

aspects of diversity and inclusion, such as personal experiences of discrimination or the effectiveness of specific programs or initiatives.

Limitations from studies

Several limitations arose from the existing studies included in the review. First, some studies present representation issues, where questionnaire respondents represent only a small fraction of the target population, focus on geographic limitations, or are limited to a single trust, which could restrict the generalization of the findings. Second, study questionnaires may attract certain demographics more than others, leading to oversampling of specific subgroups. Third, some studies have experienced data limitations, such as a lack of comprehensive or accurate data, or limited availability of data for specific groups. Fourth, some studies have experienced self-selection bias, where questionnaire respondents may have a higher interest in the topic or the targeted population, thus introducing bias into the sample. Fifth, some studies have used the country of primary qualification as a surrogate for ethnic background, which may overlook British individuals who studied abroad and minority-background individuals who studied in the UK. Therefore, conclusions on race and ethnicity should be interpreted with caution. Sixth, certain ethnic groups were underrepresented in the parent studies, limiting the depth and breadth of insights regarding these groups' experiences. Lastly, some studies have experienced mode bias, where the questionnaire was administered online, potentially introducing bias due to the mode of delivery. However, this risk is somewhat mitigated by the fact that many participants require online access for their training and work.

Strengths

Notwithstanding the limitations, this study has key strengths. First, this study includes a comprehensive literature review with a systematic approach. The use of the PRISMA methodology for the literature review ensures a systematic and thorough analysis of existing research. This approach helps in identifying relevant studies, verifying their quality, and summarizing findings in a structured manner. Second, the study is grounded in a robust methodological framework. The methodology is based on the CRISP-DM data collection and analysis framework, adapted to meet the specific needs of this project. This ensures a structured and systematic approach to data understanding, collection, preparation, visualization, and analysis. Third, the implementation of data analysis using tools like Python and Pandas ensures the use of advanced, reliable, and efficient methods for handling complex analyses and large datasets. Fourth, the study examines a wide range of demographic variables, including gender, age, ethnicity, sexual orientation, disability status, and religious beliefs. This comprehensive analysis offers a broad view of equality, diversity and inclusion within the NHS. Beyond overall distributions, this

study provides detailed patterns within specific groups, grades, and historical trends, offering insights into where disparities exist. Fifth, the analysis of multiple professions, such as doctors, midwives, and paramedics, allows for a comparative analysis and the identification of specific issues and solutions for these professions. Sixth, based on the findings, the study provides recommendations to address the identified disparities, which can guide stakeholders in policymaking and organizational changes. Seventh, the study's findings have the potential to directly impact NHS inclusivity and diversity policies and practices. By highlighting areas for improvement and suggesting initiatives, the study can influence decision-making and operational practices within the NHS. Lastly, the study identifies several areas for future research, pointing out solutions and possibilities for further investigations into equality, diversity and inclusion within the NHS. This contributes to the continuous development of knowledge in this critical area.

Incidental observation

Although not the primary focus of this research, an incidental observation was noted. The detail and completeness of historical data have varied over time, indicating that data collection practices have improved. This improvement will enable more accurate tracking of long-term trends in the future.

Comparison with other studies included in the review

Gender representation

The review of literature reveals that significant gender disparities exist within the NHS, despite some improvements in recent years. Men are more likely to occupy higher-paid and prestigious positions across all race-ethnic groups compared to females. Specialties such as trauma, orthopaedics and cardiothoracic surgery show low female representation, with predictions indicating that gender parity in some fields will only be achieved in 2082. Professions dominated by females, such as nursing and midwifery, exhibit higher levels of job stress and sickness absence rates.

Study findings further highlight gender disparities. Females represent the majority (76%) of the NHS workforce, although males are more represented in senior grades such as consultant (59.8% male) and associate specialist (58.5% male). From 2009 to 2023, male representation in the NHS workforce slightly increased from 22.5% to 24%. Midwives (96.6% female) and nurses and health visitors (88.1% female) staff groups are predominantly female, while HCHS doctors (52.9% male) and ambulance staff (51.4% male) show a more balanced gender representation.

Age distribution

The literature review indicates that some healthcare professions have aging workforces, necessitating strategic workforce planning to address potential future shortages. Older workforce segments face challenges with retention and turnover, which can negatively impact staff well-being and service delivery.

