Poor neighbourhoods, Poor Food?

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Social Distribution of Diet-Related Disease

- UK Black Report 1980
- UK Acheson 1998
- WHO 2002 – Reducing Risks, Promoting Healthy Life
- World Bank 2006 – Equity and Development
- AIHW 2004 – Australia Health 2004

Socio-economic status and health in Australia

- Household income longitudinal study (HILDA)
- Average number Australians on government pension
- Association low SES and Ill-Health

Social determinants of Health

"Social structures and positions are powerful determinants of the likelihood of health damaging exposures and of possessing particular health enhancing resources"

(Lynch and Kaplan 2000)

Relationship between social determinants and food intake

- Low income less likely to comply with dietary recommendations

  (Friel 2003, Popkin 1996,Turrell 2004, Worsley 2003, Mishra 2005)

- Poor people eat poorly (maybe?)

  (Turrell 2002)

Why do ‘poor people eat poorly’?

Assumptions (not all tested):

- Lack of Money/Relative cost of food
- Lack of Knowledge
- Differences in food values
- Lack of Cooking Skills
- Life stress/Locus of Control
- Time stress
- Poor food access in local neighbourhood

Poor neighbourhoods, poor food?

US – Healthy Food

- Healthier foods more expensive and less readily available in poorer neighbourhoods
- Food access particular problem in African-American Neighbourhoods

Morland, Wing, Diez Roux, Poole

Amer J Prev Med 2002

- Places to buy food in Mississippi, North Carolina, Maryland, Minnesota

- Addresses geocoded to census tracts

- Median house values used as marker of neighbourhood wealth

- % African-American residents measure of racial segregation

Morland, Wing, Diez Roux, Poole Amer J Prev Med 2002

- Number of supermarkets and gas stations with convenience stores greater in wealthier neighbourhoods
- Fewer places to consume alcohol in wealthier areas OR=0.3 (95%CI 0.1- 0.6)
- Supermarkets more likely to be in white neighbourhoods OR= 4,3 (95%CI 1.5-12.5)

Sloane et al.

J Gen Intern Med 2003

- Los Angeles
- Target areas 23.2%, 46.7%, 49.% African-American, 28% live below poverty line
- Contrast areas 8% African-American, 17% live below poverty line
- Survey of market inventories

Sloane et al.

J Gen Intern Med 2003

	Target Area (N=261)	Contrast Area (N=69)	P value
Supermarket	5.0	29.0	.001
Chain store	18.3	46.2	0.001
Meat sold%	41.0	71.0	0.001
Fruit+Veg%	49.0	66.7	0.05
Nonfat milk%	37.9	79.7	0.001
Low-fat snacks%	42.2	69.6	0.001

US - Healthy Food

- Dose-response between physical access to food and diet and health outcomes

US – Healthy Food

Association between availability and intake

Morland 2002 32% increase in fruit & veg for each additional supermarket

Association between cost and health

Sturm 2006 Lower prices for fruit & veg predictive of lower gain in BMI for children

UK- Healthy food

- Less consistent relationship between area-level SES and food access

- Only those with poor transport access likely to live in a ‘food desert’

Cummins and Macintyre

Brit J Food 1999 and Urban Studies 2002

- 1999 Location of food retail outlets in Greater Glasgow

- 2003 Systematic survey of price and availability of 57 foods from ‘modest but adequate diet’ relative to area-level socioeconomic disadvantage and geographic location

Cummins and Macintyre

Brit J Food 1999 and Urban Studies 2002

- Large multiple stores more likely to be in less affluent areas
- Cheapest food (incl brands) available from discounters
- 51 of 57 foods >90% available in multiples
- 5 of 57 foods price significantly more likely to be cheaper in less affluent areas
- 11 of 57 foods significantly less likely to be available in less affluent areas

Cummins and Macintyre

Brit J Food 1999 and Urban Studies 2002

- Price – type of shop most important predictor (cf deprivation or geographical location)

- Availability – type of shop most significant predictor (cf deprivation or geographical location)

