Socio-economic inequalities in access to planned hospital care

Peter Spilsbury, Director of Strategy

Presentation to NHS Confederation
Elective and emergency admissions by deprivation

crude rate per 1000 population | England | 2018

<table>
<thead>
<tr>
<th>Deprivation (IMD2019) decile</th>
<th>emergency spell</th>
<th>elective spell</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

admissions per 1000 population
Are these differences in rates clinically justified?

Are levels of inequality increasing or decreasing over time?

Where, along the patient pathway, do inequalities start to emerge?

Does poor access to planned hospital care for those living in deprived communities, increase demand for unplanned care?
Describing socio-economic inequalities in access to planned hospital care
The NHS delivers 150 elective spells and 1700 outpatient appointments per 1000 population each year. Rates have increased considerably since 2005.
In 2005, crude rates of elective spells favoured those living in the most deprived areas. By 2018, the gradient for elective spells had reversed such that crude rates were highest amongst the least deprived populations. There is now no observable gradient in rates of outpatient attendances, although a gradient in favour of the most deprived areas was present in 2005.

Planned hospital care by deprivation decile

<table>
<thead>
<tr>
<th>crude rate per 1000 population</th>
<th>England</th>
<th>2018</th>
</tr>
</thead>
</table>

- elective spell
- outpatient attendance

Decile 1 = most deprived
After taking account of differential changes in the age/sex structure, rates of elective spells and outpatient attendances for those living in the most deprived areas have grown at a slower rate.
Rates of elective spells for most of the major causes of morbidity including cancer, circulatory, ophthalmic, musculo-skeletal, nervous system and skin conditions, are skewed towards the people living in the least deprived areas.
In most STPs/ICSs, rates of elective spells and outpatient attendances are skewed towards people living in the least deprived areas.
Are these differences in planned activity clinically justified?

Where, along the patient pathway, do inequalities start to emerge?
Our approach

Four pathways
- COPD
- Heart failure
- Arthritis (hip)
- Cataracts

All analysis conducted at GP practice level. A weighted deprivation score is calculated for each GP practice based on the deprivation scores of their registrants’ LSOAs. GPs practices assigned to decile based on weighted deprivation score.

Measure levels of activity at various points along the care pathway.

Adjust for levels of need within in deprivation decile
## Four pathways – need measures

<table>
<thead>
<tr>
<th>Source of need estimates</th>
<th>COPD</th>
<th>Heart Failure</th>
<th>Arthritis (Hip)</th>
<th>Cataracts</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>PHE and Imperial college estimates</td>
<td>PHE and Imperial college estimates</td>
<td>Versus arthritis produced by Imperial</td>
<td>National eye health epidemiological model</td>
</tr>
<tr>
<td></td>
<td>produced for Fingertips 2015</td>
<td>produced for Fingertips 2015</td>
<td>college 2018</td>
<td></td>
</tr>
<tr>
<td>Methods used to derive need estimates</td>
<td>Synthetic estimates at GP level (2015). Final model variables included sex, age, smoking status &amp; deprivation</td>
<td>Synthetic estimates at GP level. Final model variables included: age, sex, ethnicity, BMI, smoking status, CHD, hypertension, diabetes, atrial fibrillation &amp; alcohol consumption</td>
<td>Synthetic estimates at MSOA level. Final model variables included: age, sex, BMI, smoking status, SES &amp; activity levels</td>
<td>Age specific prevalence estimates based on a population based clinical survey (conducted in 1999) identifying those with cataracts and dissatisfaction with vision. Age specific rates applied to GP patient lists. No adjustment made to account for potential differences in need due to deprivation.</td>
</tr>
</tbody>
</table>
Inequities along COPD pathway
relative index of inequality | Midlands STPs

COPD

- COPD Register
- Annual review
- Flu vaccination
- Bronchodilator inhalers
- Steroid inhalers
- ERS OP referrals
- Offered Pulmonary rehab.
- 1st OP attendances
- Lung vol. reduction procedures
- Steroid tablets

relative index of inequality

negative RII indicates higher rates in most deprived areas
### Inequities along heart failure pathway

