

IPEN Adolescent:

Public Transportation & Methods for Measuring Regional Accessibility



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Outline

- Public transportation variable template
 - Variables
 - Types of public transportation
- Regional accessibility variable template
 - Selecting major regional destinations
 - Calculating automobile/transit network distances & travel times

Public Transportation Template

Public Transportation Variables

- Develop international standardized definition of access to public transportation
- Main transit variables by type (n_type=7):
 - Count of public transit stops or stations
 - Gross density of public transportation access points
 - Network distance from each participant residence and school to nearest transit stop of any type
- Data - local/regional planning & transit agencies

Types of Public Transportation

- Public transportation -- all fixed route services, published schedules
- Private transportation not included – e.g. taxis, bicycle sharing or informal transit service without fixed schedule or are demand-based are
- Public Transit Types (n=7):
 - Buses: 1) Traditional Bus, 2) Express Bus, 3) BRT
 - Rail: 4) Streetcar/Lightrail, 5) Heavy Rail/Metro, 6) Commuter Rail
 - Watercraft: 7) Ferries, water taxis

Types of Public Transportation

- Passenger Bus Systems:

- 1) Regular Bus - regular route with known stops
- 2) Express Bus - regular route with limited stops, operate on faster roads, e.g. freeways
- 3) Bus Rapid Transit (BRT) - regular route, limited stops, operates in dedicated right-of-way (ROW) for most of route to avoid traffic congestion
- 4) Informal bus - may lack designated route, typically can be flagged down or asked to stop anywhere along route. May be operated by private bus drivers or companies.

Types of Public Transportation

- Rail Passenger Systems:
 - 1) Streetcar/light rail - Urban rail systems on dedicated ROW or in mixed traffic
 - 2) Heavy Rail/Metro – High capacity urban rail, exclusive ROW underground, elevated or at-grade
 - 3) Commuter Rail – Suburban rail with dedicated ROW typically directional on a diurnal basis
- Passenger Water Systems:
 - 1) Ferries – Passenger boats, fixed service water crossings

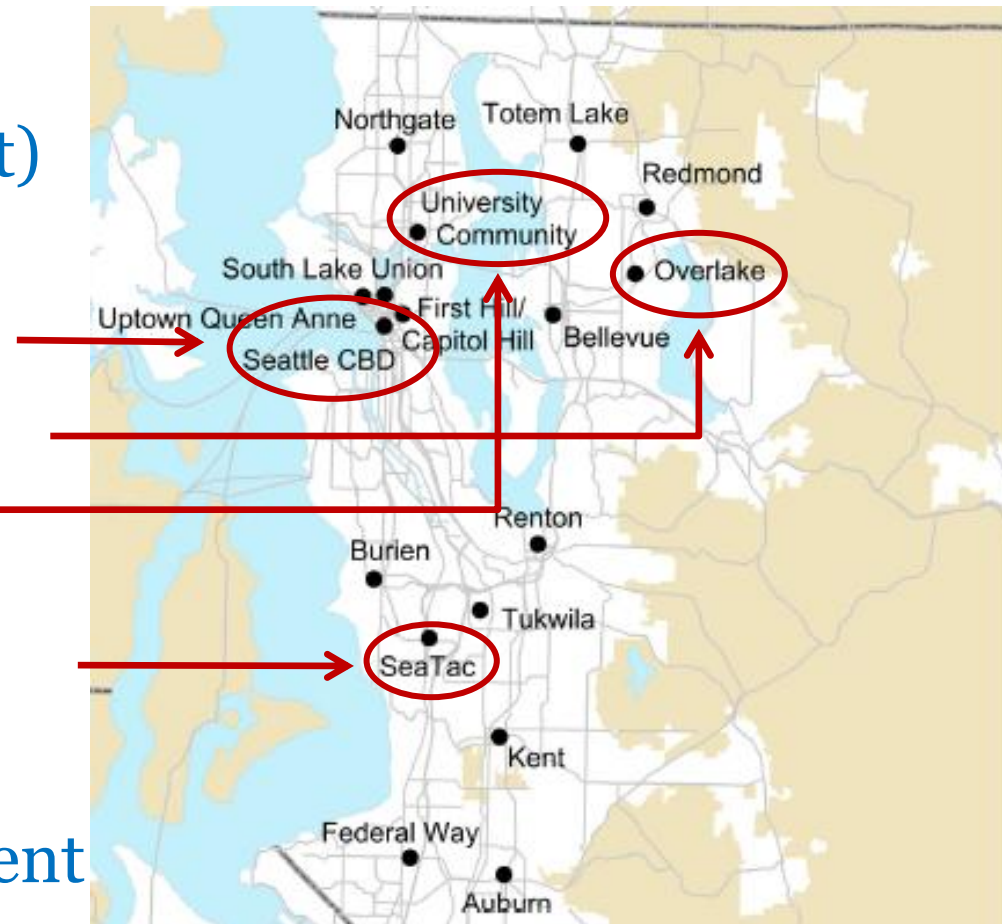
Regional Accessibility Template

Regional Accessibility

- A measure of travel access key activity center destination within a study region
 - High regional accessibility - location connected to a large # of key destinations with low travel time and cost
 - Critical factor for individuals/households making transportation and time budget decisions
 - Characterized by distance/time proximity to regionally significant activity centers
 - Relevant to automobile and transit modes

Regional Activity Centers

- Central location (e.g. Central Business District)
- Major employment
- Universities
- Hospitals
- Transportation (e.g. airport or main rail stations)
- Nearest commercial destination or employment center