The study findings show that the largest age group within the NHS workforce is 25-34 years (25.3%), followed by 35-44 years (24.9%) and 45 to 54 years (23.3%). NHS workers under 25 years old represent 5.6% of the workforce, while those aged from 55 to 64 account for 18.2%, and those above 65 years represent 2.8%. Between 2009 to 2023, there was an increase in the proportion of the workforce aged 25-34 (from 21.5% to 25.3%) and those aged 55-64 years (from 14.7% to 18.2%). The proportion of workers aged over 65 years also grew, from 1.2% in 2009 to 2.8% in 2023. Frontline staff groups, such as HCHS doctors, midwives, ambulance staff, support to ambulance staff, nurses and health visitors, are predominantly occupied by younger employees (under 34 years). In contrast, senior positions, such as Senior Managers, are more represented by older age groups (over 55 years).

Ethnicity representation

The literature review highlights significant disparities in ethnicity and race within NHS positions, pay, and leadership roles. White individuals are more likely to hold senior and higher-paid positions, particularly consultant roles. Ethnic minorities, including those who identify as Black, Asian, and Chinese, are underrepresented in these leadership positions and face substantial barriers to career progression. While Chinese and Asian/Asian British individuals are more likely to be employed as doctors compared to other ethnic groups, White doctors are more likely to reach the highest-paid consultant roles. Despite increased diversity in some areas, ethnic minorities still encounter significant challenges in advancing to leadership positions within the NHS.

Study findings show that White individuals represent 67.6% of the workforce, with Asians (13.7%) and Black individuals (8.2%) being the next largest groups. A substantial portion of the workforce (9.9%) has not stated their ethnicity or belongs to one of the following categories: Any other ethnic group, mixed, or unknown. Chinese individuals represent 0.6% of the workforce. From 2009 to 2023, there has been an increase in the representation of Asian/Asian British (from 6.9% to 13.7%) and Black/ Black British (from 4.8% to 8.2%) ethnicities in the NHS workforce. Chinese individuals have a higher probability to be employed as consultants. HCHS doctors, nurses and health visitors demonstrate higher ethnic diversity, with lower percentages of White individuals compared to other staff groups. The representation of ethnic minorities decreases significantly at the very senior manager level grade within the NHS.

Leadership roles

The literature review emphasizes that women and ethnic minorities face significant barriers in accessing leadership roles, often hindered by bullying, harassment, and discrimination. While programs like the NRS have increased diversity, leadership roles are still predominantly occupied by White males.

Study findings reveal that within the NHS workforce, senior manager and manager staff groups are more represented by females, with 58.4% and 62% respectively. Very senior manager grade is majority occupied by White individuals (86.1%), with very low representation of Asian individuals (4.09%) and other minority ethnic groups. Senior leadership roles are more commonly held by older employees, while younger employees are less represented in these roles.

Pay and career progression

The literature review reveals the existence of ethnic and gender pay gaps within the NHS workforce, with White males typically holding higher-paid positions. Ethnic minorities and women face significant barriers to career progression, often intensified by experiences of bullying and discrimination.

Study findings further illustrate these disparities, showing that men are more represented in higher-paid roles such as consultant and associate specialist. Ethnic minorities show significant representation in grades like core training, associate specialist, specialty doctor, and Staff Grade, but are underrepresented in senior management roles.

In summary, the study findings closely align with the literature review, confirming disparities in equality, diversity and inclusion within the NHS workforce. The main areas of concern include gender and ethnic representation in senior roles, pay disparities, and barriers to career progression. Although recent years have seen improvements in equality, diversity and inclusion, significant efforts are still required to address these disparities and create a more inclusive and equitable NHS workforce.

Future research

This study points to several promising directions for future research. First, studies can be improved by focusing on longitudinal data to track changes over time and assess the long-term impact of equality, diversity and inclusion programs and initiatives. Second, future studies should use a mixed-methods approach, combining quantitative and qualitative methods to capture both statistical trends and personal

experiences. Third, future research should compare NHS workforce data with data from the general population of the United Kingdom to determine whether the workforce categories are representative of the broader population or if discrepancies exist. Fourth, future studies should expand the scope of the analysis and include data from other countries for comparative analysis. Fifth, future research should evaluate specific equality, diversity and inclusion interventions in detail to identify best practices and scalable solutions. Lastly, future studies should consider collaborative research and actively engage with a diverse range of stakeholders, including staff from various demographic backgrounds, to ensure a comprehensive understanding of the issues.