**Relative Index of Inequality | Midlands STPs**

<table>
<thead>
<tr>
<th>Activity</th>
<th>Heart Failure</th>
</tr>
</thead>
<tbody>
<tr>
<td>HF register</td>
<td></td>
</tr>
<tr>
<td>Diag confirmed by ECG</td>
<td></td>
</tr>
<tr>
<td>ACEi</td>
<td></td>
</tr>
<tr>
<td>ARBs</td>
<td></td>
</tr>
<tr>
<td>Betablockers</td>
<td></td>
</tr>
<tr>
<td>Digoxin</td>
<td></td>
</tr>
<tr>
<td>Sacubitril</td>
<td></td>
</tr>
<tr>
<td>ERS OP referrals</td>
<td></td>
</tr>
<tr>
<td>1st OP attendances</td>
<td></td>
</tr>
<tr>
<td>Pacemakers</td>
<td></td>
</tr>
<tr>
<td>Valve repair</td>
<td></td>
</tr>
</tbody>
</table>

**Legend:**
- In favour of most deprived
- In favour of least deprived
- No inequity

**Notes:**
- Relative Index of Inequality (RII)
- Negative RII indicates higher rates in most deprived areas

**Graphical Representation:**
- The graph shows the relative index of inequality for various activities along the heart failure pathway.
- Each activity is represented with a horizontal line indicating the RII.
- The color of the line indicates the direction of the inequity.

**Axes:**
- **Y-axis:** Activity names
- **X-axis:** Relative Index of Inequality
  - Range: -0.4 to 0.4
  - Negative RII indicates higher rates in most deprived areas.
Inequities along hip Arthritis pathway
relative index of inequality | Midlands STPs

- Arthritis register
- F2F review
- Orthopaedic OP referrals
- Physio referrals
- 1st OP attendances
- 1st OP telephone attendances
- Hip replacement revisions
- Hip replacements
- OP injections

relative index of inequality

negative RII indicates higher rates in most deprived areas
Why might we be seeing these patterns of inequality?
Our emerging theory

Consider whether the various policy initiatives to improve access to planned hospital treatments
- Waiting times targets
- Choice
- NHS-funded access to private sector
- New treatments and screening programmes

...or to control access
- Procedures of limited clinical value
- Lifestyle-based eligibility criteria for surgery
- Referral management services

Although these programmes may be successful in their own right, might they have impacted differentially on those living in more or less deprived areas?
In the early and mid-2000s, people in more deprived areas were, on average getting faster access to elective inpatient activity. Waiting times improved dramatically for all groups in the late 2000s. By 2014 the gradient in waiting times across deprivation quintiles had reversed and those in less deprived areas were receiving faster access to care. Since 2014, waiting times have declined the gradient across deprivation quintiles has become less clear.
In the early 2000s, NHS-funded access to independent sector was negligible. The development of Independent Sector Treatment Centres (ISTCs) in the mid-2000s and the extended choice policy initiative in 2007 resulted in a steady increase in NHS-funded independent sector activity. Access to independent sector providers is substantially higher amongst the least deprived populations and disparity is increasing.
Growth in rates of access to new imaging technologies and screening programmes tends to be slower in the most deprived areas.

When the NHS introduces new screening programmes, interventions resulting from those programmes tend to increase more slowly in the most deprived areas.
When the NHS seeks to limit access to certain forms of surgery, rates tend to fall more rapidly in the most deprived areas.

Reduction per annum in procedures of limited clinical value by deprivation
change in directly age/sex standardised rate per 1000 population | England | 2009 to 2018

carpal tunnel release

tonsillectomy

growth per annum

IMD quintile [quintile 1 = most deprived]
Do inequalities in access to planned care lead to increased demand for unplanned care?
Whilst rates of elective care are higher in the least deprived areas, the opposite is true for emergency hospital spells.
Is the relationship between inequalities in access to planned and unplanned care causal?