White

Eating and Shopping in Newcastle

2004

- Cross-sectional, multilevel study
- 5044 individuals (83% response)
- Concurrent surveys of diet, social factors, health and food shopping behaviour
- Survey 560 food outlets of cost and availability of 33 food items
- Geographic data on access to retail outlets by private or public transport
- Area-level socio-economic disadvantage

White

Eating and Shopping in Newcastle 2004

- Overall retail provision good – 24 of 26 wards at least one shop selling 27 or 33 food items
- Less healthy diets associated with social disadvantage and poorer knowledge
- Differences in fruit, veg and fat more likely to be explained by gender, knowledge, alcohol consumption, cost of food, physical activity, distance to nearest shop (R2=0.068)

White

Eating and Shopping in Newcastle 2004

- Majority shop at multiple store outside area and travel by car
- ‘Do food deserts exist?’ Only for those who do shopping by foot

Australia – Healthy Food

- No demonstrated difference in access to fruit, veg and other healthy foods with respect to area-level disadvantage (Turrell 2004, Winkler 2006)

- Poor access in remote and rural areas

Winkler

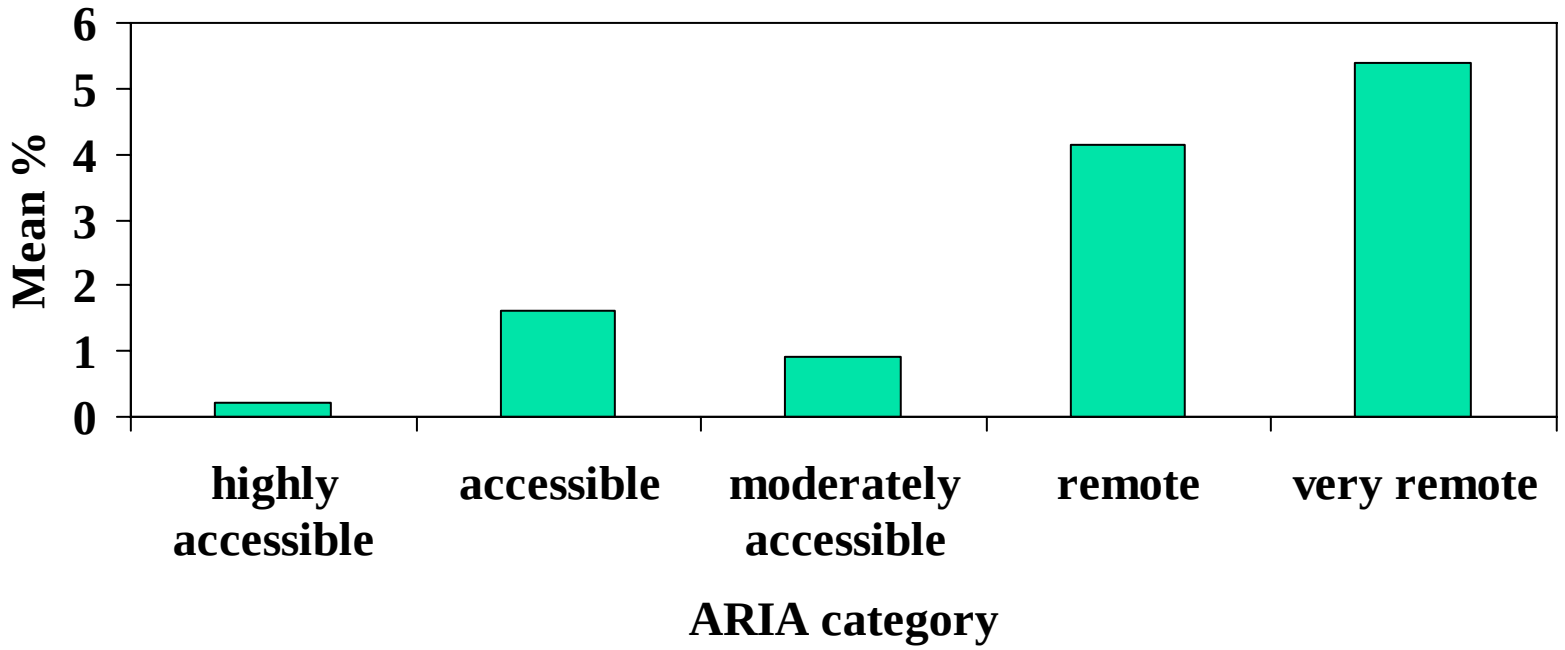
Health & Place 2006

	Supermarkets and greengrocers	Convenience stores
	Adj RR(95% CI)	Adj RR (95%CI)
Disadvantaged	1.13 (0.87-1.46)	0.97 (0.79-1.20)
Medium	0.99 (0.76-1.30)	1.14 (0.93-1.40)
Advantaged	1.00 (reference)	1.00 (reference)

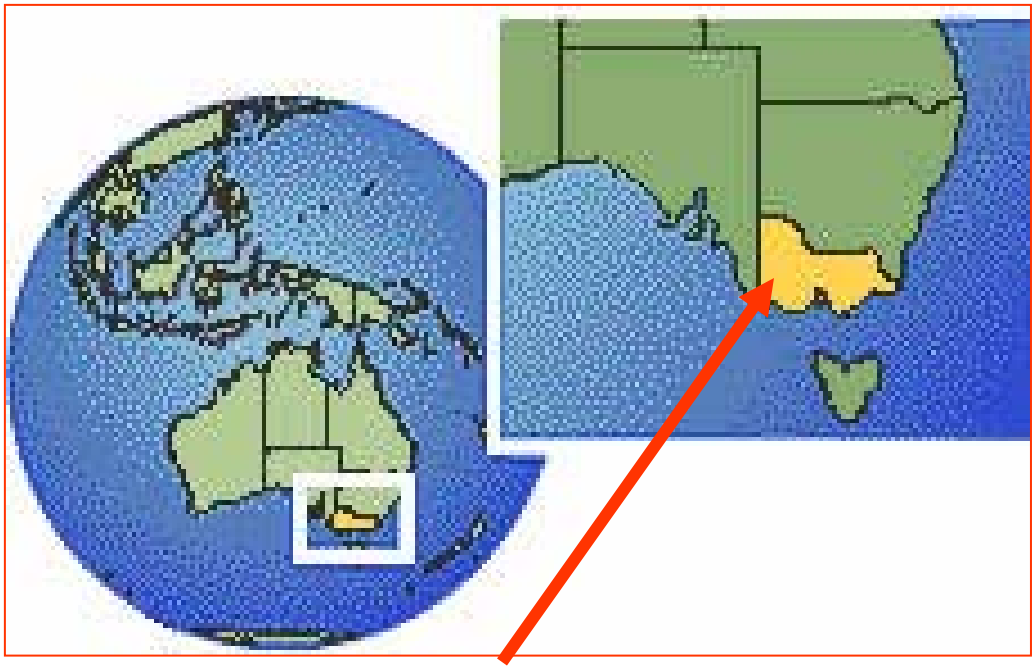
Queensland HFAB Study

(Lee 2002)

Percentage of missing HFAB items per store (n=44)



Greater Green Triangle



Greater Green Triangle Study (Burns 2004)

- Regional centres Warrnambool, Hamilton
- All of towns in GGT ‘accessible’(ARIA category)
- Pop. 225,000
- Area 70,000 square miles

Stores and Shopping list

- Stores - Yellow Pages, Local Government
- HFAB (44)
- Popular food items (10) (BIS Schrapnel top 100)
- Meat pie, Can Coke
- Packet tobacco, packet cigarettes

Availability of HFAB across GGT

Shire	No. Town	No. Shops	No Shops 100%HFAB	No Shops 90% HFAB
Glenelg	8	13	3 (23%)	6 (46%)
Warrnambool	3	7	4 (57%)	4 (57%)
Corangamite	8	9	3 (33%)	7 (78%)
S.Grampians	5	7	4 (57%)	5 (71%)
Moyne	18	17	2 (12%)	5 (29%)
Total average	42	53	16 (30%)	27 (56%)

