Diagnosis provision by young people's mental health services: a population-based study in South London integrating epidemiological estimates

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Summary

Background Little is known about the provision of diagnoses to young people with mental health disorders. We investigated diagnosis provision by NHS mental health services, focusing on 17-year-olds in South London, UK, between 2009 and 2024, and compared with estimated disorder prevalence.

Methods We extracted diagnosis data from records of the NHS mental healthcare provider serving South London, using the Clinical Record Interactive Search system at the NIHR Biomedical Research Centre: Maudsley. We compared these data with three denominators: the population size, obtained from the Office for National Statistics; the number estimated to have met criteria for a mental health disorder, derived from epidemiological interview data collected in the Environmental Risk (E-Risk) Longitudinal Twin Study and weighted to characteristics of 17-year-old South Londoners; and the number estimated to have met criteria for a disorder and used any health service for their mental health, also from weighted E-Risk Study data.

Findings Of 17-year-olds from South London in 2009–2024, 4.0% (n = 8958/223,404) had a diagnosis in NHS mental health records during the previous year. This diagnosis provision covered <1 in 15 of those estimated to have had a

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disorder, and <1 in 4 of those estimated to have also used health services. Diagnosis provision was lower in girls than boys and in those with Black, Asian, Mixed, or Other ethnicity than their White peers, in those estimated to have had a disorder and used health services.

Interpretation These findings demonstrate gaps and biases in diagnosis provision by NHS mental health services for young people, including among those who had seen any health professional for help, and reveal the imperative need to strengthen young people's mental healthcare.

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Introduction

Mental health disorders cause substantial distress and impairment for affected young people and, if left untreated, can have long-term negative effects on their health, education, and employment.[1,2] Importantly, several specialist interventions have been found to be clinically- and cost-effective, with lasting benefits for individuals and society.[3] There is, therefore, a strong moral and economic case to ensure that such evidence-based treatments can be obtained by young people with mental health disorders. However, accessing treatment can be challenging and requires several steps (Fig. 1). Research and policy on young people's mental healthcare provision have previously focused on identifying and addressing gaps in early steps, such as help-seeking and service use.[4–7] Understanding gaps in later steps, such as diagnosis provision and treatment access, is also crucial to improving healthcare for young people by highlighting targets for service-level interventions. Conversely, identifying over-diagnosis or over-treatment can inform strategies for more efficient use of available resources.

In this study, we investigated mental health diagnosis provision in young people (Fig. 1, Step 4). Diagnosis provision indicates the recognition of a disorder by a clinician, signifies the threshold for treatment in the UK, and guides the delivery of disorder-specific treatments. We examined diagnoses documented in NHS mental health records of 17-year-olds in South London, where a large mental healthcare data resource is available. We compared with population and epidemiological data to calculate diagnosis provision rates in three nested samples (Fig. 2), and tested for sociodemographic differences. We hypothesised that diagnosis provision by NHS mental health services does not meet need, even among those who had seen any health professional for help, and provision might be lower in some sociodemographic groups.

Methods

Data source for mental health diagnosis provision

We obtained data about mental health diagnosis provision from South London and Maudsley NHS Foundation Trust, which is one of Europe's largest mental healthcare providers and has a robust infrastructure to process electronic health records for research, offering a unique data resource.[8] This organisation is the sole provider of state-funded universal specialist mental healthcare for the population of four South London boroughs (Croydon, Lambeth, Lewisham, and Southwark; subsequently referred to as "South London"). It is responsible for the delivery of state-funded evidence-based treatments for local children and adolescents with a broad range of mental health disorders (although substance use disorder and intellectual disability are primarily managed by other state-funded services, as is autism spectrum disorder in some boroughs). It includes a range of teams from those offering early or short-term help, to those providing the most complex care. Other local state-funded services deliver interventions, such as supportive counselling, that may be appropriate for subthreshold mental health symptoms, but are not recommended for treating disorders (Appendix p2-p3). This provider's records therefore document most state-funded healthcare provision leading to recommended evidence-based treatments for local young people with mental health disorders. However, these records do not capture all local young people with mental health diagnoses; for example, they do not include those diagnosed in primary care only (where recommended evidence-based treatments are not typically provided), in other state-funded specialist services such as NHS paediatric clinics (which provide only a small proportion of mental health diagnoses), or in private practice (historically a relatively small component of UK mental healthcare provision, given the NHS Constitution commitment to providing

Research in context

Evidence before this study

Epidemiological research has found that less than half of young people with a mental health disorder report seeing a health professional for their symptoms and only a quarter to a third report seeing a mental health specialist, and these findings are fairly consistent across high-income countries where this research has been conducted. For young people who see health professionals, there may be barriers to the recognition and treatment of mental health disorders. We focused on the recognition of mental health disorders in young people, which is operationalised in clinical practice as provision of diagnoses. To identify studies examining mental health diagnosis provision in young people accessing health services, we searched MEDLINE from database inception to 19th September 2026 with the terms "diagnos*" AND ("mental" OR "psychiatr*" OR [various terms for individual disorders]) AND ("young" OR "youth*" OR "child*" OR "adolescen*" OR "paediatric*" OR "pediatric*" OR "juvenile*") AND ("clinical" OR "healthcare" OR "health care" OR "service*"), with no language restrictions. This search was supplemented by reviewing reference lists and forward citations of relevant articles. We identified several studies that found diagnosis provision varied by sociodemographic characteristics and has also increased over the past two decades in young people across multiple countries for several disorders, including depressive disorder, anxiety disorder, eating disorder, autism spectrum disorder, and attention-deficit/hyperactivity disorder (ADHD). Only a small number of studies investigated diagnosis provision within young people who met criteria for a disorder. Two studies compared cohort participants with their linked health records: in the Avon Longitudinal Study of Parents and Children in the UK, of 18-year-olds who met criteria for depressive disorder, only 7.0% had a diagnosis of depressive disorder documented in their primary care records; in the Child and Adolescent Twin Study in Sweden, of 9-year-olds who met criteria for ADHD, only 18.5% of boys and 12.1% of girls had a diagnosis of ADHD noted in psychiatry records. A third study, set within an Irish child and adolescent mental health service, found that of 12–15-year-olds who met criteria for depressive disorder, only 28.4% received a depressive disorder diagnosis after clinical assessment. More recently, another study took a different approach, comparing English primary care diagnoses with a conservative unweighted global estimate of ADHD prevalence, and found that of under-18-year-olds estimated to have ADHD, only 41.4% were diagnosed, with lower rates in girls than boys. Taken together, these studies suggest that many young people with mental health disorders are not diagnosed, even if they access healthcare services, and highlight possible bias in diagnosis provision by sociodemographic characteristics. A better understanding of this topic is needed to enable more effective service planning, commissioning, and policymaking.