Strong anecdotal evidence of a causal relationship;
- Inverse relationship between levels of planned and emergency spells across levels of deprivation.
- Larger increases in elective care in least deprived areas, and slower increases in emergency spells.
- Rates of emergency spells increase prior to elective admission and then decline
- Higher rates of prior emergency admissions and readmissions in the most deprived areas.

To formally test whether this is a causal relationship we use panel regression analysis.

Panel regression analysis is an econometric technique which uses both time series and cross-sectional components of data to control for unobserved time-invariant factors and thereby tease out potential, causal relationships.
Model results

The model suggests that increases in elective spells lead to reductions in emergency spells.

The effect accumulates over 2 years.

For every 10 additional elective spells, c. 1 emergency spell is avoided.

The effect of outpatient attendances is negligible.

Panel regression specification

Outcome variable: emergency spells

Panel variables: time (quarters), and CCG of residence

Independent variables: elective spells (plus 8 lags), outpatient attendances (plus 4 lags), deaths, age/sex population profile, year and quarter.

Exposure variable: population

Model type: fixed effects

The Lagrange Multiplier test, F test and Hausman test used to select between model types.

Software: r, plm package.
Levelling-up access to elective care would have a modest but material impact on emergency care rate.
Levelling-up access to elective care would have a modest but material impact on emergency care rate.
Levelling-up access to elective care would have a modest but material impact on emergency care rate.
Project outputs

Regional report &
STP/ICS level pathway analysis

R-markdown files containing code and data, and sample outputs.

Several planning sessions for Midlands STP/ICS Boards & their subgroups.

Future work

An assessment of strategies to reduce inequalities in access to planned hospital care.
How confident are you that ....

....your local planned care policies and procedures (choice, PLCV, referral management, waiting list prioritisation, access to aftercare) do not unintentionally disadvantage people living in more deprived areas?

...there is no unconscious bias in the patient-clinician decision making process about the benefits and risks of treatment in secondary care?
Thank you
Restoring Elective Care: Health Inequalities & Clinical Prioritisation

Prof. Kiran Patel – Chief Medical Officer
Daniel Hayes – Director of Performance & Informatics
Dr Rachel Chapman – Consultant in Public Health
“There is clear evidence that reducing health inequalities improves life expectancy and reduces disability across the social gradient. Tackling health inequalities is therefore core to improving access to services, health outcomes and improving the quality of services and the experiences of people”

- NHS Long Term Plan
Inequalities in health
# Life expectancy across C&W 2017-19

<table>
<thead>
<tr>
<th>Location</th>
<th>Male LE</th>
<th>Female LE</th>
<th>Male gap</th>
<th>Female gap</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coventry</td>
<td>78.7</td>
<td>82.2</td>
<td>10.1</td>
<td>7.8</td>
</tr>
<tr>
<td>N. Warwickshire</td>
<td>79.1</td>
<td>82.7</td>
<td>4.6</td>
<td>5.3</td>
</tr>
<tr>
<td>Nuneaton &amp; Bedworth</td>
<td>77.6</td>
<td>82.3</td>
<td>10.1</td>
<td>5.5</td>
</tr>
<tr>
<td>Rugby</td>
<td>80.5</td>
<td>83.5</td>
<td>7.2</td>
<td>2.6</td>
</tr>
<tr>
<td>Stratford-upon-Avon</td>
<td>81.5</td>
<td>85.2</td>
<td>3.3</td>
<td>4.0</td>
</tr>
<tr>
<td>Warwick</td>
<td>81.2</td>
<td>84.8</td>
<td>8.0</td>
<td>6.4</td>
</tr>
</tbody>
</table>

Source: Public Health Outcomes Framework
Life expectancy at birth in Coventry 2011-2015

Coventry’s bus route 10 crosses the city’s more affluent and more deprived neighbourhoods. This makes it useful to help illustrate the stark differences in life expectancy across the city – a gap of 10 years for males and 8 years for females.

www.coventry.gov.uk/infoandstats/
Disparities in and predictors of COVID-19 risk

**KEY:**
- Green: Evidence known
- Orange: Limited evidence
- Blue: Indirect Evidence
- Red: Not known/no evidence

**GENDER**
Men are nearly twice as likely to die from COVID-19 than women.

**HOUSING**
Living in overcrowded and multigenerational housing may increase risk of virus transmission.

**OCCUPATION**
Keyworkers and health and social care staff may be at increased risk of infection due to occupational exposure to the virus.

