Examples of Automated Zone Design in practice

Professor David Martin
Automated zone design in practice

• Automated zone design has been used by the Office for National Statistics in England and Wales:
  • 2001 Output Areas
  • 2004 Lower Layer Super Output Areas
  • 2011 Output Areas
  • 2011 Lower Layer Super Output Areas
  • 2011 Workplace Zones

• Northern Ireland 2001/11 output areas/small areas

• Northern Ireland/Scotland 2011 Workplace Zones under production (April 2016)
Common features

• Output Area creation independent of the geography of enumeration
• Underlying zone design based on synthetic postcode (or part postcode) polygons built around addresses, clipped to major topographic features
• Output Areas provide foundation for Lower and Middle Layer Super Output Areas and also Workplace Zones in each of 2001 and 2011 Censuses
• All nest within Local Authority District boundaries in place at the time of creation
2001 Census Output Areas

• Built from synthetic unit postcode polygons, constrained within ward and parish boundaries
• Minimum thresholds of 100 persons and 40 households
• Target size of 125 households
• Shape controlled by an accessibility statistic
• Attempt not to combine urban with rural postcodes
• Homogeneity controlled by Intra-Area Correlation statistic using tenure and dwelling type characteristics
2011 Census Output Areas

• Updated set of 2001 Output Areas (2.6% changed)
• Review and manual adjustment of unsatisfactory 2001 zones, LA boundary changes
• Subdivision of zones with population over 625, or aggregation of any below threshold
• Automated zone design re-applied for subdivisions
• No longer constrained to wards and parishes
• N=171,372 in England and Wales
Lower Layer Super Output Areas

• Initially created for Indices of Deprivation 2004
• Thresholds of 1000 persons and 400 households
• 2001 Census Output Areas used as building blocks for re-run of zone design
• Constrained within Local Authority boundaries
• Original mean 1500 population, typically 5 output areas combined
• N=34,753 in England and Wales
• Recalculated for 2011, N=32,844
2011 Workplace Zones

• Entirely new units for reporting of workplace statistics from 2011 Census
• Minimum 200 workers and 3 workplace postcodes
• May be the same as 2011 Output Areas, subdivisions or aggregations depending on workplace population density
• Subdivisions based on automated zone design using postcode polygons as building blocks
• N=53,578 in England and Wales
Summary

• Automated zone design used for all census zones in England and Wales 2001 and 2011

• Users of the small area census data need to understand the implications of the zone design
  • Relationship to other geographical units
  • Placement of boundaries
  • Sizes and shapes of zones
  • Thresholds, size ranges, social homogeneity

• Researchers should consider likely dependence of results on specific zone design decisions
For more information please visit
www.n.crm.ac.uk