Analysis of social prescribing observatory data from Jan – Sep 2020

*(based on the RCGP RSC sentinel network)*

Dr Anant Jani

anant.r.jani@gmail.com
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Extrapolated social prescribing activity across England

*(based on the RCGP RSC sentinel network)*

Dr Anant Jani

October 11, 2020

anant.r.jani@gmail.com
Summary

- Using data (based on the RCGP RSC sentinel network of 1700 GP practices across England) from the Social Prescribing Observatory, we estimate that from Jan – Sep 2020 there will have been:
  - ~250,000 social prescribing referrals
  - ~65,000 social prescribing declines
Extrapolated Average Weekly Referrals from Jan – Sep 2020

Average weekly referrals

- NE & Yorkshire
- North West
- Midlands
- East of England
- London
- South West
- South East
Extrapolated Average Weekly Declines from Jan – Sep 2020
Extrapolated Referral:Decline ratio*

*Referral/Decline ratio (# referrals for every decline)

*This should be just taken as rough estimates because it does not allow us to distinguish between instances where both referral/decline were recorded for the same individual.
Average %* of Regional GP practices represented by the RCGP RSC

* Averaged across all weeks from Jan – Sept 2020
Variation in social prescribing activity across England

(based on the RCGP RSC sentinel network)

Dr Anant Jani
October 29, 2020
anant.r.jani@gmail.com
Summary - Regions

Using data from the Social Prescribing Observatory (based on the RCGP Research Surveillance Centre sentinel network of 1700 English GP practices), we explored variation in social prescribing activity from Jan – Sep 2020

Regional variation (Slides 6-7)
- There is moderate variation between regions in the use of social prescribing referrals and declines
  - **Referrals**: The National average is 1.05/10k; the region with the highest referral rate is London at 1.69/10k and the region with the lowest referral rate is Midlands with 0.83/10k
    - An ~2-fold variation between the highest and lowest regional referral rates
  - **Declines**: The National average is 0.30/10k; the region with the highest decline rate is East of England at 0.84/10k and the region with the lowest decline rate is the South East at 0.05
    - An ~17-fold variation between the highest and lowest regional decline rates

Weekly variation (Slide 6)
- There is substantial weekly variation in social prescribing referrals and declines across regions (indicated by the size of the standard deviation/error bars – larger error bars indicate larger week to week variation)
  - **Referrals**: The National average for weekly variation is 0.55/10k; the region with the highest weekly variation is London with 1.95/10k and the region with the lowest weekly variation is Midlands with 0.33/10k
    - An ~6-fold variation between the highest and lowest regional weekly variation in referral rates
  - **Declines**: The National average for weekly variation is 0.30/10k; the region with the highest weekly variation is East of England with 1.35/10k and the region with the lowest weekly variation is South East with 0.06/10k
    - An ~22-fold variation between the highest and lowest regional weekly variation in decline rates
Summary – IMD quintiles

Using data from the Social Prescribing Observatory (based on the RCGP Research Surveillance Centre sentinel network of 1700 English GP practices), we explored variation in social prescribing activity from Jan – Sep 2020

Variation based on IMD (Slides 9-10)

- **Referrals:**
  - IMD quintile 1 has the highest referral rate at 1.27/10k and IMD quintile 4 has the lowest rate at 0.95/10k
    - A 1.3-fold variation between these IMD quintiles
  - The most deprived individuals (e.g. IMD 1/2) are getting lower rates of social prescribing referrals in the NW, Midlands and SE
    - NW: ~20% less than the national average
    - Midlands: ~20-40% less than the national average
    - SE: ~20% less than the national average
  - There is substantial weekly variation in the use of social prescribing referrals with IMD quintile 3 having the highest weekly variation rate of 1.35/10k and IMD quintile 1 having the lowest weekly variation rate of 0.29/10k
    - An ~4-fold variation between these IMD quintiles

- **Declines:**
  - IMD quintile 2 has the highest decline rate at 0.46/10k and IMD quintile 5 has the lowest rate at 0.23/10k
    - An ~2-fold variation between these IMD quintiles
  - The most deprived individuals (e.g. IMD 1/2) have the highest decline rate in the East of England
    - East of England: ~350% more than the national average
  - There is substantial weekly variation in the use of declined social prescriptions with IMD quintiles 2 and 3 having the highest weekly variation rate of 0.73/10k and IMD quintile 5 having the lowest weekly variation rate of 0.39/10k
    - An ~1.8-fold variation between these IMD quintiles
Summary – Age groups