**ETHNICITY**
BAME populations are more likely to die from COVID-19 than white ethnic groups. South Asian and Black groups are at 1.2 to 2 times increased risk compared to white.

**COMORBIDITIES**
People with comorbidities are at increased risk.

**GENETICS**
Some genetic variations may be associated with infection susceptibility and diverse clinical presentation of COVID-19.

**LIFESTYLE**
Smoking, alcohol intake, diet, and physical activity contribute to comorbidities.

**DEPRIVATION**
People who live in deprived areas have higher diagnosis rates and death rates than those living in less deprived areas. Mortality rates in the most deprived areas are around double the least deprived areas.

**AGE**
Diagnosis and mortality increases with age. People aged 70-79 are around 2.5 times more likely to die from COVID-19 than 60-69 year olds.

**OBESITY**
People with a BMI over 40 are at more than double the risk of death from COVID-19 than those who are not obese (BMI less than 30).

**STRUCTURAL DISCRIMINATION**
Structural discrimination may impact on health seeking behaviours and ability to challenge work conditions.

**BEHAVIOUR**
Social distancing, shielding, wearing of facemasks etc. can reduce transmission risk.

**VITAMIN D**

**ENVIRONMENTAL POLLUTION**

University Hospitals Coventry and Warwickshire NHS Trust
Healthcare

• Prevention: Strategic use of screening and immunisation programmes
  • Targeted vaccination – flu and COVID
  • Screening for DM and other NCDs
  • NHS Health checks coupled to COVID-19
  • Brief interventions linked to vaccination

• Treatment
  • Waiting lists: targeted restoration or fuelling inequality?
  • Proactive demand generation from JSNA informed areas
  • Working with GPs and communities to generate demand
  • Outcome and equity based service design – not just access monitoring
  • Maternity outcomes
  • LD

• Rehabilitation
  • New services e.g. Long COVID, unemployment related healthcare needs
How do we ensure that restoration doesn’t inadvertently increase inequalities?

How can restoration help to reduce inequalities?
NHS priorities to tackle Health Inequalities

1. Restore NHS services inclusively
2. Mitigate against digital exclusion
3. Ensure datasets are complete and timely
4. Accelerate preventative programmes that proactively engage those at greatest risk of poor health outcomes
5. Strengthen leadership and accountability
What can we do?

Case finding & referral

Uptake & prioritisation

Experience & outcomes
Facts

• Conventional waiting lists fuel inequality
• 4 touch points
  • Referral
  • Listing
  • On WL
  • Delivery
Why Waiting lists and RTT fuel inequality

William from Warwick

Keeps fit and well in youth
Mild hip pain at 55yo
Sees GP Day 2 of knee pain
Referred for physio 3/12
Sees GP after persistent pain despite physio
Referred to Orthopaedics
Prehab
Surgery at early disease stage
Recovery
Back to WFH then work

18 weeks

No impact on family

Norman from Nuneaton

Suboptimal early years
DM, HT, Smoker
Heavy manual worker
Hip pain at 35yo
Cant stop work
Sees GP after persistent pain
Referred to orthopaedics
Prehab – cant attend
Surgery – at late disease stage
Poor recovery with perioperative MI
Loses job – impacts family

18 weeks

Loses job as unable to work
Impacts family income
Impacts QoL of children
Current Elective Prioritisation Process

The current process for prioritising and booking patients has remained largely the same for many years. Clinical Priority (P1-P6) has recently been added, but the process is currently:

Patients are referred by the GP who gives them an initial priority (Routine, Urgent or Two Week Wait)

They are seen as an outpatient by the Service the GP referred them for, in the order of the GP priority and referral date

If treatment is needed, they are given a Clinical Priority by the Service (P1-P6)

They are booked for treatment within the Service - once they move to the top of the Waiting List (either due to Clinical Priority, or due to Wait Time)
Additional Factors Impacting Healthcare

Within the existing categories are numerous patients, with many conflicting underlying health issues, and a range of social and demographic indicators including socio economic status, occupation, geographical location and protected characteristics.