Added value of this study

This study investigated mental health diagnosis provision in 17-year-olds from South London. We examined diagnosis provision for several mental health disorders in NHS mental health records. We compared these data with population data and with directly assessed, sociodemographically weighted epidemiological estimates to calculate diagnosis provision rates in the general population, in those estimated to have met criteria for a disorder, and in those estimated to have also seen a health professional for help with mental health problems. We found that diagnosis provision substantially increased during our study period of 2009–2024, demonstrating an increase in the number of young people whose mental health needs were recognised in NHS mental health services. However, we estimated that diagnoses were only provided to a small proportion of young people with a mental health disorder, including those accessing health services. Estimated diagnosis gaps were largest for those with generalised anxiety disorder and multiple disorders. We also tested for and found evidence of biases in diagnosis provision, based on gender, neighbourhood deprivation, and ethnicity.

Implications of all the available evidence

Diagnosis and formulation of young people's mental health needs are an essential step to selecting evidence-based treatments. Therefore, under-provision of diagnoses by NHS mental health services implies barriers to mental healthcare access for young people, which seem greater for some groups than others. Reducing these barriers, including through investment in adequately staffed services with skilled clinicians, would enable more young people with mental health disorders to receive cost-effective evidence-based healthcare that has long-term benefits. Greater clinician awareness of the under-diagnosis and bias in diagnosis of young people's mental health disorders, alongside strategies to address these problems, could also improve young people's mental healthcare. In addition, the development, evaluation, and implementation of more scalable interventions capable of reaching many more young people will be important. Prevention strategies are also required, including addressing risk factors for young people's mental health disorders, and intervening early for those with symptoms before disorders develop, to reduce the future burden of mental health disorders in young people. Embedding equity in these strategies will be essential to ensure that improvements in diagnosis provision reach all young people with mental health disorders.

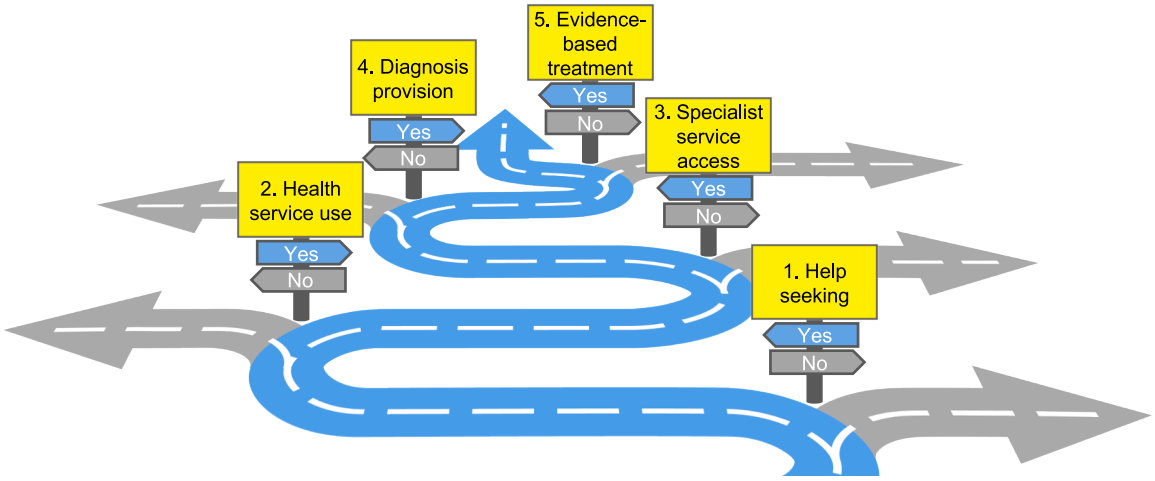

***Fig. 1:* Route to evidence-based treatment.** This figure illustrates the route to evidence-based treatment for most young people with mental health disorders, shown in blue, on which there are several junctions to be navigated, including the five summarised here: 1. First, the young person or their caregivers seek help from health professionals, sometimes with the support of others (e.g., teachers). 2. They then use those health services, often initially through primary care. 3. To access services that can provide further care, the health professional recognises that the young person has a likely mental health disorder and refers to appropriate services; the referral is accepted, and the young person attends. The skills and ongoing supervision required for recommended management of mental health disorders in young people are largely only available in specialist services in the UK, with most state-funded care delivered by NHS mental health services (Appendix p2-p3). 4. The mental health specialist then recognises and provides an accurate diagnosis of the disorder, as part of a holistic formulation. This step is important because diagnosis commonly determines whether a young person meets the threshold for treatment, and guides selection of recommended treatment as research evidence and treatment guidelines are disorder-specific. Without a diagnosis, a young person is less likely to receive treatment, and there is less basis for selecting appropriate treatment. With an incorrect diagnosis, a young person may receive treatment that is not effective for their true condition. 5. After diagnosis provision, evidence-based treatment can be offered if available, and delivered if the young person engages. Although this route may not be helpful for all young people with mental health disorders, evidence suggests that it is likely to be beneficial for most, and is consistent with healthcare guidelines, such as those produced by the UK National Institute for Health and Care Excellence (Appendix p2-p3).

recommended evidence-based healthcare to all who need it).[9]

