Measuring Connectivity for Bicycling and Walking

Active Living Research
Round 1
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Why Connectivity?
Three-Step Project

1. Develop measures of network connectivity

2. Compare connectivity measures to performance measures to help select best measure(s)

3. Evaluate implementation issues
Measures of Connectivity
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- Block length
- Block area
- Block density
- Intersection density
- Street network density
Measures of Connectivity

- Connected Node Ratio
  - \( \frac{\text{intersections}}{\text{intersections} + \text{cul-de-sacs}} \)

- Link/Node Ratio
Measures of Connectivity

• Alpha Index
  – *Ratio of the number of actual circuits to the maximum number of circuits*
  – *A circuit is a finite, closed path starting and ending at a single node*

• Gamma Index
  – *Ratio of the number of links in the network to the maximum possible number of links between nodes*
Measures of Connectivity

• Effective Walking Area
  – Ratio of the number of parcels within a one-quarter mile walking distance of a point to the total number of parcels within a one-quarter mile radius of that point

• Pedestrian Route Directness
  – Ratio of route distance to straight-line distance for two selected points
Intersection Density
Link-Node Ratio

Metro Average = 1.38
Evaluating Measures

- Which connectivity measures best reflect minimizing trip distances and route directness?
- Pedestrian Route Directness: most direct route/straight-line
- But, difficult to use in research and policy – requires selecting points.
Implementation Potential

- What can other researchers and public agencies realistically measure?
- Survey of 30 cities
The end

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