<table>
<thead>
<tr>
<th>Current Factors for Booking Order</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Clinical Priority</strong></td>
</tr>
<tr>
<td><strong>Time on the Waiting List</strong></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Additional Factors Impacting Healthcare</th>
</tr>
</thead>
<tbody>
<tr>
<td>Patients Age</td>
</tr>
<tr>
<td>Underlying Health Issues</td>
</tr>
<tr>
<td>Readmission Rates</td>
</tr>
<tr>
<td>Deprivation Score</td>
</tr>
<tr>
<td>Emergency Admissions</td>
</tr>
<tr>
<td>Cancer Diagnosis or Referral</td>
</tr>
<tr>
<td>Breaches to the Clinical Priority</td>
</tr>
<tr>
<td>Shielded Patient</td>
</tr>
<tr>
<td>Mental Health Issues</td>
</tr>
<tr>
<td>Previous Cancellations</td>
</tr>
<tr>
<td>Previous DNAs impacting Wait</td>
</tr>
<tr>
<td>Many more...</td>
</tr>
</tbody>
</table>
Currently the teams on the ground book large numbers of patients with short time scales, and are unaware of many of these underlying factors.

They will normally book based on only the two key principals of Clinical Priority and Wait time – with everything else coming down to who responds first.
The Clinical Priority Tool developed by UHCW and Performance & Informatics team takes all of these factors into account, allowing a detailed comparison of patient need and making recommendations on booking when comparing patients on the same priority and procedure.

This is not considered a clinical review, and is only used to help guide the booking teams when comparing similar patients.

Everybody gets the NHS Constitutional Standards
What information do we have now?

Example 1 – Pain Management

**Patient A**
- Waiting for a Therapeutic Lumbar Injection
- Priority 4
- Waited 36 Weeks

**Patient B**
- Waiting for a Therapeutic Lumbar Injection
- Priority 4
- Waited 27 Weeks

In this example, we would book Patient A, as they have waited longer.
What additional information can the tool give us?

Example 1 – Pain Management

**Patient A**
- 35 Years Old
- No previous history of illness

**Patient B**
- 65 Years Old
- Lives in the most deprived area
- Has previously been diagnosed with Cancer
- Has been into A&E 3 times in the last year
- All 3 visits to ED linked to pain management
What should we do?

Patient A
- 35 Years Old
- No previous history of illness

Patient B
- 65 Years Old
- Lives in one of the most deprived areas
- Previously been diagnosed with Cancer
- Been into A&E 3 times in the last year

Example 1 – Pain Management
In this example, the Tool recommends we book Patient B.
What information do we have now?

Example 2 – Trauma & Orthopaedics

Patient A

• Waiting for Total Prosthetic Replacement of Knee Joint
  • Priority 3
  • Waited 15 Weeks

Patient B

• Waiting for Total Prosthetic Replacement of Knee Joint
  • Priority 3
  • Waited 47 Weeks

In this example, we would book Patient B, as they have waited longer
What additional information can the tool give us?

Example 2 – Trauma & Orthopaedics

**Patient A**
- 75 Years Old
- 7 Comorbidities
- Has been referred separately to another service for suspected Cancer
- Recently came into A&E after a fall
- Has breached their clinical priority
- Lives in a deprived area

**Patient B**
- 54 Years Old
- Smoker
In this example, the Tool recommends we book Patient A

<table>
<thead>
<tr>
<th>Patient A</th>
<th>Patient B</th>
</tr>
</thead>
<tbody>
<tr>
<td>75 Years Old</td>
<td>54 Years Old</td>
</tr>
<tr>
<td>7 Comorbidities</td>
<td>0 Comorbidities</td>
</tr>
<tr>
<td>Has been referred separately to another service for suspected Cancer</td>
<td>Has not been referred to another service</td>
</tr>
<tr>
<td>Recently came into A&amp;E after a fall</td>
<td>Has not come into A&amp;E</td>
</tr>
</tbody>
</table>

What should we do?