Using data from the Social Prescribing Observatory (based on the RCGP Research Surveillance Centre sentinel network of 1700 English GP practices), we explored variation in social prescribing activity from Jan – Sep 2020

Variation based on Age (Slides 12-13)

- **Referrals:**
  - There is substantial variation in social prescribing referrals across different age groups with the 65+ age group getting the highest rate at 4/10k and the 0-17 age group getting the lowest rate at 0.09/10k
    - A 44-fold variation between these age groups
  - The 0-17 age group are getting very low referral rates in the Midlands, East of England and South West
    - Midlands: ~50% less than the national average
    - East of England: ~40% less than the national average
    - South West: ~50% less than the national average
  - The 65+ age group are getting lower referral rates in NE & Yorkshire, North West, Midlands, East of England and the South West
    - NE & Yorkshire: ~30% less than the national average
    - North West: ~30% less than the national average
    - Midlands: ~20% less than the national average
    - East of England: ~40% less than the national average
    - South West: ~30% less than the national average
  - There is substantial weekly variation in the use of social prescribing referrals with the 65+ age group having the highest weekly variation rate of 4.65/10k and the 0-17 age group having the lowest weekly variation rate of 0.16/10k
    - An ~30-fold variation between these age groups

- **Declines:**
  - The 65+ age group has the highest decline rate at 1.09/10k and the 0-17 age group has the lowest rate at 0.02/10k
    - An ~52-fold variation between these age groups
  - The decline rate is highest in: the East of England across all age groups, ranging from ~250-325% more than the national average
  - The decline rate is lowest in: the South East across all age groups, ranging from ~80-90% less than the national average
Summary – Ethnicity

Using data from the Social Prescribing Observatory (based on the RCGP Research Surveillance Centre sentinel network of 1700 English GP practices), we explored variation in social prescribing activity from Jan – Sep 2020

Variation based on Ethnicity

Referrals:
- White ethnicity has the highest referral rate at 1.42/10k and Mixed ethnicity has the lowest rate at 0.69/10k
  - An ~2-fold variation between these ethnicities
- BAME individuals (e.g. Black, Asian, Mixed) are generally getting lower rates of social prescribing referrals in the NW, Midlands, EoE and SE
  - NW: ~10-50% less than the national average
  - Midlands: ~10-60% less than the national average
  - EoE: ~50-70% less than the national average
  - SE: ~20-50% less than the national average
- There is moderate weekly variation in the use of social prescribing referrals with Black ethnicity having the highest weekly variation rate of 1.22/10k and Asian ethnicity having the lowest weekly variation rate of 0.68/10k
  - An ~1.8-fold variation between these ethnicities

Declines:
- White ethnicity has the highest decline rate at 0.34/10k and Mixed ethnicity has the lowest rate at 0.12/10k
  - An ~2.9-fold variation between these ethnicities
- BAME individuals (e.g. Black, Asian, Mixed) generally have the highest decline rate in the NW and London
  - East of England: ~150-200% more than the national average
  - London: ~150-175% more than the national average
- There is moderate weekly variation in the use of declined social prescriptions with white ethnicity having the highest weekly variation rate of 0.52/10k and Asian ethnicity having the lowest weekly variation rate of 0.25/10k
  - An ~2-fold variation between these ethnicities
Regions
Weekly Average Rate/10,000 of Social Prescribing Activity from Jan-Sep 2020