Availability by store type

- HFAB more likely available in chain store (p=0.00)
- Least likely in independent store in one store town (p=0.004)
- 15 towns had one store at which could not purchase HFAB
- 15/42 towns food insecure
- Lack of HFAB + Popular Foods
- 10/42 journey > 18 km to access HFAB

Most available items
(Available >90% stores)

HFAB Items	Popular Items	Takeaway Tobacco
Potatoes	Packet Spaghetti	Packet tobacco
Instant noodles	Pasta Sauce	Can Coke
Onions	Family block Chocolate	Packet cigarettes
Weetbix	Litre Coke	
Packet Spaghetti		
Tinned beetroot		
Baked Beans		
Margarine		
Spaghetti tinned		
Rice		
Eggs		
Sugar		
Fresh fat reduced milk		
Fresh milk		
Cheese		

Cost of HFAB relative to store type (A,B,C = chain)

Store Type	Price HFAB
A (n=3)	353.05 ± 16.94
B (n=3)	365.80 ± 12.62
C (n=14)	389.41 ± 26.86
Independent (n=7)	380.00 ± 18.92
Total	380.31 ± 25.14

Fast food

- Foods prepared outside the home = fast food +café + takeaway + restaurant
- Fast food = No table service
- US 60% food expenditure
- Australia 25% food expenditure

Fast food and Nutrient Intake (Burns 2002)

- In Australia foods prepared outside home (FPOH) 13% energy intake
- ↑FPOH
  - High intake fat, sodium, sugar
  - Low intakes micronutrients and fibre
  - High alcohol in women

Fast food and Health

Fast food energy dense

Fast food (~1100kJ/100g)

- 65% higher than average British diet (~670 kJ/100g),
- 2 fold x supermarket healthy options (300-700 kJ/100g)
- 3 fold x traditional Gambian food (~450 kJ/100g)

(Prentice and Jebb 2003)

Fast food and Health

Fast food is fattening

Over 15 years strong association frequency fast food and weight gain (Pereira 2005)

US – Fast Food

- Greater prevalence of fast food outlets in poorer African-American neighbourhoods New Orleans (Block 2004)

- Fewer healthy options, more promotion fast foods in poorer neighbourhoods with higher proportion of African-Americans Los Angeles (Lewis 2005)

Lewis 2005

Am J Pub Health

	%African American	Full Service	Limited service	Total
Target area	36	76 (27%)	202 (73%)	278
Comparison	8	236 (58%)	173 (42%)	409

