

# Harnessing the power of natural language processing to explore inclusive recruitment strategies in the NHS

October 2024

Sarindi Aryasinghe (@sarindiary)

Programme Manager Digital Health and Patient Experience

Imperial College London



# Background and purpose of analysis

As part of the Trust's **Equality, Diversity, and Inclusion Strategy**, the Inclusive Recruitment programme was started in Sept 2021 to increase the diversity of the workforce in more senior roles. Programme had two components:

- ✓ Ethnicity and gender compliant interview panels
- ✓ Hiring managers must write a letter to the ICHT CEO, Tim Orchard, explaining their hiring decision.



**Analysis of structured recruitment data** to understand trends in diversity of candidates through the recruitment stages



**Natural Language Processing (NLP) of anonymised ~1500 Letters to the CEO** to derive thematic trends in hiring managers' candidate assessments



**Aim:** Using a data-driven approach, assess the effectiveness of ICHT's inclusive recruitment programme

# What is natural language processing (NLP)?

- 80-90% of the data in any organization is unstructured.
- Healthcare data systems are only as good as the information that is inputted and asking healthcare professionals to continually enter structured data can be challenging because of workflow issues, time, etc.
- NLP is a computer science technique that transforms unstructured text into a structured format.
- Unstructured data is an **untapped opportunity** – NLP is starting to recognise value of this data.



## 1. Use raw data

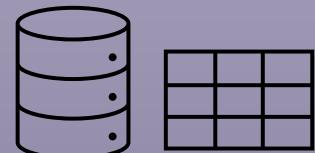
Convert Dear Tim letters into machine-encoded texts.



1010  
1010

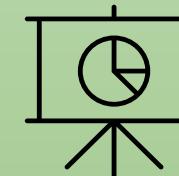
## 2. Build NLP model

Cleaning, standardising and transforming free-text to understand the vocabulary being used.



## 3. Triangulated data

Model extracts data and converts it into useful information complementing other relevant data sources.



## 4. Insights

Robust dataset to tell a story.

# Number of interview campaigns and Dear Tim letters analysed

Division	No. of interview campaigns	No. of applications	No. of shortlisted candidates	No. of candidates offered a role	Dear Tim letters included in analysis*	Triangulated Dear Tim letters **
Corporate	369	5452	1037	343	273	204
Women's Cardiac, Clinical Support and Sexual Health (WCCS)	423	3858	1002	407	514	281
Surgery and Cancer (SC)	431	3555	1017	428	366	266
Medicine and Integrated Care (MIC)	404	2786	671	365	392	249
Pathology	89	922	332	85	0	70
<b>TOTAL</b>	<b>1716</b>	<b>16573</b>	<b>4059</b>	<b>1628</b>	<b>1545</b>	<b>1070</b>

\*The Dear Tim letters became mandatory from June 2022.

\*\* Triangulated with Inclusive Recruitment structured data.

We consider two key time periods:

**1. Between September 2021 to May 2022**, where both components of the inclusive recruitment programme were a **recommendation**.

**2. Between June 2022 to January 2024** where the completion of Dear Tim letter became **mandatory**.

# A note on language

This presentation uses the terminology **Black and Minority Ethnic (BME)** to describe candidates and employees at the Trust that are from a global majority, non-white background, aligning with terminology agreed by the Imperial College Healthcare NHS Trust's Equality, Diversity and Inclusion Committee.

Where data was available, we attempted to disaggregate as much as possible using the ONS ethnicity categories, but this was not possible for majority of the free-text analysis due to how data was collected in the inclusive recruitment programme.



# Data extracted from Letters to Tim



St Mary's Hospital  
6<sup>th</sup> Floor, Salton House  
London  
W2 1NY

Professor Tim Orchard  
St Mary's Hospital  
Præd Street  
London W2 1NY

Dear Tim

RE: Interview outcome from the Chair of the Interview Panel

Directorate/department	Job title and Reference Number	Interview date
Pathology	Clinical specialist	24/10/2023

In line with the Trust's commitment to improve transparency and fairness in the recruitment process, I am writing to provide an overview of the interview and selection process for the above post so that you can be assured that the process we have undertaken has been truly inclusive.

#### Overall observations and comments

The ethnicity and gender of the panel was compliant with our policy to have gender and ethnicity diverse interview panels.

Following the interview, the panel discussed and agreed on the most suitable candidate. There was consensus on the preferred candidate(s).

As panel chair, I have provided initial feedback to all candidates, with appointments for detailed feedback arranged within the working week.