**Referrals**

<table>
<thead>
<tr>
<th>Region</th>
<th>Average</th>
<th>Standard deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>NE &amp; Yorkshire</td>
<td>0.89525</td>
<td>0.56327334</td>
</tr>
<tr>
<td>North West</td>
<td>1.0135</td>
<td>1.20586631</td>
</tr>
<tr>
<td>Midlands</td>
<td><strong>0.833</strong></td>
<td><strong>0.32889247</strong></td>
</tr>
<tr>
<td>East of England</td>
<td>0.72325</td>
<td>0.62423856</td>
</tr>
<tr>
<td>London</td>
<td><strong>1.69625</strong></td>
<td><strong>1.94662718</strong></td>
</tr>
<tr>
<td>South West</td>
<td>1.21825</td>
<td>0.73411341</td>
</tr>
<tr>
<td>South East</td>
<td>0.98725</td>
<td>0.56912433</td>
</tr>
<tr>
<td>National Average</td>
<td><strong>1.0523929</strong></td>
<td><strong>0.551699</strong></td>
</tr>
</tbody>
</table>

**Declines**

<table>
<thead>
<tr>
<th>Region</th>
<th>Average</th>
<th>Standard deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>NE &amp; Yorkshire</td>
<td>0.1615</td>
<td>0.28478107</td>
</tr>
<tr>
<td>North West</td>
<td>0.4465</td>
<td>0.53779965</td>
</tr>
<tr>
<td>Midlands</td>
<td>0.21325</td>
<td>0.535357</td>
</tr>
<tr>
<td>East of England</td>
<td><strong>0.83625</strong></td>
<td><strong>1.35426144</strong></td>
</tr>
<tr>
<td>London</td>
<td>0.23</td>
<td>0.15817874</td>
</tr>
<tr>
<td>South West</td>
<td>0.1375</td>
<td>0.08923464</td>
</tr>
<tr>
<td>South East</td>
<td><strong>0.048</strong></td>
<td><strong>0.06272447</strong></td>
</tr>
<tr>
<td>National Average</td>
<td><strong>0.29614286</strong></td>
<td><strong>0.45146908</strong></td>
</tr>
</tbody>
</table>
- East of England has the lowest referral rates relative to the National Average

- London has the highest referral rates relative to the National Average

- South East has the lowest decline rates relative to the National Average

- East of England has the highest decline rates relative to the National Average
IMD
Weekly Average Rates/10k of National Social Prescribing Activity for different IMD quintiles from Jan-Sep 2020

**Referrals**

<table>
<thead>
<tr>
<th>IMD</th>
<th>Average</th>
<th>Standard Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>IMD 1</td>
<td>1.27075</td>
<td>0.29066745</td>
</tr>
<tr>
<td>IMD 2</td>
<td>1.162357143</td>
<td>0.73589649</td>
</tr>
<tr>
<td>IMD 3</td>
<td>1.186071429</td>
<td>1.25052066</td>
</tr>
<tr>
<td>IMD 4</td>
<td>0.9515</td>
<td>0.69080976</td>
</tr>
<tr>
<td>IMD 5</td>
<td>1.064785714</td>
<td>0.77785872</td>
</tr>
</tbody>
</table>

**Declines**

<table>
<thead>
<tr>
<th>IMD</th>
<th>Average</th>
<th>Standard Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>IMD 1</td>
<td>0.40921429</td>
<td>0.72503264</td>
</tr>
<tr>
<td>IMD 2</td>
<td>0.4664286</td>
<td>0.72831722</td>
</tr>
<tr>
<td>IMD 3</td>
<td>0.31689286</td>
<td>0.56818193</td>
</tr>
<tr>
<td>IMD 4</td>
<td>0.26571429</td>
<td>0.50893418</td>
</tr>
<tr>
<td>IMD 5</td>
<td>0.23103571</td>
<td>0.3887974</td>
</tr>
</tbody>
</table>
Weekly Average Regional Rates/10k for IMD quintiles relative to National weekly Average Rates/10k from Jan-Sep 2020

**Referrals**

- The most deprived individuals (e.g. IMD 1/2) are getting lower rates of social prescribing referrals in the NW, Midlands and SE
  - NW: ~20% less than the national average
  - Midlands: ~20-40% less than the national average
  - SE: ~20% less than the national average

**Declines**

- The East of England has the highest decline rates across all IMD quintiles
  - The most deprived individuals (e.g. IMD 1/2) have the highest decline rate in the East of England
    - East of England: ~350% more than the national average
Weekly Average Rates/10k of National Social Prescribing Activity for different Age Groups from Jan-Sep 2020