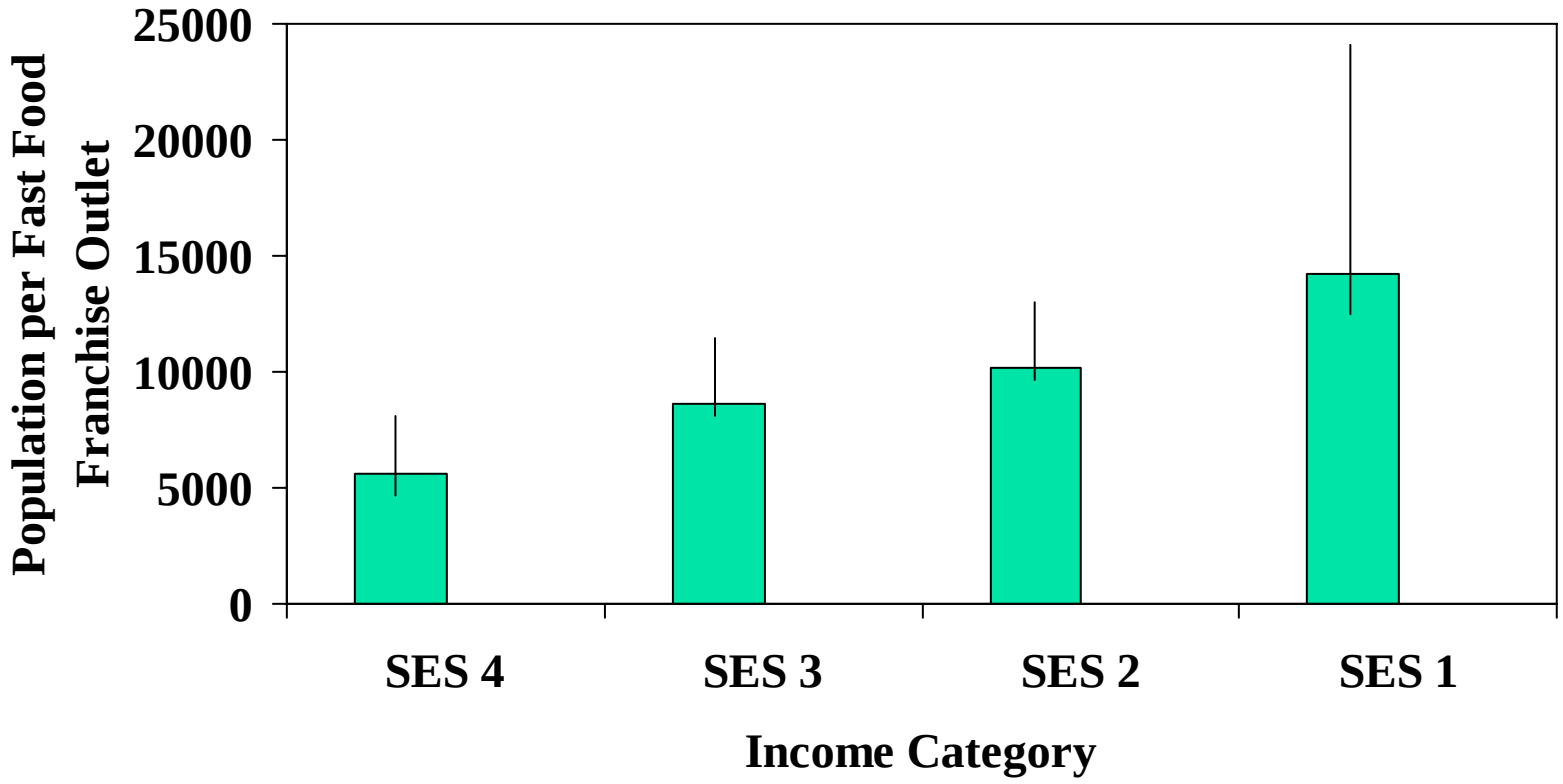
UK- Fast food

- Across England and Scotland more McDonalds in poorer areas (Cummins 2005)

- Though density of out of home outlets not associated area deprivation in Glasgow (Macintyre 2005)

Fast food and SES In Melbourne

(Reidpath & Burns2002)



Access to Healthy and Fast Food in the City of Casey
(Submitted for publication)

- How easily can residents in Casey access a healthy diet?

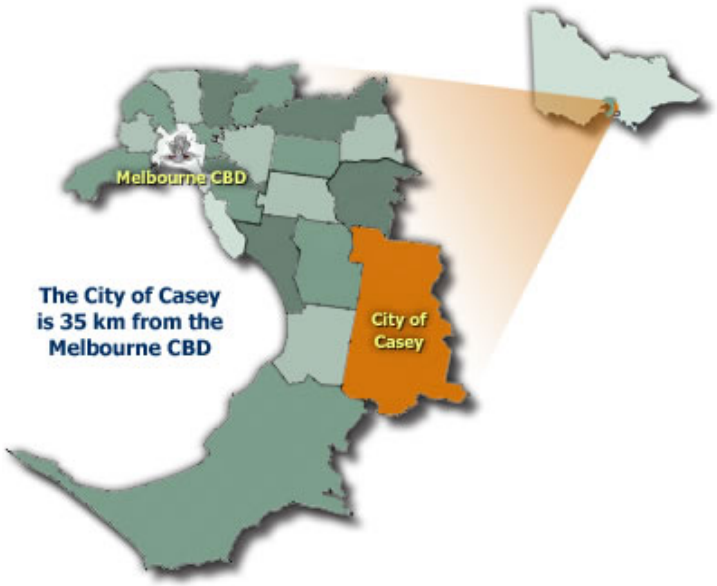
  Which residents will find it difficult to access a healthy diet?

  Is it easier to access fast food than healthy food in the City of Casey?