Should you have any questions or concerns on this recruitment episode, please contact me at

Yours sincerely

Please complete the rest of the report below and send this to your Recruitment Officer and to [tim.orchard@nhs.net](mailto:tim.orchard@nhs.net) within 2 working days of the interview date.

Data triangulation with spreadsheets

#### Report from the Chair of the Interview Panel

##### Advertisement

##### Selection process

###### Selection Panel members

The interview panel consisted of the following people.

Role	Name and job title	Gender	Ethnicity *Note 1	Grade	Internal/ external	Involved in shortlisting?	Inclusive recruitment trained?
Chair	John Doe	M	B	9	I	No	Y
Panel member	Clare Smith	F	White	8C	E	No	N
Panel member	Maria Lewis	Female	W	8D	Internal	Y	Y

Inclusive recruitment training

##### Candidates Interviewed

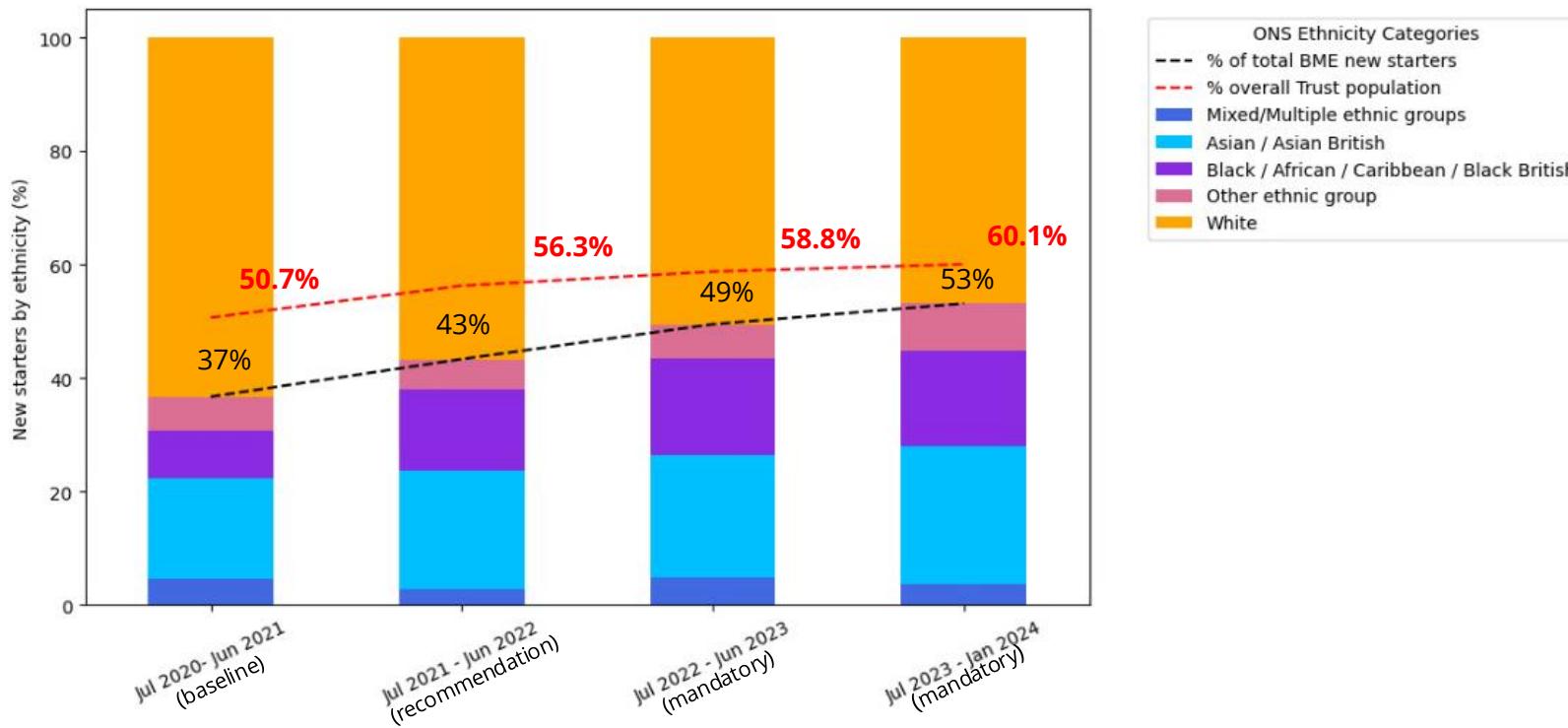
Candidate First name and Surname	TRAC ID	Appointable	Interview score (out of total)	Summary of assessment – areas of strengths and weaknesses	Date feedback provided	Internal / external	Ethnicity *Note 1
Laura Jones	1234	YES	30/40	<p>The following examples of their knowledge, skills and experience were evidenced:</p> <p><b>Strengths</b></p> <p>The following elements of the person specification were not evidenced, or were not as strong as the successful candidate:</p> <p><b>Weaknesses</b></p> <p>The reasons this candidate was considered appointable was:</p>		External	BME
Peter White	6789	N	10/40	<p>The following examples of their knowledge, skills and experience were evidenced:</p>		Ext	W

