Prevalence and patterns of testing for anaemia in primary care in England

Introduction

Global Context

Anaemia is a **major global health problem.**

Highest prevalence in **low- and middle-income countries.**

Prevalence in **Western Europe (2021): 6.0%** (Global Burden of Disease Study).

Causes of Anaemia

Multifactorial aetiology

Iron deficiency = most common and treatable cause.

Other causes:

- **Vitamin B12 or folate deficiency**
- **Anaemia of chronic disease**
- **Inherited forms**

Limited data on proportion of each cause

Health Impact

Anaemia contributes significantly to **morbidity and mortality**

Accurate diagnosis and treatment are essential

Diagnosis

Common tests:

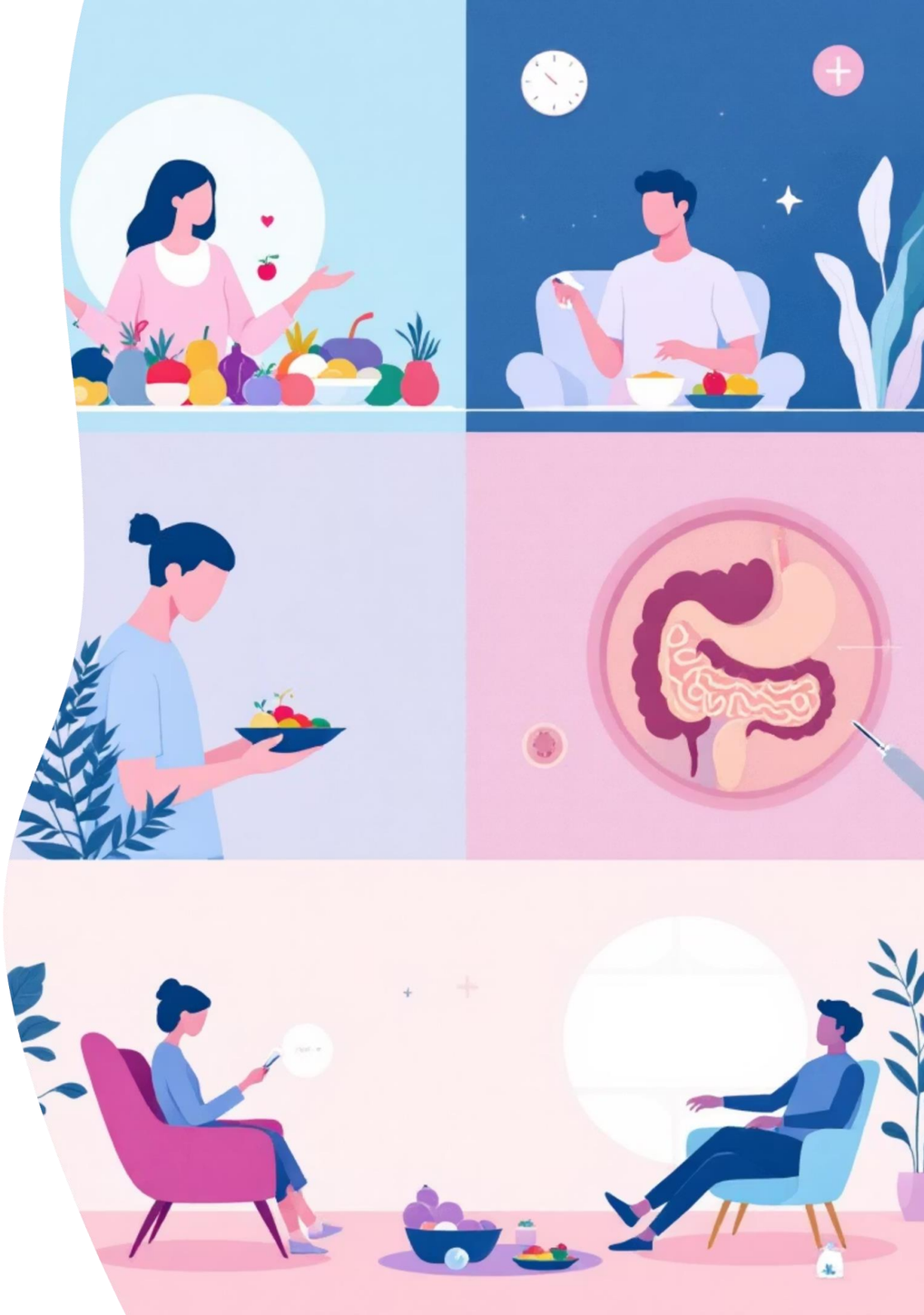
- **Haemoglobin (Hb)**
- **Serum ferritin**

Challenges:

Ferritin can be **elevated in inflammation**, masking iron deficiency

Common Causes of Iron Deficiency

- **Dietary insufficiency**
- **Malabsorption**
- **Menorrhagia (heavy menstrual bleeding)**
- May indicate **underlying gastrointestinal malignancy** (not always detectable by endoscopy)



Anaemia in the UK

Limited data on UK prevalence.