We extracted data from these records using the Clinical Record Interactive Search (CRIS) system at the NIHR Biomedical Research Centre: Maudsley.[8] We selected young people from South London aged 17 (i.e., 17 ≤ age <18) years on 30th June each year in 2009–2024 with an active mental health diagnosis during the previous year. We chose age 17 years to capture those receiving care from child and adolescent mental health services and to best fit data for estimated prevalence of disorders and health service use, and

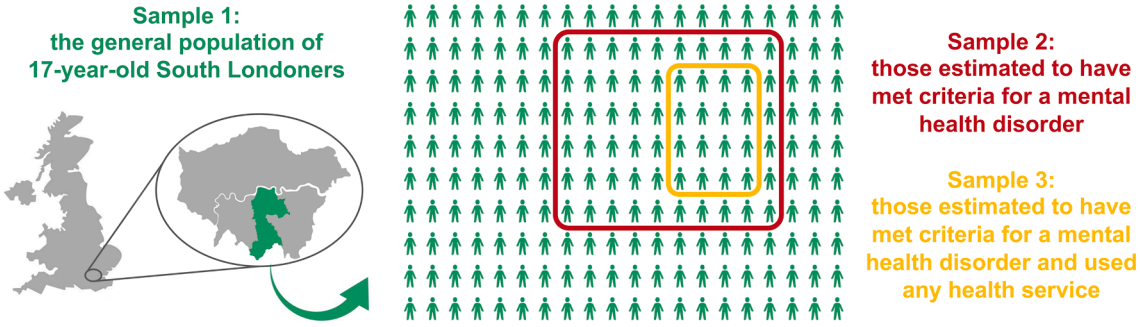

***Fig. 2:* Nested samples studied.** The figure illustrates the three nested samples studied: Sample 1 (green), the general population of all 17-year-olds living in South London (boroughs of Croydon, Lambeth, Lewisham, and Southwark in the UK) in 2009–2024; Sample 2 (red, within Sample 1), those estimated to have met criteria for a mental health disorder during the previous year; and Sample 3 (yellow, within Samples 1 and 2), those estimated to have also used any health service for help with mental health problems during that year. Sample 1 was identified from population census and administrative data, and Samples 2 and 3 were derived from epidemiological interview data weighted and applied to population data.

30th June to align with population data (both described below). We extracted patients' diagnosis data according to ICD-10 (listed in Fig. 3, detailed in Appendix p4), from structured fields clinicians must complete before discharge. We also extracted sociodemographic data, including gender, ethnicity, and neighbourhood deprivation (Index of Multiple Deprivation national quintile, based on their home address' lower-layer super output area comprising approximately 1500 residents) at diagnosis. For further details, see Appendix p5.

Data source for population characteristics

We next obtained the size of the general population to which these young people with diagnoses belonged. The UK Office for National Statistics determines population size as of 30th June annually, based on the previous census and subsequent administrative data. From this resource, we sought the number of 17-year-olds living in South London on this date in 2009–2024 (Fig. 2, Sample 1), stratified by sex (as a proxy for gender) and by neighbourhood deprivation (Index of Multiple Deprivation national quintile). Additionally, we ascertained population ethnicity by applying ethnicity ratios from censuses. For further details, see Appendix p6.

Data source for mental health disorders and health service use

We then obtained prevalence rates of mental health disorders and any health service use in this population. Because interviewing the entire population to obtain exact prevalence figures is not feasible, we derived estimates from epidemiological research. To identify a comparable epidemiological study, we systematically reviewed existing cohorts for samples representative of British young people, where data could be weighted to South London's sociodemographic characteristics, and where measures involved interviews to assess past-year mental health disorders and health service use. We determined that the study that best fit our prespecified requirements was the Environmental Risk (E-Risk) Longitudinal Twin Study (Appendix p7-p13).

The E-Risk Study has tracked a birth cohort of 2232 children born in England and Wales in 1994–1995, which is representative of the UK population.[10] At 18 years old in 2012–2013, 2066 participants (93% of the original sample) were interviewed during home visits. Assessment of mental health disorders (depressive disorder, generalised anxiety disorder, post-traumatic stress disorder [PTSD], conduct disorder, and attention-deficit/hyperactivity disorder [ADHD]) used the Diagnostic Interview Schedule for DSM-IV or adapted structured interviews to ascertain DSM-5 diagnostic criteria, including impairment, in the past year (thus for the period when participants were aged 17 years). Such research interviews yield prevalence estimates similar to those from clinical interviews,[11–13] but are more feasible in large-scale epidemiological studies. Any health service use in the past year was also assessed by interview, asking whether participants had