Characteristics of the candidates

Interview outcome

Interview Scoring

# Across the Trust - Proportion of BME candidates in time

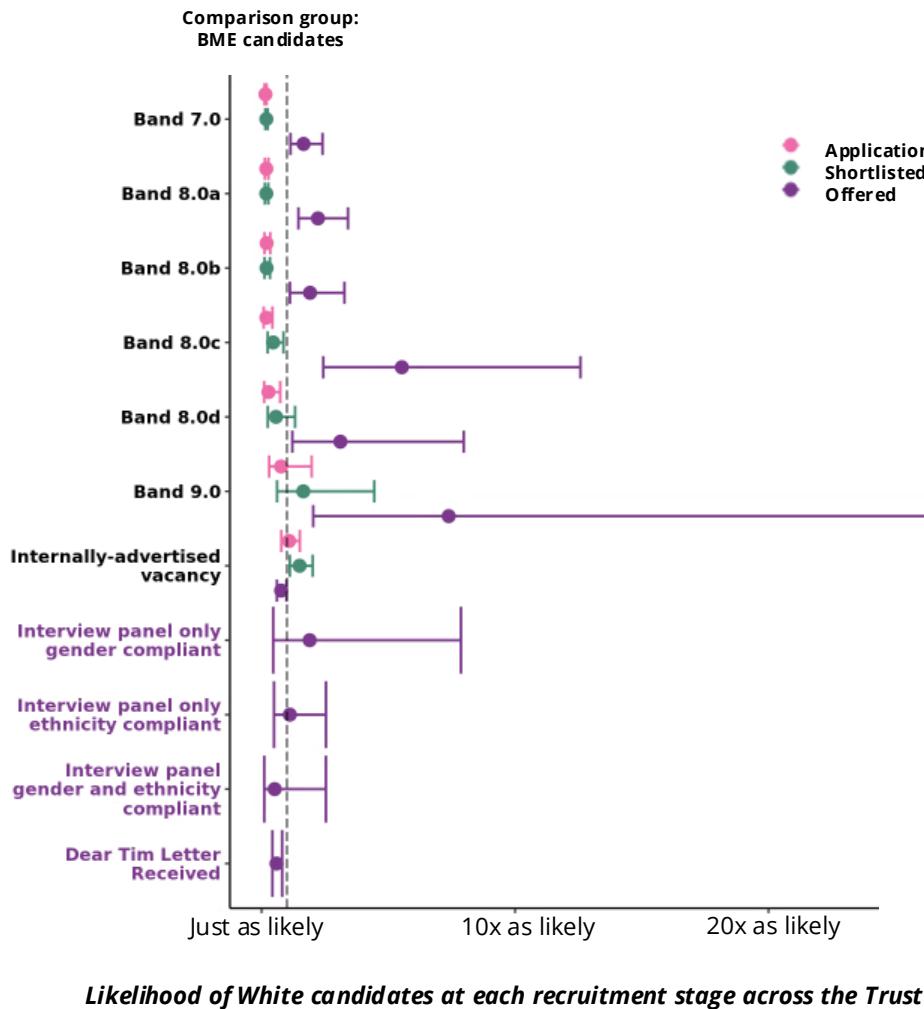


Since the implementation of the inclusive recruitment, the **relative proportion of BME new starters have increased**, becoming closer to the % of BME employees in the Trust.

Comparing July 2020-June 2021 and July 2023 to January 2024, the relative proportions of:

- Black/African/Caribbean and Black British candidates being appointed have doubled in time (8% to 17%).
- Asian and Asian British candidates being appointed has increased by 6% (18% to 24%)

# Factors affecting presence of White candidates at each recruitment stage across ICHT



To understand the immediate impact of the inclusive recruitment programme, we reviewed the data from September 2021 to May 2022 (before) and June 2022 to March 2023 (after).

## Key insights:

### Application

- A White applicant is significantly **less** likely than BME candidates to apply for a Band 7 and 8 role, but the size of this likelihood increases with seniority.

### Shortlisted

- For internally-advertised vacancies, a White candidate is 1.5 times ( $p<0.05$ ) **more** likely to be shortlisted for the role compared to BME candidates.