**Referrals**

<table>
<thead>
<tr>
<th>Age Group</th>
<th>Average</th>
<th>Standard Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-17</td>
<td>0.09142857</td>
<td>0.15548221</td>
</tr>
<tr>
<td>18-39</td>
<td>0.51521429</td>
<td>0.32286105</td>
</tr>
<tr>
<td>40-64</td>
<td>0.99628571</td>
<td>0.65349433</td>
</tr>
<tr>
<td>65+</td>
<td>4.01232143</td>
<td>4.65283051</td>
</tr>
</tbody>
</table>

**Declines**

<table>
<thead>
<tr>
<th>Age Group</th>
<th>Average</th>
<th>Standard Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-17</td>
<td>0.02096429</td>
<td>0.05401127</td>
</tr>
<tr>
<td>18-39</td>
<td>0.10414286</td>
<td>0.14361046</td>
</tr>
<tr>
<td>40-64</td>
<td>0.26682143</td>
<td>0.38773180</td>
</tr>
<tr>
<td>65+</td>
<td>1.08921429</td>
<td>1.65128565</td>
</tr>
</tbody>
</table>
Weekly Average Regional Rates/10k for Age groups relative to National weekly Average Rates/10k from Jan-Sep 2020

Referrals

- The 0-17 age group are getting very low referral rates in the Midlands, East of England and South West
  - Midlands: ~50% less than the national average
  - East of England: ~40% less than the national average
  - South West: ~50% less than the national average
- The 65+ age group are getting lower referral rates in NE & Yorkshire, North West, Midlands, East of England and the South West
  - NE & Yorkshire: ~30% less than the national average
  - North West: ~30% less than the national average
  - Midlands: ~20% less than the national average
  - East of England: ~40% less than the national average
  - South West: ~30% less than the national average

Declines

- The decline rate is highest in: the East of England across all age groups, ranging from ~250-325% more than the national average
- The decline rate is lowest in: the South East across all age groups, ranging from ~80-90% less than the national average
Ethnicity
Considerations

• There is a wide variation in the number of different ethnicities across the RSC population in England as well as a wide range of these individuals in different regions:

<table>
<thead>
<tr>
<th></th>
<th>National Average</th>
<th>Standard Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Asian</td>
<td>52012.0179</td>
<td>44218.486</td>
</tr>
<tr>
<td>Black</td>
<td>22402.6714</td>
<td>33096.1717</td>
</tr>
<tr>
<td>Mixed</td>
<td>11505.2036</td>
<td>8550.82044</td>
</tr>
<tr>
<td>White</td>
<td>496849.064</td>
<td>163208.533</td>
</tr>
<tr>
<td>Unknown</td>
<td>231843.893</td>
<td>95635.5344</td>
</tr>
</tbody>
</table>

• The implications of this wide variation in the prevalence of these different ethnicities combined with the generally low level of social prescribing means that the rates/10k will display high levels of variation

• Furthermore, there are a large number of people (‘Unknown’ in the table above) whose ethnicity is not recorded

• **Thus, these results should be interpreted with care**
Weekly Average Rate/10,000 of Social Prescribing Activity from Jan-Sep 2020

**Referrals**

<table>
<thead>
<tr>
<th></th>
<th>Average</th>
<th>Standard Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Asian</td>
<td>0.779</td>
<td>0.68117716</td>
</tr>
<tr>
<td>Black</td>
<td>1.04614286</td>
<td>1.2193649</td>
</tr>
<tr>
<td>Mixed</td>
<td>0.68607143</td>
<td>0.99031601</td>
</tr>
<tr>
<td>White</td>
<td>1.42464286</td>
<td>1.21067737</td>
</tr>
</tbody>
</table>

**Declines**

<table>
<thead>
<tr>
<th></th>
<th>Average</th>
<th>Standard Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Asian</td>
<td>0.11707143</td>
<td>0.24917438</td>
</tr>
<tr>
<td>Black</td>
<td>0.17471429</td>
<td>0.44043657</td>
</tr>
<tr>
<td>Mixed</td>
<td>0.11617857</td>
<td>0.3537443</td>
</tr>
<tr>
<td>White</td>
<td>0.33689286</td>
<td>0.51859899</td>
</tr>
</tbody>
</table>
Weekly Average Regional Rates/10k relative to National weekly Avg Rates/10k from Jan-Sep 2020