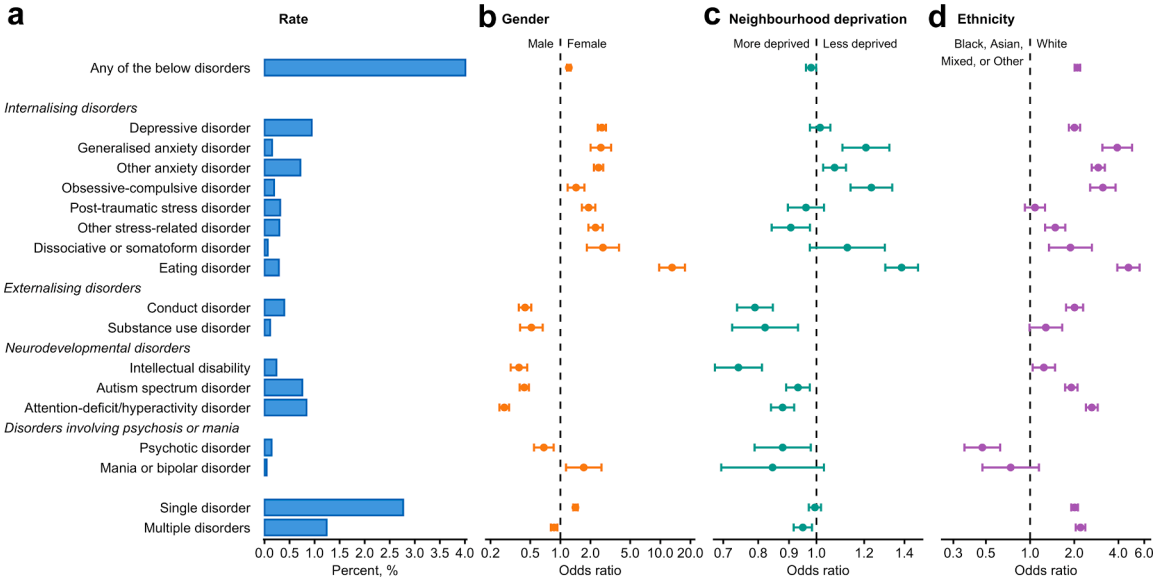

Fig. 3: **Diagnosis provision by NHS mental health services in the general population of 17-year-olds from South London, Sample 1.** The plot presents, for each disorder, the rates of diagnosis provision by NHS mental health services during the past year in 17-year-olds from South London in 2009–2024, as a percentage of the population, identified from census and administrative data (Panel a). The plot also presents odds ratios and their 95% confidence intervals for associations of gender (female vs male), neighbourhood deprivation (Index of Multiple Deprivation national quintile; 1 = most deprived, 5 = least deprived), and ethnicity (White vs Black, Asian, Mixed, or Other ethnicity) with diagnosis provision in these young people (Panels b, c, and d respectively). For further details, see Appendix p19-p24.

seen any of the following health professionals for mental health problems: a general practitioner, medical doctor, counsellor, psychotherapist, psychologist, or psychiatrist. This health service use therefore relates to frontline settings (Fig. 1, Step 2; e.g., primary care) or specialist services (Fig. 1, Step 3; e.g., NHS mental health services). For further details, see Appendix p14-p17.

We used these E-Risk Study data to estimate prevalence rates of mental health disorders and health service use weighted according to sex and neighbourhood deprivation distributions in 17-year-olds from South London. We additionally undertook sensitivity analyses that also weighted according to ethnicity distributions. We then applied these rates to population data to calculate the estimated number of 17-year-olds from South London who would have met criteria for a disorder during the past year in 2009–2024 (Fig. 2, Sample 2), and the estimated number who would have also used health services (Fig. 2, Sample 3), rounded to the nearest integer, overall and by sex (as a proxy for gender), neighbourhood deprivation, and ethnicity. For further details, see Appendix p18.

Statistical analysis

We investigated the provision of diagnoses by NHS mental health services in our three nested samples: Sample 1, the general population of all 17-year-olds living in South London in 2009–2024; Sample 2, those estimated to have met criteria for a mental health disorder during the previous year; and Sample 3, those estimated to have also used any health service for help with mental health problems during that year (Fig. 2).

To calculate the rate of mental health diagnosis provision in each sample, we determined the number of 17-year-olds from South London in 2009–2024 who had a diagnosis in NHS mental health records during the previous year (numerator; from our data source for diagnosis provision, described above), and divided it by the number of young people in each sample (denominator; from data sources for population characteristics and for mental health disorders and health service use, described above). To explore differences by sociodemographic characteristics, we tested for associations of gender, neighbourhood deprivation, and ethnicity (explanatory variables) with diagnosis provision (outcome) in each sample using univariable logistic regression models. These models were based on row-level analytic datasets constructed by expanding the relevant counts (with the number diagnosed coded as 1, and the remainder coded as 0). We similarly tested for associations between year and diagnosis provision in Sample 1 only (Samples 2 and 3 were estimated across our full study period only). Multivariable models were not fitted because of sparse data.

Analyses of Sample 1 examined diagnoses of all disorders listed in Fig. 3. Analyses of Samples 2 and 3 examined diagnoses of five of these disorders that were assessed in the E-Risk Study: depressive disorder, generalised anxiety disorder, PTSD, conduct disorder, and ADHD. To prevent under-estimation of diagnosis provision in Samples 2 and 3 resulting from differences in diagnostic systems between our diagnosis provision data (ICD-10) and the E-Risk Study (DSM-IV/5), we included a wide range of ICD-10 diagnosis codes for each disorder, including "unspecified" categories, which have lower thresholds than these DSM criteria (Appendix p4). Within each sample, we calculated diagnosis provision rates and fitted regression models separately for any disorder, each individual disorder, a single disorder (i.e., exactly one disorder), and multiple disorders (i.e., comorbidity).

Missing data in NHS mental health records for sociodemographic characteristics affected up to 4.7% of diagnosed young people (0.2% of the general population). Because other gender was recorded for only 0.6% of diagnosed young people (0.02% of the general population), and this category was not available in population data, it was also considered missing. Individuals with missing sociodemographic characteristics were treated as undiagnosed in analyses including these characteristics. In the E-Risk Study, data were missing for 1.3% of participants for any disorder and 9.5% for neighbourhood deprivation. Pairwise deletion was used in analyses including these variables. For further details, see Appendix p18.

The analysis plan was pre-registered with the E-Risk Study team,[14] and pre-approved by the South London and Maudsley NHS Foundation Trust Clinical Record Interactive Search (CRIS) Oversight Committee. We followed the STrengthening the Reporting of OBservational studies in Epidemiology (STROBE) and REporting of studies Conducted using Observational Routinely-collected health Data (RECORD) reporting guidelines.

Ethics approval

CRIS data have been approved for secondary research by the South Central – Oxford C Research Ethics Committee (reference 23/SC/0257; approved 1st September 2023). As only de-identified data were used, individual patient consent was not required. The E-Risk Study was approved by the Joint South London and Maudsley and the Institute of Psychiatry Research Ethics Committee (NRES 1997/122; age-18 phase last approved 4th July 2013). Parents gave informed consent and participants gave assent at ages 5–12; participants gave informed consent at age 18.

Role of the funding source

The study funders had no role in design, data collection, analysis, interpretation, or report writing.

