KEEP BRITAIN TIDY.
PUTTING A STOP TO SMOKING-RELATED LITTER

BASELINE LITTER SURVEY

NOVEMBER 2022
Keep Britain Tidy

Baseline Litter Survey

England Update

November 2022
Executive summary

Keep Britain Tidy (KBT) is pursuing a national survey of smoking related litter (SRL) with the objective to create a baseline and an understanding of the relationship of SRL with people and places.

KBT and LITTERATI agreed on a sample of 248 Small Area Units (SAU) across England.

The Litterati App was used to take photos of litter and a team of Citizen Scientist Researchers (CSR) recruited and trained locally. The researchers, using the App on their smartphones, collected litter data at about 15 spatially balanced locations per SAU.

This report describes the research that was performed over the last three months, highlights key statistics (SRL per meter, weight and volume), and compares these statistics across different Regions, Indices of Multiple Deprivation, Land Use Types, Rural and Urban areas.

- On average, a piece of smoking related litter was observed every 7 meters!
- Cigarette Butts account for 98% of all SRL.
- There are 2.4 million Cigarette Butts littered along High Streets and nearby retail areas in England.
- The highest rate of SRL was found in North West England at 0.61 pieces of litter per meter.
England SAU’s research completion

<table>
<thead>
<tr>
<th>NATION</th>
<th>SAU's Completed</th>
<th>SAU's Skipped</th>
<th>Total SAU's</th>
</tr>
</thead>
<tbody>
<tr>
<td>England</td>
<td>247</td>
<td>1</td>
<td>248</td>
</tr>
</tbody>
</table>

HIGHLIGHTS

- 247/248 SAU’s completed;
- 1 SAU skipped due to lack of network availability (Dartmoor National Park).
Results and Findings
Smoking Related Litter in England: Key Descriptive Statistics*

- On average, there is a piece of smoking related litter every 7 meters!
- Cigarette Butts account for 98% of all Smoking Related Litter.

<table>
<thead>
<tr>
<th># Smoking Items per Meter</th>
<th># Smoking Items</th>
<th>Weight (kilograms)</th>
<th>Volume (liters)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.137</td>
<td>34,681</td>
<td>10.6</td>
<td>129</td>
</tr>
</tbody>
</table>

* Image Recognition @90%
Smoking Related Litter by Region

- East Midlands (England): 0.1
- East of England: 0.11
- London: 0.23
- North East (England): 0.21
- North West (England): 0.14
- South East (England): 0.09
- South West (England): 0.08
- West Midlands (England): 0.12
- Yorkshire and The Humber: 0.12
A piece of SRL can be found every two meters along streets in these Urban Built Up Areas (Other Retail, Main Roads, and Main Retail, [link]).
**Smoking Related Litter by Region & Land Use Type**

- **South East England:** High Obstruction housing areas had significantly more litter per meter.
- **West Midlands:** Low obstruction houses areas has significantly more litter per meter.
- **London:** Main Roads; Industry warehouses, retail sheds & science parks; and Other retail commercial areas are the most prevalent land-use areas.

**HIGHLIGHTS**

- **South East England:** High Obstruction housing areas had significantly more litter per meter.
- **West Midlands:** Low obstruction houses areas has significantly more litter per meter.
- **London:** Main Roads; Industry warehouses, retail sheds & science parks; and Other retail commercial areas are the most prevalent land-use areas.
Smoking Related Litter by Rural/Urban
Overall IMD quintiles 1 through 3 are the most common amongst all of the regions. The West Midlands exhibit the opposite pattern with the majority of SRL eper Meter belonging to IMD quintiles 4 and 5.

In London, there are $N$ pieces of SRL in IMD Quintiles in $X$ for every 1 piece of SRL in IMD Quintiles $Y$. 
Insights & Dashboard
Keep Britain Tidy: National Baseline Dashboard

* View Additional Statistics (e.g., Litter per Meter by Rural/Urban) on the KBT NBL - Dashboard.
Find Point Clusters of at least 15 Retail/Restaurant POIs up to 150 meters apart using DBSCAN.

Calculate Average LPM of the 72 Sampling Locations within these Clusters: 0.42 pieces of litter per meter on the typical roadside.

Calculate Linear Meters of Roadway within these clusters: 2,851,001 meters.
- Note: It’s pretty clear that this also includes minor roads that are located just off the high streets.

Estimate # SRL in England:
- Most roads in these commercial areas have two sides, it is therefore appropriate to multiply the result by 2.
- $0.42 \times 2,851,001 \text{ meters} = 1,197,420 \text{ Cigarette Butts}$
- $(0.42 \times 2,851,001 \text{ meters}) \times 2 = 2,394,840 \text{ Cigarette Butts}$

Estimate # SRL in High streets:
- On a typical high street expect to find between 168 to 420 SRL items.
Explore Outliers and Secondary Datasets using the ArcGIS Dashboard
SAU E01019299 has a highest rate of smoking related litter in North West England at 0.61 pieces of litter per meter. Pol data gives us additional context to better understand why.
Pol Composition within 100 meters of Litter Hotspots

HIGHLIGHTS

This sampling location has both the highest rate of smoking related litter per meter in England and in SAU E01019299 (4.75 LPM)!
Keep Britain Tidy (KBT) is pursuing a national survey of smoking related litter (SRL) with the objective to create a baseline and an understanding of the relationship of SRL with people and places.

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Project phases

**Phase #1**
Sampling Design
- a. SAUs selection
- b. Final survey locations

**Phase #2**
Research Execution
- a. Researchers Mobilisation
- b. Researchers Training
- c. Sampling Execution

**Phase #3**
Data Analysis & Reporting
- a. Data QA
- b. Data Analysis
- c. Interim Report
- d. Final Report
Research Task - Status Types

**Assigned:** The task has been assigned to a Researcher and will be made visible to them in the Litterati Mobile Application.

**Submitted:** The Researcher has completed the minimum number of required segments and has elected to submit those segments for review.

**Accepted:** The QA/QC Analyst has reviewed and approved enough segments associated with this task in order to approve it for inclusion in the final analysis.

**Skipped:** The Researcher has elected to skip a Task. This may happen if the Researcher determines that the location of the task is unsafe or otherwise inaccessible. For example:

- Locations in rural areas on highway or high traffic roads
- Locations in private areas
- Hostile behaviors towards the researcher
Segment/Transect definition
Main land use types

- Industry and warehousing area
- Main retail and commercial area
- Other highway area
- Recreational area / Park
- Rural road area
WE’VE GOT A
PLANET TO CLEAN

LITTERATI

JOIN US.
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