Referrals:

- East of England has the lowest referral rates relative to the National Average
- London has the highest referral rates relative to the National Average

Declines:

- South East has the lowest decline rates relative to the National Average
- East of England has the highest decline rates relative to the National Average
Statistical Analyses – Considerations

Using data from the Social Prescribing Observatory (based on the RCGP Research Surveillance Centre sentinel network of 1700 English GP practices), we explored variation in social prescribing activity from Jan – Sep 2020

Logic
- We had the choice of analysing variation across time or the different regions;
  - We chose to do our analyses across different regions because it would allow for a more fair comparison; we could make a general assumption that individuals of different IMD or age in a given region would have access to the same supply of social prescription providers
  - One large caveat with this assumption is that in a given region, individuals of different IMD or ages may live in different areas, which means that their access to social prescription providers may still vary, which could have an impact on whether they can actually be referred for a social prescription – e.g. if a 0-17 person lives in an area with no social prescription providers, they are unlikely to have a social prescription referral
- Our Null Hypothesis was based on the principle of equality – i.e. all IMD or age groups should have the same rates of social prescribing referrals and declines
  - We chose not to set a Null Hypothesis based on the principle of equity because we do not have any quantifiable information on relative need across different IMD or age groups
Statistical Analyses Referrals – IMD

<table>
<thead>
<tr>
<th>IMD</th>
<th>Average</th>
<th>Variance</th>
<th>F</th>
<th>F Critical</th>
<th>P-Value</th>
<th>Conclusion</th>
</tr>
</thead>
<tbody>
<tr>
<td>IMD 1</td>
<td>1.27075</td>
<td>0.19843113</td>
<td>0.53686252</td>
<td>4.74722535</td>
<td>0.47780467</td>
<td>H0 stands; however, the p value is very high</td>
</tr>
<tr>
<td>IMD 2</td>
<td>1.16235714</td>
<td>0.14044581</td>
<td>0.04123640</td>
<td>4.74722535</td>
<td>0.84248482</td>
<td>H0 stands; however, the p value is very high</td>
</tr>
<tr>
<td>IMD 3</td>
<td>1.18607143</td>
<td>0.19058183</td>
<td>0.09320822</td>
<td>4.74722535</td>
<td>0.76536839</td>
<td>H0 stands; however, the p value is very high</td>
</tr>
<tr>
<td>IMD 4</td>
<td>0.9515</td>
<td>0.06601675</td>
<td>1.57919850</td>
<td>4.74722535</td>
<td>0.23278786</td>
<td>H0 stands; however, the p value is very high</td>
</tr>
<tr>
<td>IMD 5</td>
<td>1.06478571</td>
<td>0.08054297</td>
<td>0.17973438</td>
<td>4.74722535</td>
<td>0.67910210</td>
<td>H0 stands; however, the p value is very high</td>
</tr>
<tr>
<td>National</td>
<td>1.12709286</td>
<td>0.07065382</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

- ANOVA
  - Each IMD quintile is compared to the National averages across all IMD quintiles across all 7 English regions
  - Variance in referral rates across different regions is relatively high for IMD 1-3
  - For IMD 1-5, H0 is maintained (F<F crit: IMD 1-5 do have equal referral rates)
    - HOWEVER the p-values for the different IMD quintiles are very high, suggesting that there is a significant chance that the findings are random
Statistical Analyses Declines – IMD

<table>
<thead>
<tr>
<th></th>
<th>Average</th>
<th>Variance</th>
<th>F</th>
<th>F Critical</th>
<th>P-Value</th>
<th>Conclusion</th>
</tr>
</thead>
<tbody>
<tr>
<td>IMD 1</td>
<td>0.40921429</td>
<td>0.21758795</td>
<td>0.10929751</td>
<td>4.74722535</td>
<td>0.74664616</td>
<td>H0 stands; however, the p value is very high</td>
</tr>
<tr>
<td>IMD 2</td>
<td>0.46464286</td>
<td>0.37938981</td>
<td>0.2303766</td>
<td>4.74722535</td>
<td>0.63987482</td>
<td>H0 stands; however, the p value is very high</td>
</tr>
<tr>
<td>IMD 3</td>
<td>0.31689286</td>
<td>0.10269958</td>
<td>0.01385863</td>
<td>4.74722535</td>
<td>0.9082349</td>
<td>H0 stands; however, the p value is very high</td>
</tr>
<tr>
<td>IMD 4</td>
<td>0.26571429</td>
<td>0.04801486</td>
<td>0.22572236</td>
<td>4.74722535</td>
<td>0.64324436</td>
<td>H0 stands; however, the p value is very high</td>
</tr>
<tr>
<td>IMD 5</td>
<td>0.23103571</td>
<td>0.01861709</td>
<td>0.60840541</td>
<td>4.74722535</td>
<td>0.4505003</td>
<td>H0 stands; however, the p value is very high</td>
</tr>
<tr>
<td>National</td>
<td>0.3375</td>
<td>0.1117935</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