Results

Diagnosis provision by NHS mental health services in the general population of 17-year-olds from South London, Sample 1

On analysing NHS mental health records of 17-year-olds from South London in 2009–2024, we found that 8958 had a diagnosis of the mental health disorders listed in Fig. 3 during the previous year. According to the Office for National Statistics, there were 223,404 17-year-olds living in South London in 2009–2024 (Sample 1). By dividing these numbers, we calculated that the rate of diagnosis provision by NHS mental health services in the previous year was 4.0% (n = 8958/223,404) in Sample 1. The most common diagnoses were depressive disorder (0.9%, n = 2105/223,404), ADHD (0.8%, n = 1875/223,404), and autism spectrum disorder (0.8%, n = 1686/223,404). Of those with a diagnosis, 30.9% (n = 2771/8958) were diagnosed with multiple disorders (Fig. 3, Panel a; Appendix p19). When considered by year, diagnosis provision rate increased 1.7-fold over the 16-year period, from 2.6% (n = 355/13,777) in 2009 to 4.4% (n = 674/15,191) in 2024. Each year was associated with diagnosis provision with an odds ratio of 1.03 (95% CI = 1.03, 1.04) (Appendix p20-p21).

Sociodemographic characteristics were associated with diagnosis provision by NHS mental health services in Sample 1. Odds ratios and 95% CIs are shown in Fig. 3 (Panels b–d; Appendix p22-p24). Girls were more likely to be diagnosed with any disorder, internalising disorders, and mania or bipolar disorder than boys; whereas boys were more likely to be diagnosed with externalising, neurodevelopmental, and psychotic disorders than girls. Young people living in less deprived neighbourhoods were more likely to be diagnosed with generalised anxiety, other anxiety, obsessive-compulsive, and eating disorders than those from more deprived neighbourhoods; whereas those living in more deprived neighbourhoods were more likely to be diagnosed with any disorder, other stress-related disorder, externalising disorders, neurodevelopmental disorders, and psychotic disorder than those from less deprived neighbourhoods. Those with White ethnicity were more likely to be diagnosed with most disorders than those with Black, Asian, Mixed, or Other ethnicities; whereas these groups were more likely to be diagnosed with a psychotic disorder than their White peers. These results reflect sociodemographic differences in population prevalence of disorders, health service use, and/or subsequent diagnosis provision by NHS mental health services.

Diagnosis provision by NHS mental health services in those estimated to have met criteria for a disorder, Sample 2

In subsequent analyses, we focused on five disorders assessed in the E-Risk Study: depressive disorder, generalised anxiety disorder, PTSD, conduct disorder, and ADHD. On analysing NHS mental health records of 17-year-olds from South London in 2009–2024, we found that 5132 had a diagnosis of any of these five disorders during the previous year. Based on E-Risk Study interview data weighted according to sex and neighbourhood deprivation distributions of 17-year-olds from South London in 2009–2024, we estimated that 36.3% of our population would have met criteria for any of these disorders during the previous year. Applying this prevalence to population data (n = 223,404), we estimated that 81,050 17-year-olds from South London in 2009–2024 would have met criteria for any of these disorders during the previous year (Sample 2). By dividing these numbers, we calculated that the rate of diagnosis provision by NHS mental health services in the previous year was 6.3% (n = 5132/81,050) in Sample 2. In other words, fewer than one in 15 of those estimated to have met criteria for any of these disorders received a diagnosis from NHS mental health services. Young people estimated to have met criteria for ADHD were most likely to receive a diagnosis from NHS mental health services (9.8%, n = 1875/19,102), whereas those estimated to have had generalised anxiety disorder were least likely (2.0%, n = 340/17,131) (Fig. 4, Panel a; Appendix p25). Depressive disorder accounted for the highest number of estimated undiagnosed cases because of its high population prevalence (diagnosed n = 2105/45,755). Regarding the number of disorders diagnosed, substantially fewer young people estimated to have met criteria for multiple disorders were diagnosed with more than one disorder (2.5%, n = 748/29,617), compared with those estimated to have had a single disorder who were diagnosed with one disorder (8.5%, n = 4384/51,433). Sensitivity analyses weighting according to ethnicity, as well as sex and neighbourhood deprivation, found similar results (Appendix p26).

Sociodemographic characteristics were associated with diagnosis provision by NHS mental health services in Sample 2. Odds ratios and 95% CIs are shown in Fig. 4 (Panels b–d; Appendix p27-p29). Boys estimated to have had depressive or generalised anxiety disorders were less likely to be diagnosed than girls with these disorders; whereas girls estimated to have had ADHD were less likely to be diagnosed than boys with this disorder. Young people living in more deprived neighbourhoods who were estimated to have had depressive disorder, generalised anxiety disorder, and PTSD were less likely to be diagnosed than those from less deprived neighbourhoods with these disorders; whereas those living in less deprived neighbourhoods who were estimated to have had conduct disorder and ADHD were less likely to be diagnosed than those from more deprived neighbourhoods with these disorders. Those with Black, Asian, Mixed, or Other ethnicity who were estimated to have had any of the five disorders were less

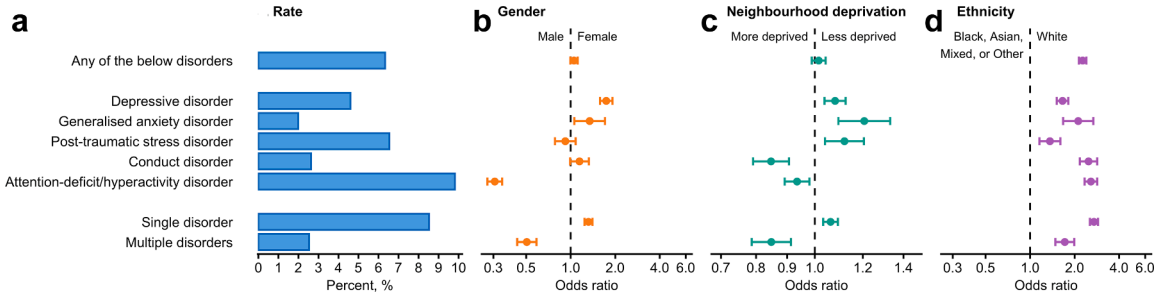

***Fig. 4:* Diagnosis provision by NHS mental health services in those estimated to have met criteria for a disorder, Sample 2.** The plot presents, for each disorder, the rates of diagnosis provision by NHS mental health services during the past year in 17-year-olds from South London in 2009–2024, as a percentage of those estimated to have met criteria for the disorder during that year, derived from epidemiological interview data weighted and applied to population data (Panel a). The plot also presents odds ratios and their 95% confidence intervals for associations of gender (female vs male), neighbourhood deprivation (Index of Multiple Deprivation national quintile; 1 = most deprived, 5 = least deprived), and ethnicity (White vs Black, Asian, Mixed, or Other ethnicity) with diagnosis provision in these young people (Panels b, c, and d respectively). For further details, see Appendix p25-p29.