MPO-defined King County,
WA Activity Centers

Influence on Physical Activity & Active Transportation

- Transportation mode choice -- strongly influenced by relative utility of modes
- Regional travel time and cost by mode -- significant predictors of mode choice for work & non-work trips¹
- Adolescents can rely on transit to access school, work and other destinations, access to regional transit is critical for allowing the choice to use transit

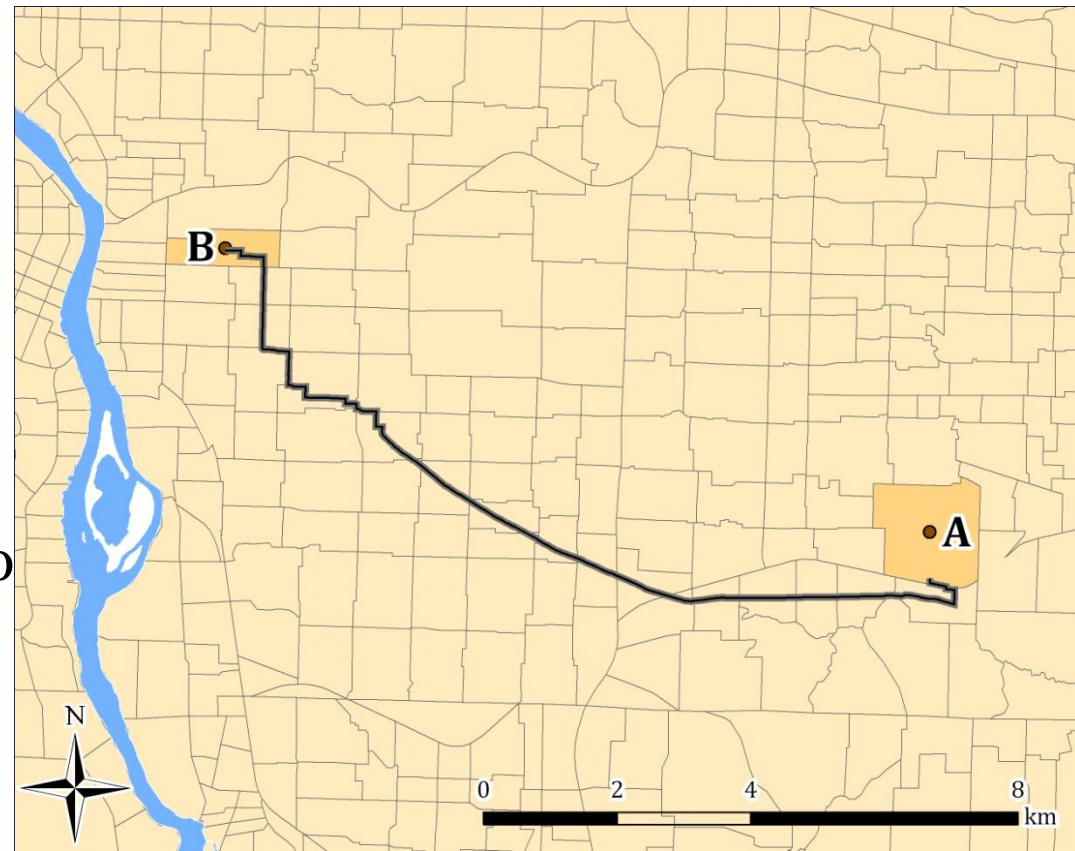
Regional Accessibility Variables - required and desired

Required: Network Distance - Home to Destinations

- Calculate shortest network-based driving distance from each participant's home to each regional accessibility destination
- Calculate mean distance to all destinations
- Utilize entire road network, including freeways, highways, toll roads and roads that prohibit pedestrians

Desired #1: Travel Time - TAZ

- Uses regional travel demand model data (at traffic analysis zone (TAZ) level)
 - estimated peak hour (AM/PM) travel time between zones by single-occupant vehicle (SOV), transit and carpool
- Origin TAZ centroid to Destination TAZ centroid
- Data obtained from planning/transportation authorities
- Calculate total walk and transit travel time
- Calculate mean travel time to all destinations



Desired #2: Travel Time - Transit

- Calculate transit travel time between participant home and each regional accessibility destination
- Transit route-based origin to destination measure
- Calculate total walk and transit travel time
- Calculate mean travel time to all destinations



Desired #2: Travel Time - Transit

- Transit travel times generated from:
 - General Transit Feed Specification (GTFS) data.
 - Open international data exchange by transit authorities¹
 - Used by ESRI ArcGIS Network Analyst extension²
 - Travel time can include walking times to/from transit
 - Incomplete international coverage³
 - Locally available route/schedule data (database, web-based, paper schedules)

¹ GTFS Data Exchange: www.gtfs-data-exchange.com/

² <http://www.arcgis.com/home/item.html?id=ofa52a75d9ba4abcad6b88bb6285fae1>

³ GTFS data currently only available for US & New Zealand study sites.

Desired #3: Travel Time- Vehicle

- Calculate automobile travel time between participant home and each regional accessibility destination
 - Road network datasets can contain posted speeds along segment lengths
 - May be able to use online trip planning resources to calculate estimated trip travel times
- Limitations:
 - Does not take into account congestion and peak hour versus off peak travel times

Discussion

- Should destination types be expanded to further tailor them to adolescents?
 - For example a regionally significant major natural feature such as a park, beach, lake
 - For example a regionally significant shopping or retail destination
- Discussion about two desired method types:
 - What is the extent to which partner sites are aware of TAZ data and availability?
 - What other options exist to create travel time estimates?

Thank You

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