NICE estimates:

- 3% in adult males
- 8% in adult females

Sources for these statistics are unclear.

Studies show inadequate investigation and management of anaemia in the UK.

Study Purpose

To describe **anaemia prevalence** and **patterns of Hb and ferritin testing** in England.

To provide data for **researchers, clinicians, and policymakers** to improve anaemia management.

Data Source

Clinical Practice Research Datalink (CPRD) Aurum database

Contains **anonymised UK primary care data**

Includes records from **41 million patients** across 1,489 practices

Study Population

- Data from **CPRD Aurum**
- Patients **registered in current practice in 2019**, born **2017 or earlier**.

- Patients with **indeterminate gender** were excluded.
- Focused on **pre-COVID-19 period (2019)**
- **Ethnicity classified**: Asian, Black, Mixed, Other, White, or missing

Hb and Ferritin Data Extraction

- Counted **number of Hb tests in 2019** for each patient
- Extracted **lowest Hb value** and **test date**
- Extracted **MCV** and **ferritin** if recorded within **0–90 days** of Hb test
- If multiple ferritin tests → chose closest date to Hb test

Definition of Anaemia

Used **WHO age-specific Hb cut-offs**:

Age Group	Hb Cut-off (g/L)
Male ≥15 years	130
Female ≥15 years	120
Age 12–14	120
Age 5–11	115
Age <5	110

Low ferritin used to define Iron Deficiency Anaemia (IDA)

Follow-Up Subpopulation

- Patients with **anaemia (Hb test) in Jan–Mar 2019** followed up for **1 year**
- Calculated percentage who had **repeat Hb test 3–6 months** later and percentage still below threshold
- Also calculated for **6–12 months** post-initial test

Analysis

- Conducted using **Stata version 18**.

Results

This comprehensive analysis examined a total study population of **14,207,841 people** with a gender ratio that was approximately **equal**.

Haemoglobin (Hb)

Anaemia prevalence varied significantly across the population:

- Females: **5.1%**
- Males: **3.1%**
- Overall: **4.1%**

Anaemia was most common in people aged **>65 years**:

- Females: 13.8%
- Males: 16.1%

Ethnic differences in females were evident from **late childhood**:

- Asian & Black females had **higher prevalence** than White females

Anaemia prevalence **increased with social deprivation**.

Mean Corpuscular Volume and Ferritin Analysis

Microcytic Anaemia

<80 fL

Decreases with age

Macrocytic Anaemia

>100 fL

Increases gradually with age

Ferritin Findings

- Majority of confirmed IDA cases were **females aged 15–49 years**
- Most >65 years had normocytic anaemia

Discussion Summary

Overall Anaemia Prevalence: 4.1%

Higher Prevalence Groups:

- Older people
- Black or Asian ethnicity
- People living in areas with high social deprivation
- Females of reproductive age (also higher testing rates)

Differences by ethnicity and social deprivation were seen in reproductive-age females and older adults.

Testing Gaps:

NICE recommends ferritin testing for everyone with MCV < 95 fL. However, many with microcytic or normocytic anaemia lacked ferritin measurements. Follow-up Hb testing after anaemia findings was often missing.