### Offer

- Across all bands, BME candidates are significantly **less** likely to be offered a role at ICHT than their White counterparts.
- Where a Dear Tim letter is written, a BME candidate is **1.7 times significantly more likely** to be offered a role than a White candidate.

# Impact of gender and ethnicity compliant panel on interview scoring

Candidate	Average Interview Score (Band 7)	Average Interview Score (Band 8 and 9)
Female White	<b>62</b> (p<0.05)	61
Female BME	<b>57</b> (p<0.05)	57
Male White	57	<b>59</b> (p<0.05)
Male BME	54	<b>53</b> (p<0.05)

*Candidate interview scores by banding*

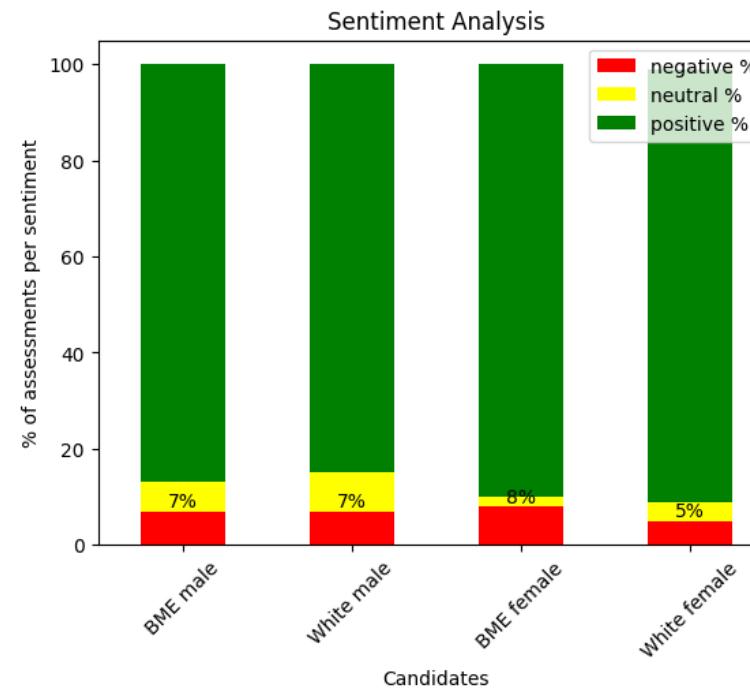
We used the Dear Tim letters to assess the impact of compliant panels on interview scoring across the Trust, normalising interview scores between 0-100 for fair comparison across interviews.

Regardless of whether there was a compliant panel, the average interview score was **5% lower for BME females than White females**, (p<0.05) for band 7 roles.

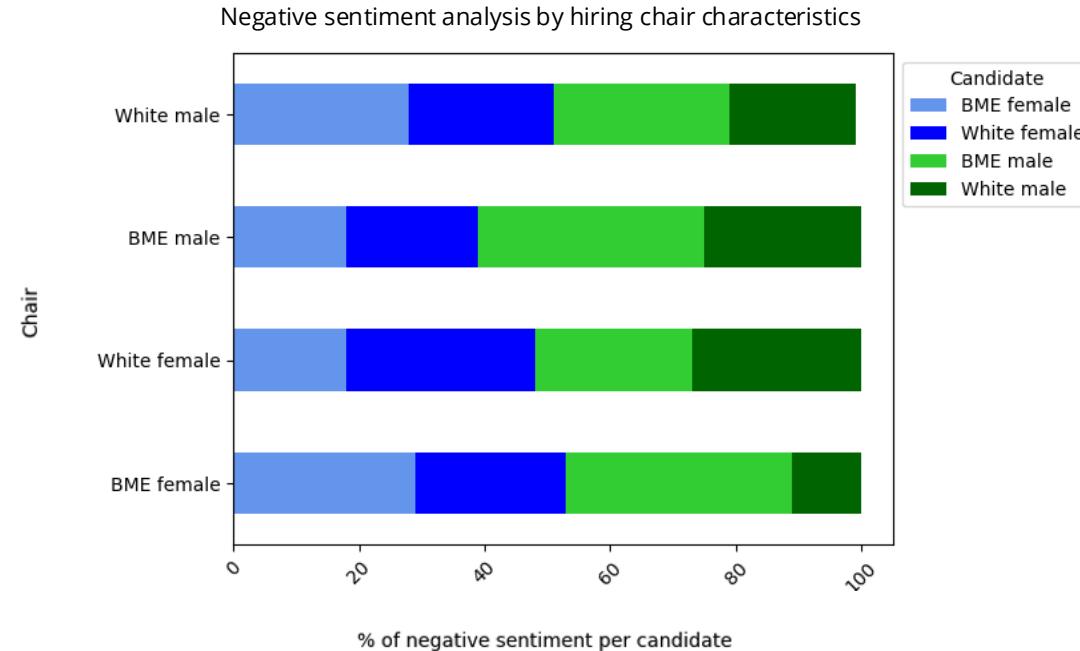
For male candidates, the average interview score was **6% lower for BME males than White males**, (p<0.05) for Band 8 and 9 roles.