likely to be diagnosed than their White peers with these disorders. These results reflect sociodemographic differences in health service use and/or subsequent diagnosis provision by NHS mental health services (after accounting for disorder prevalence).

Diagnosis provision by NHS mental health services in those estimated to have met criteria for a disorder and used health services, Sample 3

Based on E-Risk Study interview data weighted according to sex and neighbourhood deprivation distributions of 17-year-olds from South London in 2009–2024, we estimated that 9.7% of our population would have met criteria for any of the five disorders and used any health service for help with mental health problems during the previous year. Applying this prevalence to population data, we estimated that 21,598 17-year-olds from South London in 2009–2024 would have met criteria for these disorders and used health services during the previous year (Sample 3). We compared this number to the 5132 17-year-olds from South London in 2009–2024 who had a diagnosis of these disorders in NHS mental health records during the previous year, and calculated that the rate of diagnosis provision by NHS mental health services in the previous year was 23.8% (n = 5132/21,598) in Sample 3. In other words, fewer than one in four of those estimated to have met criteria for any of these disorders and to have used any health service received a diagnosis from NHS mental health services. Young people estimated to have met criteria for ADHD and to have used health services were most likely to receive a diagnosis from NHS mental health services (34.4%, n = 1875/5454), whereas those estimated to have had generalised anxiety disorder and to have used health services were least likely (3.9%, n = 340/8778) (Fig. 5, Panel a; Appendix p30). Again, depressive disorder accounted for the highest number of estimated undiagnosed cases in service users because of its high prevalence (diagnosed

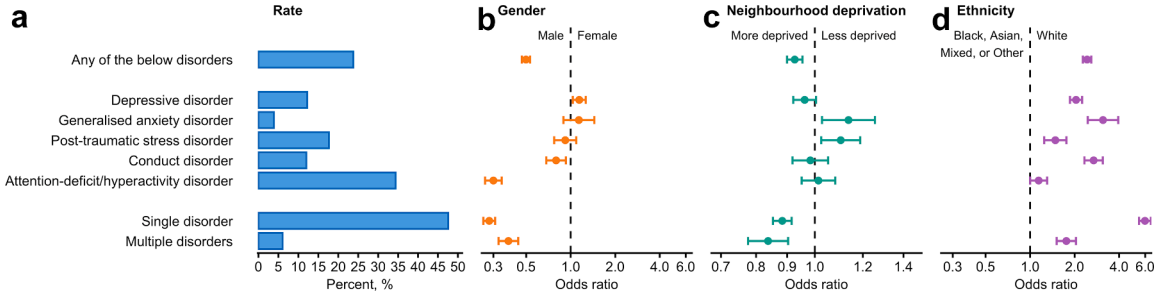

***Fig. 5:* Diagnosis provision by NHS mental health services in those estimated to have met criteria for a disorder and used health services, Sample 3.** The plot presents, for each disorder, the rates of diagnosis provision by NHS mental health services during the past year in 17-year-olds from South London in 2009–2024, as a percentage of those estimated to have met criteria for the disorder and to have used any health service for help with mental health problems during that year, derived from epidemiological interview data weighted and applied to population data (Panel a). The plot also presents odds ratios and their 95% confidence intervals for associations of gender (female vs male), neighbourhood deprivation (Index of Multiple Deprivation national quintile; 1 = most deprived, 5 = least deprived), and ethnicity (White vs Black, Asian, Mixed, or Other ethnicity) with diagnosis provision in these young people (Panels b, c, and d respectively). For further details, see Appendix p30-p34.

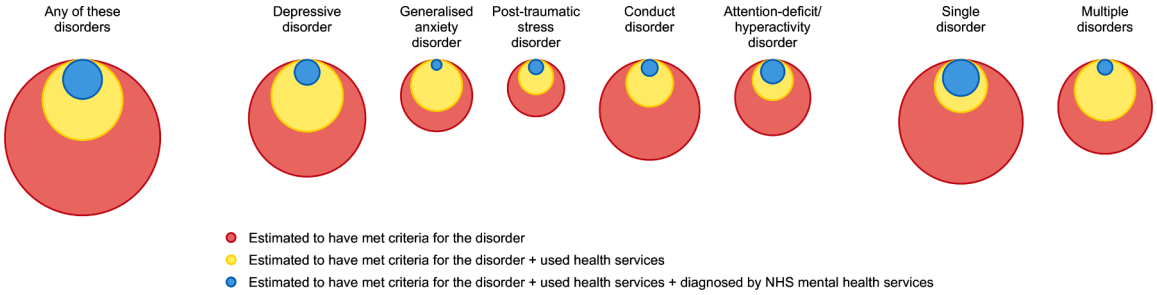

Fig. 6: **Mental health disorder, health service use, and diagnosis provision by NHS mental health services in the general population of 17-year-olds from South London.** The plot reflects, for each disorder, the estimated prevalence of disorder (red circle area), disorder and any health service use for help with mental health problems (yellow circle area), and the rate of diagnosis provision by NHS mental health services (blue circle area), all during the past year, in 17-year-olds from South London in 2009–2024. The prevalence of disorder, and of disorder and health service use, was derived from epidemiological interview data weighted to population data; diagnosis provision rate was obtained from NHS mental health records as a percentage of the population.

n = 2105/17,243) (Fig. 6). Regarding the number of disorders diagnosed, far fewer young people estimated to have met criteria for multiple disorders and to have used health services were diagnosed with more than one disorder (6.0%, n = 748/12,379), compared with those estimated to have had a single disorder and to have used services who were diagnosed with one disorder (47.6%, n = 4384/9219). Sensitivity analyses weighting according to ethnicity, as well as sex and neighbourhood deprivation, found similar results (Appendix p31).