- ANOVA
  - Each IMD quintile is compared to the National averages across all IMD quintiles across all 7 English regions
  - Variance in referral rates across different regions is relatively high for IMD 1-3
  - For IMD 1-5, H0 is maintained (F<F crit: IMD 1-5 do have equal referral rates)
    - HOWEVER the p-values for the different IMD quintiles are very high, suggesting that there is a significant chance that the findings are random
# Statistical Analyses Referrals – Age

<table>
<thead>
<tr>
<th></th>
<th>Average</th>
<th>Variance</th>
<th>F</th>
<th>F Critical</th>
<th>P-Value</th>
<th>Conclusion</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-17</td>
<td>0.09142857</td>
<td>0.00352791</td>
<td>16.9778782</td>
<td>4.74722535</td>
<td>0.00141958</td>
<td>H0 is rejected</td>
</tr>
<tr>
<td>18-39</td>
<td>0.51521429</td>
<td>0.01552353</td>
<td>7.65416047</td>
<td>4.74722535</td>
<td>0.01706863</td>
<td>H0 is rejected</td>
</tr>
<tr>
<td>40-64</td>
<td>0.99628571</td>
<td>0.11909065</td>
<td>1.40796908</td>
<td>4.74722535</td>
<td>0.2583548</td>
<td>H0 stands; however, the p value is very high</td>
</tr>
<tr>
<td>65+</td>
<td>4.01232143</td>
<td>8.39829406</td>
<td>5.23127812</td>
<td>4.74722535</td>
<td>0.04113942</td>
<td>H0 is rejected</td>
</tr>
<tr>
<td>National</td>
<td>1.4038125</td>
<td>0.70659976</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

- **ANOVA**
  - Each age group is compared to the National averages across all age groups across all 7 English regions.
  - Variance in referral rates across different regions is high for 40-64 and very high for 65+.
  - H0 is rejected for **0-17 and 18-39** (F>F crit: these age groups have lower average referral rates relative to the national average) and is statistically significant with p-values of 0.001 and 0.02, respectively.
  - H0 is rejected for **65+** (F>F crit: this age group has a higher average referral rates relative to the national average) and is statistically significant with a p-value of 0.04.
  - H0 is maintained for **40-64** (F<F crit: this age group has a referral rate equal to the national average) but this is not statistically significant with a p-value of 0.26, suggesting that there is a significant chance that the findings are random.
Statistical Analyses Declines – Age

<table>
<thead>
<tr>
<th>Average</th>
<th>Variance</th>
<th>F</th>
<th>F Critical</th>
<th>P-Value</th>
<th>Conclusion</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-17</td>
<td>0.02096429</td>
<td>0.00061311</td>
<td>9.06492524</td>
<td>4.74722535</td>
<td>0.01084676 H0 is rejected</td>
</tr>
<tr>
<td>18-39</td>
<td>0.10414286</td>
<td>0.01297323</td>
<td>4.65173642</td>
<td>4.74722535</td>
<td>0.0520089 H0 stands</td>
</tr>
<tr>
<td>40-64</td>
<td>0.26682143</td>
<td>0.06617618</td>
<td>0.46894719</td>
<td>4.74722535</td>
<td>0.50648374 H0 stands; however, the p value is very high</td>
</tr>
<tr>
<td>65+</td>
<td>1.08921429</td>
<td>0.69680815</td>
<td>4.57730048</td>
<td>4.74722535</td>
<td>0.05364244 H0 stands</td>
</tr>
<tr>
<td>National</td>
<td>0.37028571</td>
<td>0.09361582</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