# Sentiment analysis of candidate assessments

The sentiment of candidate assessments (negative, neutral, positive) varied based on candidate and chair characteristics.

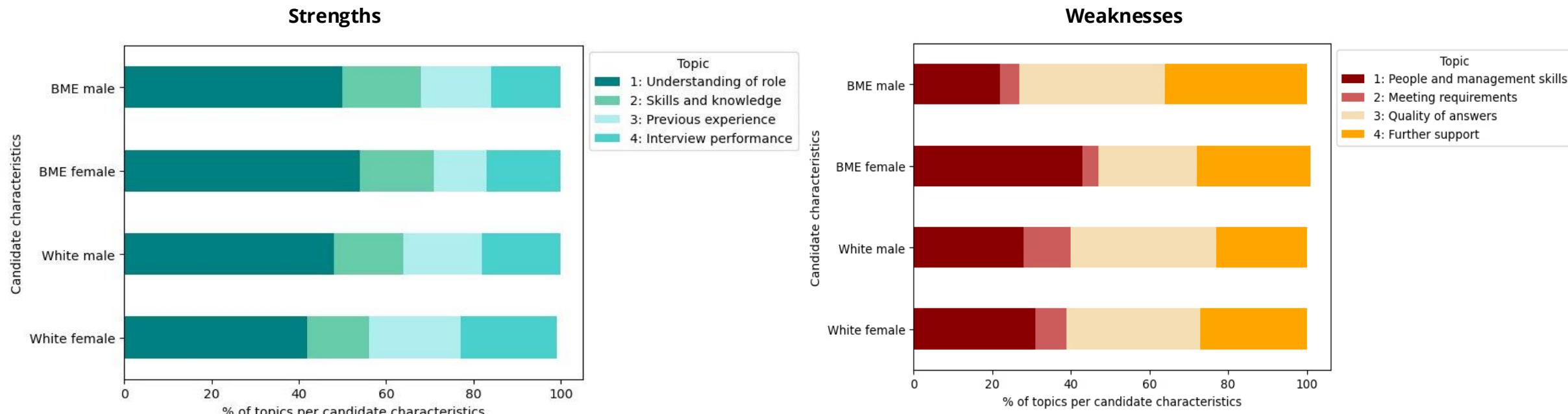


Overall, majority of candidate assessments were positive, but BME female candidates are **1.6 times** more likely to receive **negative** feedback than White female candidates ( $p<0.05$ ).



- BME female chairs provide less negative feedback to White candidates than BME candidates.
- White male chairs provide more negative feedback to BME candidates, regardless of the candidate's gender.

# Candidate assessment topics - by **candidate** characteristics



- Interview performance is highlighted as a strength for White female candidates.
- For BME females, their previous experiences are less highlighted as a strength as compared to other candidates.

- White candidates (especially male candidates) have greater instances of not meeting role requirements.
- White male candidates have less instances of requiring further support.
- People and management skills is most highlighted as a weakness for BME female candidates.

# Recommendations and next steps

## Improvements to inclusive recruitment programme

- **Provide guidance on shortlisting process** (e.g. who should be shortlisting/ how many people) to minimise potential subjectivity to address drop-off of BME candidates between application and shortlisting stage.
- **Identify ways to support internal BME candidates to apply for roles** using staff engagement survey data.
- **Increase awareness and availability of inclusive recruitment training**, with a focus on senior leadership.

## Improvements to data quality

- **Conduct a user experience survey on Dear Tim Letter process** to get feedback from hiring managers on current process.
- **Implement an online form that hiring managers complete** which generates a Dear Tim letter in current format to improve quality of information captured.
- **Capture standardised disaggregated ethnicity categories for candidates and panel members at each recruitment stage** to identify more targeted areas for improvement.

# Thank you

For any questions, please contact:

Sarindi Aryasinghe ([s.aryasinghe@imperial.ac.uk](mailto:s.aryasinghe@imperial.ac.uk))

Louise Clark, Director of Workforce, Imperial College Healthcare NHS Trust ([louise.clark20@nhs.net](mailto:louise.clark20@nhs.net))

