**Identifying Demographic and Socio-Economic Factors**

**Affecting Covid-19 Vaccination Uptake**

### 1. **Background**

Vaccination uptake is not equal in all cohorts of the population. As part of the BNSSG CCG’s duty to reduce inequalities, it is important to find what factors contribute or drive these differences. A member of the Business Intelligence (BI) team at the CCG was interested in investigating the challenge but lacked the technical skills to do so independently.

### 2. The Question

What factors are most significant in driving inequalities in vaccination status? What population segments have received disproportionately few doses?

### 3. Approach

Vaccination data was joined to the usual data used in the PHM ExploreR, and the tool was re-loaded. Once complete, the ExploreR was given to the BI colleague for use. The user successfully built a decision tree, setting vaccination status as the target variable. This tree is shown below in Figure 1. The attributes used during tree construction were restricted to deprivation (socio-economic) and demographic fields.

Chart, scatter chart

Description automatically generated

Figure 1: Decision tree targeting Vaccine Doses Received.

### 4. Results

The decision tree identified a several patient attributes that can indicate inequalities. Of these, some were unexpected. The decision tree also showed cohort sizes and the rules by which these cohorts are defined, as well as mean vaccine status for comparison.

### 5. Outcome

While historically this BI team member was not successful with constructing decision trees, they were happy with the trees the ExploreR built, and said they would be interested in using this function again in the future. They were surprised by the fact that sex appeared as a variable in the *ethnicity white, under 46s* cohort, which prompted further discussion in their team about possible driving factors behind vaccine uptake inequality.