**Based on underlying factors, it is advised to book Patient A**

<table>
<thead>
<tr>
<th>Trauma and Orthopaedics Service</th>
<th>Trauma and Orthopaedics Service</th>
</tr>
</thead>
<tbody>
<tr>
<td>Consultant A</td>
<td>Consultant A</td>
</tr>
<tr>
<td>Primary total prosthetic replacement of knee joint using cement</td>
<td>Primary total prosthetic replacement of knee joint using cement</td>
</tr>
<tr>
<td>15 Weeks Wait</td>
<td>47 Weeks Wait</td>
</tr>
<tr>
<td>P3</td>
<td>P3</td>
</tr>
</tbody>
</table>

### Additional Factors

<table>
<thead>
<tr>
<th>Factor</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>75</td>
</tr>
<tr>
<td>Age</td>
<td>54</td>
</tr>
<tr>
<td>Smoker</td>
<td>Yes</td>
</tr>
<tr>
<td>Smoker</td>
<td>No</td>
</tr>
</tbody>
</table>

**Referral for Suspected Cancer in the last 12 Months**

- Patient A: Yes
- Patient B: No
What information do we have now?

Example 3 – Cardiology

**Patient A**
- Direct Current Cardioversion
- Priority 3
- Waited 19 Weeks

**Patient B**
- Direct Current Cardioversion
- Priority 4
- Waited 42 Weeks

In this example, we would book Patient A, as they are a higher priority.
What additional information can the tool give us?

Example 3 – Cardiology

**Patient A**
- 59 Years Old
- 3 Comorbidities
- Has been an inpatient in the last 12 months, and readmitted within 30 days of discharge

**Patient B**
- 84 Years Old
- 16 Comorbidities
- 6 A&E visits in the last year
- Lives in a deprived area
- Have been referred for suspected cancer
What should we do?

In this example, as the underlying conditions suggest Patient B, but they are a lower priority, the tool recommends a Clinical Decision is made.
Waiting List Generator

Using the weighting system within the Priority Tool we can apply the same process for comparing two patients to the entire Waiting List. This is done on a Specialty, or even Procedure basis, to ensure a like for like comparison.

Here, this patient was original number 200 on the list. Based on their underlying conditions, they are now next to be booked.
Additional Features of the Priority Tool

The Tool can generate a complete timeline of the most recent waiting list history, which can be viewed in one click – pulling data from numerous internal systems – saving staff large amounts of time in searching through internal data.

Machine Learning allows the system to remember other scenarios entered and look for corresponding factors, and adjust the weighting in future versions to make them more useful (all under the watch of Clinicians).

Additional supporting Apps in development by UHCW Performance & Informatics will allow the collection and comparison of further data from the GP or direct from the Patient, allowing for a constantly improving system.
Next steps 1

1. Evaluation of perceptions:
   - Establishing the extent to which there is perceived to be a problem
   - Support/opposition for the new policy
   - Confidence in the policy to solve the problem

2. Involving the public in the development of a scoring system (M&L CSU and IPSOS-MORI)
   - Deliberative research, in which a group of participants reflective of the wider population are convened and spend a significant amount of time learning about the issues and debating them with each other.
   - Conjoint analysis - survey-based technique in which each participant is shown a range of different scenarios following which statistical analysis can develop a scoring system.

3. Impact on waiting lists and outcomes at population level

4. Seeking early adopter partners
Next steps 2

Social value judgments

- Carer status
- Educational impact
- Occupational impact

Clinical status reviews

- Change in status enables re-prioritisation by provider, GP or patient

Outcome evaluation

- Linkage to outcome datasets, ONS etc
Questions?