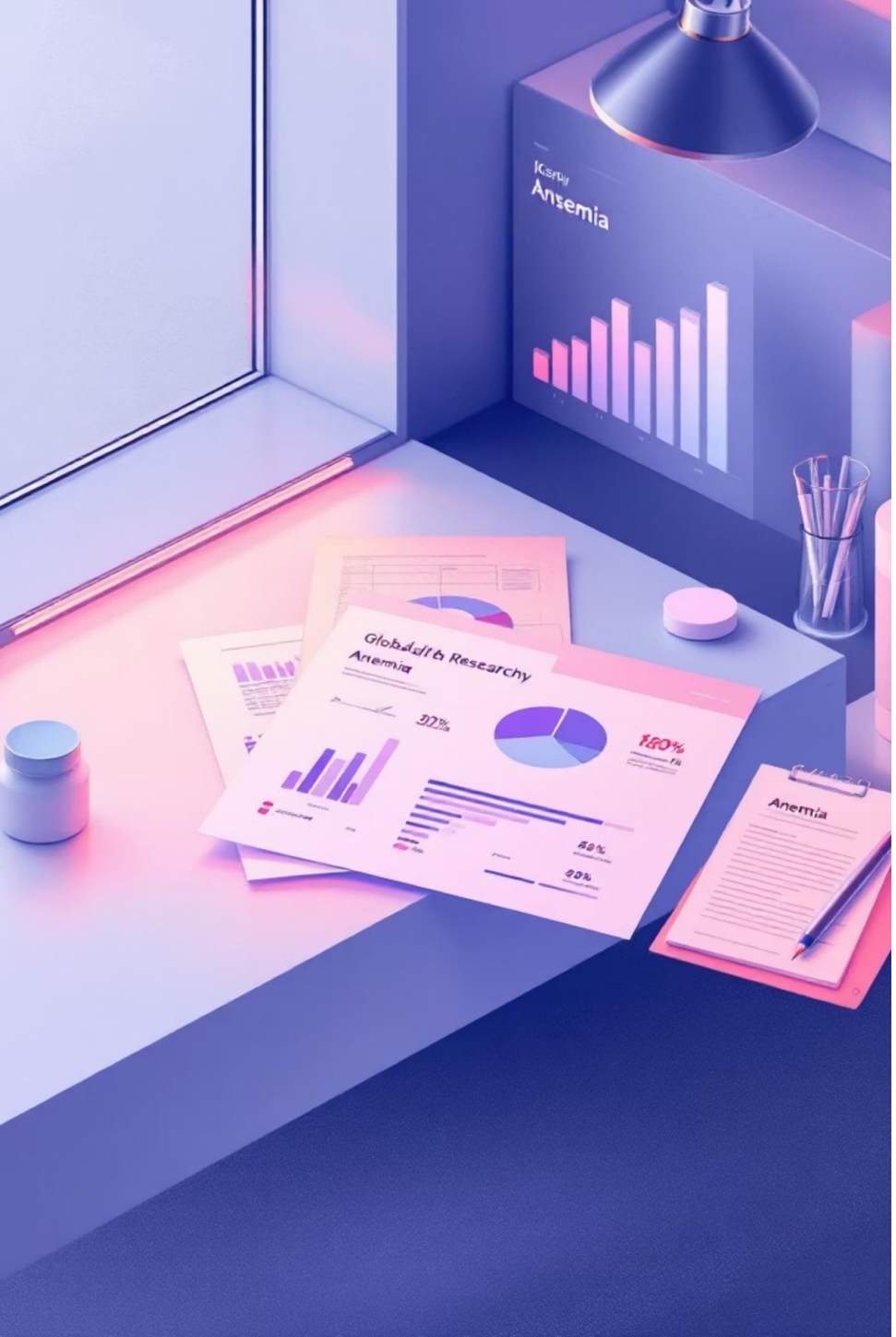
Strengths and Limitations

Strengths:

- Very large, real-world database allowed detailed analysis of anaemia prevalence and testing.
- Database roughly represents the population in terms of age and gender.

Limitations:

- Tests were done for clinical reasons, so the study reflects known or suspected anaemia rather than true population prevalence.
- Population prevalence may be underestimated, especially in those with mild symptoms or limited healthcare interaction.
- Blood tests done in other healthcare settings may not be captured, potentially missing patients receiving secondary or tertiary care.
- Pregnant and non-pregnant females were reported together; separate analysis for pregnant females is planned.
- Some pregnancy dates were unavailable, and physiological changes in pregnancy make defining anaemia from lab tests more complex.
- Overall, anaemia prevalence may be slightly overestimated in females aged 15–49 years.



Comparison with Existing Literature

Overall anaemia prevalence of **4.1%** is slightly lower than the **6.0%** reported by the Global Burden of Disease study.

Higher anaemia prevalence in older adults, females of reproductive age, Black and Asian ethnicities, and socially deprived groups **aligns with global patterns**.

Around **14–16% of people >65 years** had anaemia, consistent with other studies in developed countries, likely linked to chronic disease and inflammation.

Differences between ethnicities are likely due to multiple factors: higher menorrhagia rates in Black females, social deprivation, diet, chronic diseases, and inherited anaemia causes.

Implications for Research and Practice

High Burden Across All Ages

The study reveals a **high burden of anaemia across all age groups**, emphasizing the need for better diagnosis and management strategies.

Multiple Contributing Factors

Differences in anaemia prevalence between ethnicities, genders, and social deprivation levels suggest multiple contributing factors — further research is needed to understand these.

Priority for Reproductive-Age Females

Black and Asian females of reproductive age have particularly high anaemia rates; early diagnosis **before pregnancy** should be prioritized to prevent poor pregnancy outcomes.

Macrocytic Anaemia Monitoring

Macrocytic anaemia in adults >65 years may relate to disorders like **myelodysplasia**; monitoring could help detect bone marrow diseases earlier.

Ferritin Testing Gaps

Only about **half of patients with microcytic or normocytic anaemia** had ferritin tests, despite **NICE guidelines recommending them**.