Sociodemographic characteristics were associated with diagnosis provision by NHS mental health services in Sample 3. Odds ratios and 95% CIs are shown in Fig. 5 (Panels b–d; Appendix p32-p34). Boys estimated to have had depressive disorder and to have used health services were less likely to be diagnosed than girls with this disorder who used services; whereas girls estimated to have had any disorder, conduct disorder, or ADHD and to have used health services were less likely to be diagnosed than boys with these disorders who used services. Young people living in more deprived neighbourhoods who were estimated to have had generalised anxiety disorder or PTSD and to have used health services were less likely to be diagnosed than those from less deprived neighbourhoods with these disorders who used services. Those with Black, Asian, Mixed, or Other ethnicity who were estimated to have had any of the five disorders and to have used health services were less likely to be diagnosed than their White peers with these disorders who used services. These results reflect sociodemographic differences in diagnosis provision by NHS mental health services (after accounting for disorder prevalence and any health service use).

Discussion

In this study of 17-year-olds from South London in 2009–2024, we found that 4.0% of the population had a diagnosis of any of 15 disorders in NHS mental health records during the previous year (Sample 1). Importantly, diagnosis provision increased 1.7-fold over the 16-year period (from 2.6% to 4.4% of the general population), suggesting a substantial increase in the number of young people whose difficulties were recognised in these specialist services. Nevertheless, across five disorders for which population estimates were available, NHS mental health service diagnoses were provided to fewer than one in 15 of those estimated to have had a disorder (Sample 2), and fewer than one in four of those estimated to have also used health services for help with their mental health problems (Sample 3). Additionally, diagnosis provision was lower in certain sociodemographic groups; for example, any disorder diagnosis provision was lower in girls than boys and in young people with Black, Asian, Mixed, or Other ethnicity than their White peers, in those estimated to have had a mental health disorder and to have used any health service (Sample 3). These findings indicate large gaps and biases in diagnosis provision by NHS mental health services for young people, which deliver most state-funded healthcare leading to recommended evidence-based treatment (Appendix p2-p3). Because gaps and biases were present among those who had seen any health professional for help, our findings show that gaps are not simply driven by a lack of help-seeking and initial health service use (Fig. 1, Steps 1 and 2), but also reflect difficulties in specialist service access or diagnosis provision in those who present to health services (Fig. 1, Steps 3 or 4). Although some young people without a diagnosis may have received treatment, and some may have received diagnoses and treatment through other services—including private practice—we expect this provision to be insufficient to fill the gaps identified; however, the scale of such provision has not been quantified. Moreover, in relation to private care, in the UK, where the healthcare system is based on universal free-at-the-point-of-use care, young people with disorders should not, in principle, need to

rely on private provision to obtain recommended evidence-based care. Our findings therefore highlight a vital need for further research and greater investment and equity in young people's mental healthcare.

These findings should be considered alongside some limitations. First, our diagnosis data might be subject to some recording errors. On the one hand, some accurate diagnoses may have been missed if not recorded or recorded only in unstructured free-text fields of mental health records, as we focused only on structured fields. Natural language processing (NLP) tools have been developed to identify unstructured diagnoses; however, concerns have been raised about the validity of NLP models applied to different samples,[15] and our pilot testing of the available NLP application for diagnoses found poor precision (Appendix p35), so NLP was not used for this study. Furthermore, clinical teams are required to document diagnoses in structured fields before patients' discharge from the electronic record system, which minimises this limitation. On the other hand, any inaccurate structured diagnoses would have been included in our analyses and treated as if they were accurate, leading us to detect more diagnosis provision than there actually was in Samples 2 and 3, which is unavoidable. Second, our estimates for Samples 2 and 3, derived from E-Risk Study prevalence rates of disorder and health service use, may be subject to bias arising from differences between the E-Risk Study and South London populations. To reduce this bias, we weighted calculations according to the sociodemographic characteristics of 17-year-olds in South London. Third, these estimates may also be subject to measurement inaccuracy and imprecision. Regarding accuracy, previous work has found that disorder prevalence estimates based on research interviews are similar to those based on blinded clinical reappraisal interviews,[11–13] supporting the validity of our disorder estimates. However, regarding precision, because the denominators used in Sample 2 and 3 analyses were treated as fixed, reported confidence intervals do not reflect the sampling uncertainty in these E-Risk Study-derived denominators, and so may underestimate uncertainty around the associations. Fourth, we could not account for changes in disorder and health service use prevalence over time, as these epidemiological data have not been collected. Because disorder prevalence may have increased during our study period of 2009–2024,[16] but our prevalence estimates were obtained in 2012–2013, we may have underestimated disorder prevalence and over-estimated diagnosis provision in more recent years in Samples 2 and 3. Fifth, ethnicity analyses were limited by small numbers in some ethnic groups, necessitating the combination of Black, Asian, Mixed, and Other groups, which may have obscured differences between them. These limitations are unlikely to undermine our conclusions.