- **ANOVA**
  - Each age group is compared to the National averages across all age groups across all 7 English regions
  - Variance in decline rates is high for 65+
  - H0 is rejected for **0-17** (F>F crit: this age group has a lower average decline rates relative to the national average) and is statistically significant with a **p-values of 0.01**
  - H0 is maintained for **18-39 and 65+** (F<F crit: this age group has a decline rate equal to the national average) and is statistically significant with **p-values of 0.05**
  - H0 is maintained for **40-64** (F<F crit: this age group has a decline rate equal to the national average) but this is not statistically significant with a **p-value of 0.50**, suggesting that there is a significant chance that the findings are random
 Statistical Analyses Referrals – Ethnicity

<table>
<thead>
<tr>
<th></th>
<th>Average</th>
<th>Variance</th>
<th>F</th>
<th>F Critical</th>
<th>P-Value</th>
<th>Conclusion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Asian</td>
<td>0.779</td>
<td>0.28563692</td>
<td>0.6160819</td>
<td>4.74722535</td>
<td>0.44772631</td>
<td>H0 stands; however, the p value is very high</td>
</tr>
<tr>
<td>Black</td>
<td>1.04614286</td>
<td>0.40108131</td>
<td>0.04565542</td>
<td>4.74722535</td>
<td>0.83439075</td>
<td>H0 stands; however, the p value is very high</td>
</tr>
<tr>
<td>Mixed</td>
<td>0.68607143</td>
<td>0.1397617</td>
<td>1.87412212</td>
<td>4.74722535</td>
<td>0.19608315</td>
<td>H0 stands; however, the p value is very high</td>
</tr>
<tr>
<td>White</td>
<td>1.42464286</td>
<td>0.1148831</td>
<td>4.43412339</td>
<td>4.74722535</td>
<td>0.05696163</td>
<td>H0 stands</td>
</tr>
<tr>
<td>National</td>
<td>0.98396429</td>
<td>0.19169006</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

- ANOVA
  - Each ethnicity is compared to the National averages across all ethnicities across all 7 English regions
  - Variance in referral rates across different regions is high for all ethnicities, especially Asian and Black For all ethnicities H0 is maintained (F<F crit: different ethnicities do have equal referral rates)
  - HOWEVER, with the exception of White ethnicity, the p-values for the different ethnicities are very high, suggesting that there is a significant chance that the findings are random
### Statistical Analyses Declines – Ethnicity

<table>
<thead>
<tr>
<th>Ethnicity</th>
<th>Average</th>
<th>Variance</th>
<th>F</th>
<th>F Critical</th>
<th>P-Value</th>
<th>Conclusion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Asian</td>
<td>0.11707143</td>
<td>0.00645704</td>
<td>1.64094345</td>
<td>4.74722535</td>
<td>0.22439914</td>
<td>H0 stands; however, the p value is very high</td>
</tr>
<tr>
<td>Black</td>
<td>0.17471429</td>
<td>0.00981245</td>
<td>0.03898017</td>
<td>4.74722535</td>
<td>0.8467927</td>
<td>H0 stands; however, the p value is very high</td>
</tr>
<tr>
<td>Mixed</td>
<td>0.11617857</td>
<td>0.00972112</td>
<td>1.45131102</td>
<td>4.74722535</td>
<td>0.25153988</td>
<td>H0 stands; however, the p value is very high</td>
</tr>
<tr>
<td>White</td>
<td>0.33689286</td>
<td>0.07498685</td>
<td>1.78724342</td>
<td>4.74722535</td>
<td>0.20605497</td>
<td>H0 stands; however, the p value is very high</td>
</tr>
<tr>
<td>National</td>
<td>0.18621429</td>
<td>0.01393681</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

- **ANOVA**
  - Each ethnicity is compared to the National averages across all ethnicities across all 7 English regions
  - Variance in referral rates across different regions is low across ethnicities
  - For all ethnicities H0 is maintained (F<F crit: different ethnicities do have equal referral rates)
    - HOWEVER, the p-values for the different ethnicities are very high, suggesting that there is a significant chance that the findings are random