Conclusion

Our analysis finds evidence that disparities exist in equality, diversity and inclusion in the NHS workforce. First, females represent 76% of the workforce, while males represent only 24%. Although females are the majority in the NHS workforce, males are more represented in senior grades, such as consultant (59.8% male) and associate specialist (58.5% male), and almost evenly represented among very senior managers (50.1% male), indicating that men occupy a larger share in some of the senior NHS roles. Second, those who identify as Asian/Asian British and Chinese are more likely to hold consultant and specialty registrar positions compared to other ethnic groups. Specifically, consultant roles are held by 8.54% of individuals who identify as Asian/Asian British and 14.53% of those who identify as Chinese. In comparison, only 3.19% of individuals identifying as White and 1.50% of those identifying as Black/Black British hold these positions. Similarly, in the specialty registrar grade, 5.11% of those who identify as Asian/Asian British and 11.42% of those who identify as Chinese occupy these roles, whereas just 2.43% of Black/ Black British individuals and 1.39% of White individuals occupy these grades. Third, ethnic minorities have low representation at the very senior manager level, with White individuals constituting 86.1% of the workforce in this grade, while Asian/Asian British individuals represent only 4.1%, and other ethnic groups have minimal representation. Fourth, from 2009 to 2023 there was a significant increase in the representation of Asian/Asian British and Black/Black British ethnicities within the NHS workforce, rising from 6.9% and 4.8% in 2009 to 13.7% and 8.2% in 2023, respectively. Those who identify as Disabled are less likely to hold consultant and specialty registrar positions compared to their non-disabled counterparts. Specifically, 3.84% of those who identify as non-disabled hold the position of consultant, compared to only 1.43% of those who identify as Disabled. A similar pattern is observed in the specialty registrar category, where 2.38% of those who identify as non-disabled occupy this position, compared to only 1.19% of those who identify as Disabled. Lastly, HCHS doctors exhibit the highest religious diversity among NHS staff groups. This analysis emphasizes the need for targeted efforts to address these disparities and promote greater equality, diversity and inclusion at all levels and sectors of the NHS workforce.

This study has several important contributions. First, it explores a wide range of demographic variables, such as gender, age, ethnicity, sexual orientation, disability status, and religious beliefs, providing a comprehensive analysis and a broad view of equality, diversity and inclusion in the NHS. Beyond overall distributions, the study offers detailed patterns within specific groups, grades, and historical trends, providing insights into where disparities exist. Second, the study compares multiple professions such as doctors, midwives, nurses and paramedics, helping to identify specific issues and solutions for each profession. Third, the study's findings have the potential to directly impact NHS inclusivity and diversity policies and practices,

highlighting areas for improvement and suggesting initiatives that can influence decision-making and operational practices within the NHS.

This study also has some limitations. First, from 2009 until recent years, data on religious belief, disability status, and sexual orientation has been incomplete, with a significant percentage of unknown responses, making it challenging to accurately analyse the distribution of these variables over time. Second, this study does not compare the proportions of categories for the variables gender, age, ethnicity, sexual orientation, disability status, and religious belief with data from the general United Kingdom population, making it difficult to determine if these categories are representative of the overall population. Third, the data on sensitive variables like ethnicity, sexual orientation, and disability status is often self-reported, which can introduce response bias. Respondents may underreport or overreport their status due to privacy concerns or social stigma. Fourth, a substantial portion of the workforce chose not to disclose their religious beliefs, potentially leading to the underrepresentation of certain groups and affecting the accuracy of the analysis. Fifth, most of the analyses are based on cross-sectional data, capturing only a snapshot from December 2023, which limits the ability to draw conclusions about trends and changes over time. Lastly, this study relies solely on quantitative data for analysis, which may not capture the qualitative aspects of diversity and inclusion, such as personal experiences of discrimination or the effectiveness of specific programs or initiatives.

Future research on NHS equality, diversity and inclusion can be further improved. First, studies should focus on longitudinal data to track changes over time and evaluate the long-term effects of equality diversity and inclusion programs and initiatives. Second, future studies should adopt a mixed-methods approach, integrating quantitative and qualitative methods to capture both statistical trends and personal experiences. Third, future studies should compare NHS workforce data with data from the general United Kingdom population to determine whether the workforce categories are representative of the overall population or if discrepancies exist. Fourth, future studies should include data from other countries for comparative purposes. Fifth, future research should evaluate specific equality, diversity and inclusion interventions in detail to identify best practices and scalable solutions. Lastly, future studies should use collaborative research and involve a diverse range of stakeholders, including staff from different demographic backgrounds, to achieve a comprehensive understanding of the issues.

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