Our findings based on 17-year-olds in South London may not directly generalise to other ages and regions, but the substantial diagnosis provision gaps observed in this area with internationally recognised NHS mental health services suggest that such gaps are likely to exist more broadly. Consistent with this interpretation, previous research has also shown under-diagnosis of mental health disorders in other samples of young people. In cohort participants who met criteria for mental health disorders, linkages with health records have found broadly similar rates of diagnosis provision in another region of the UK and in Sweden.[17,18] Furthermore, within health services, thorough interviews compared with records suggest large diagnosis provision gaps in Ireland.[19] In line with these findings, the STADIA trial found that patients in English NHS child and adolescent mental health services had high symptom scores and impairment, but low diagnosis provision.[20] Additionally, a recent England-wide primary care study found that recorded ADHD diagnoses had increased markedly but remained substantially below expected population prevalence[21]; our study extends this work by examining multiple disorders and multimorbidity in young people, and by triangulating specialist mental health records with population data and directly assessed epidemiological estimates of disorder prevalence and service use, weighted to our study population, to quantify diagnosis provision gaps—including among young people accessing healthcare—and sociodemographic inequalities. Our research therefore complements these previous findings and provides evidence to counteract recent concerns about over-diagnosis[22]: although it is possible there is some misdiagnosis, our study and others strongly suggest that there is considerably more under- than over-diagnosis from NHS mental health services for young people.

Our findings have implications for future research. Further evaluation of healthcare gaps is required, including research on diagnosis provision in other age groups and regions, and on the provision of evidence-based treatments. Additionally, research is required to investigate the needs of young people who meet criteria for mental health disorders but do not receive diagnoses. It is possible that they have different presentations (e.g., milder difficulties) and different healthcare needs from those who receive diagnoses. Even so, empirical evidence shows that people with mild disorders have poor outcomes,[23] suggesting that interventions for this group could be beneficial and cost-effective to treat current symptoms and prevent future deterioration. Moreover, epidemiological research has found that 19% of young people with mental health disorders have serious difficulties,[24] which is substantially higher than our diagnosis provision rate in Sample 2 (6.3%), implying that many severe cases were not diagnosed. Thus, notwithstanding the

requirement for further research, our results suggest that NHS mental health service diagnosis provision does not meet need.

The effects of diagnosis provision also warrant attention. Qualitative research has found that while clinicians, parents, and young people think that accurate diagnosis provision can improve understanding and enable access to effective treatments, they also raise concerns about the potential negative effects of labelling, and so some clinicians have reported a reluctance to diagnose.[25,26] Quantitative research has found that mental health diagnosis provision is associated with better outcomes in adult services.[27] Further research is therefore needed to understand how diagnoses can be used most beneficially in young people.

Our research also has implications for clinical practice and policy. Our findings of large diagnosis provision gaps demonstrate the need to reduce barriers to evidence-based healthcare for young people with mental health disorders. Research indicates that multiple barriers may occur at each step to diagnosis provision illustrated in Fig. 1. Barriers to young people and families seeking help from health services (Fig. 1, Step 1) include limited knowledge about mental health and healthcare, which may affect understanding of when help is needed and where and how to seek help, as well as perceived social stigma and anticipated embarrassment, and concerns about confidentiality and trust in professionals.[28] Practical barriers to initial health service use (Fig. 1, Step 2) include families' competing priorities, transport difficulties, services' appointment availability, and financial costs where healthcare is not free at the point of use.[28] Notably, our findings also suggest substantial barriers at later steps, within health services. Barriers to accessing specialist services (Fig. 1, Step 3) may include referring professionals' limited confidence, knowledge, and time, affecting recognition of problems and ability to refer; particularly prominent barriers in specialist services include high thresholds, limited capacity, and lengthy waiting times, in addition to financial costs in privately funded systems.[28–30] Finally, barriers to diagnosis provision after accessing specialist services (Fig. 1, Step 4) may include limited clinician training and time, the complexity of young people's presentations with co-occurring problems that may make individual disorders harder to identify, difficulties engaging young people in assessment when symptoms or other circumstances affect their ability to participate, and concerns about diagnostic labelling.[26,31] There is therefore a pressing need to address these barriers, particularly by investing to increase capacity in young people's mental health services and to improve clinician training. Importantly, reducing barriers to diagnosis provision must be accompanied by improved provision of evidence-based treatments (Fig. 1, Step 5). Furthermore, to fully address healthcare gaps, it will also be necessary to develop, evaluate, and implement effective, scalable approaches to early intervention and prevention.[32]

Additionally, our findings of diagnosis provision biases in certain sociodemographic groups suggest the need for greater equity in young people's mental healthcare. The barriers described above may disproportionately affect some groups; for example, differences in knowledge about mental health and healthcare, and in families' practical and financial resources, may influence young people's ability to seek help and navigate the healthcare system, while language and communication barriers and clinicians' biases may contribute to ethnic inequalities in referral, assessment, and diagnosis provision.[28,33] There is therefore a need to understand and address these challenges and embed equity in the development of young people's mental health services, to improve access to recommended evidence-based healthcare for all young people with mental health disorders.

Contributors

SJL and AD formulated the research questions and designed the analysis plan. AC, TJF, KCK, TEM, and MP contributed to the analysis plan. TEM and AC designed the E-Risk Study. TEM, AC, LA, and HLF acquired funding for the E-Risk Study, and supervised data collection and data curation for the E-Risk Study. SJL and MA carried out the literature search. SJL and AJM directly accessed and verified the underlying data. SJL undertook the data analysis, and AJM checked the data analysis. SJL and AD drafted the manuscript. All authors assisted with interpretation, commented on drafts of the manuscript, and approved the final version. SJL and AD led the decision to submit the manuscript, and all authors agreed.

Data sharing statement

Clinical Record Interactive Search (CRIS) data are owned by the CRIS system at the NIHR Biomedical Research Centre: Maudsley, which provides access to these anonymised data derived from South London and Maudsley NHS Foundation Trust electronic records. These data can only be accessed by permitted individuals from within a secure firewall (i.e., the data cannot be sent elsewhere), in the same manner as the authors. For more information, please contact: cris.administrator@slam.nhs.uk. Population data are available to all online. For full information, see Appendix p6 and related references. E-Risk Study data are available to researchers on request from the E-Risk Study team. Requests require a concept paper describing the purpose of data access, ethical approval at the applicant's institution, provision for secure data access, and a signed data use agreement. For further details, see: https://www.eriskstudy.com/data-access/.

Declaration of interests

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Appendix A. Supplementary data

Supplementary data related to this article can be found at https://doi.org/10.1016/j.lanepe.2026.101887.

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