- To describe access (by car, bus and foot) to healthy and fast foods in City of Casey

The City of Casey

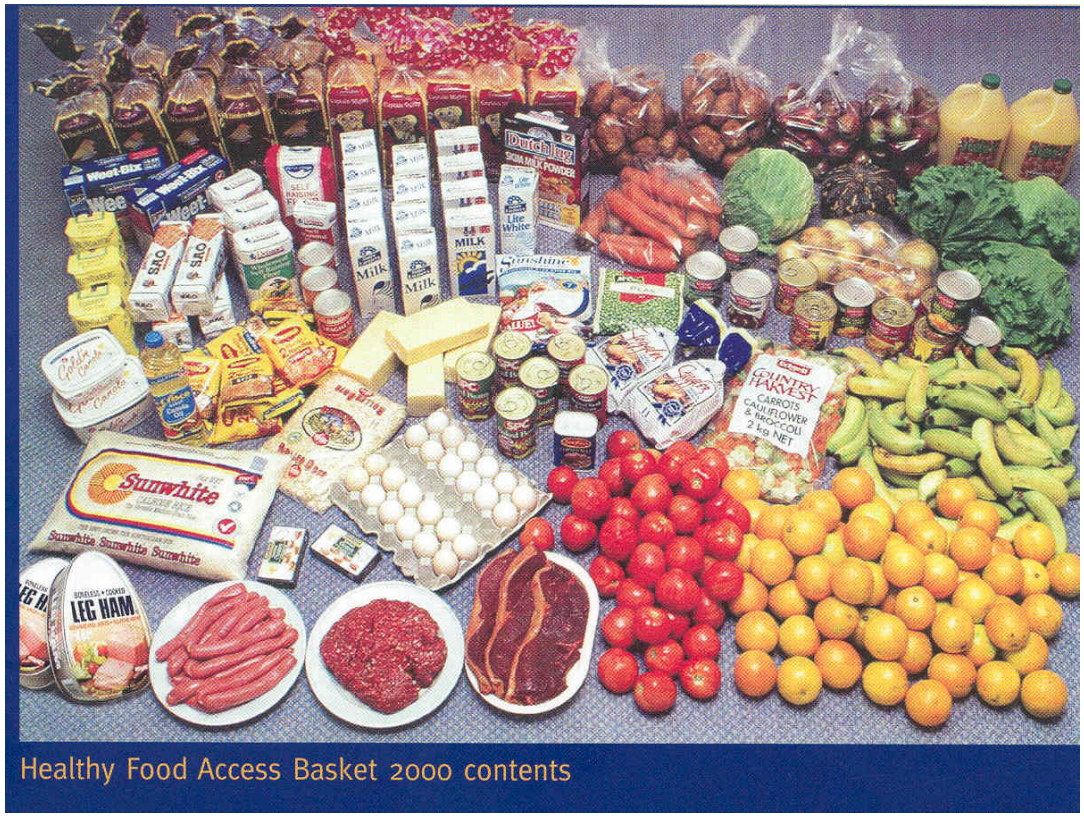
- **A population of more than 220,000**
- **70% of population under 40 years of age**
- **On average, around 40 families move in each week.**
- **Highest population of pre-schoolers in Victoria**
- **Over 90% of people live in houses rather than flats or units**



Defining healthy and fast foods

- Healthy diet designated by Healthy Food Access Basket (HFAB) (Lee 2002, Burns 2004)
- Access to a major supermarket chain ensures access to an adequate and affordable diet (Burns 2004)
- Use 3 major chains. Account for 90% food retailing.
- Fast food = food sourced at an outlet without table service
- Include only major fast food chains with more than 10 franchises in Australia
- Food Act 1984

Healthy Food Access Basket (Lee 2002, Burns 2004)



Healthy Food Access Basket 2000 contents

Modelling access to Healthy and Fast Food

- Describing the Methodology
  - Data Preparation
  - Assumptions
  - Modelling

Methodology – Modelling Food Access

- Obtain data
  - Locations of Food outlets in the City of Casey
  - Road Network
  - Bus routes
  - Reserves
  - Census Data
  - Elevation

Methodology

Preparation of Data

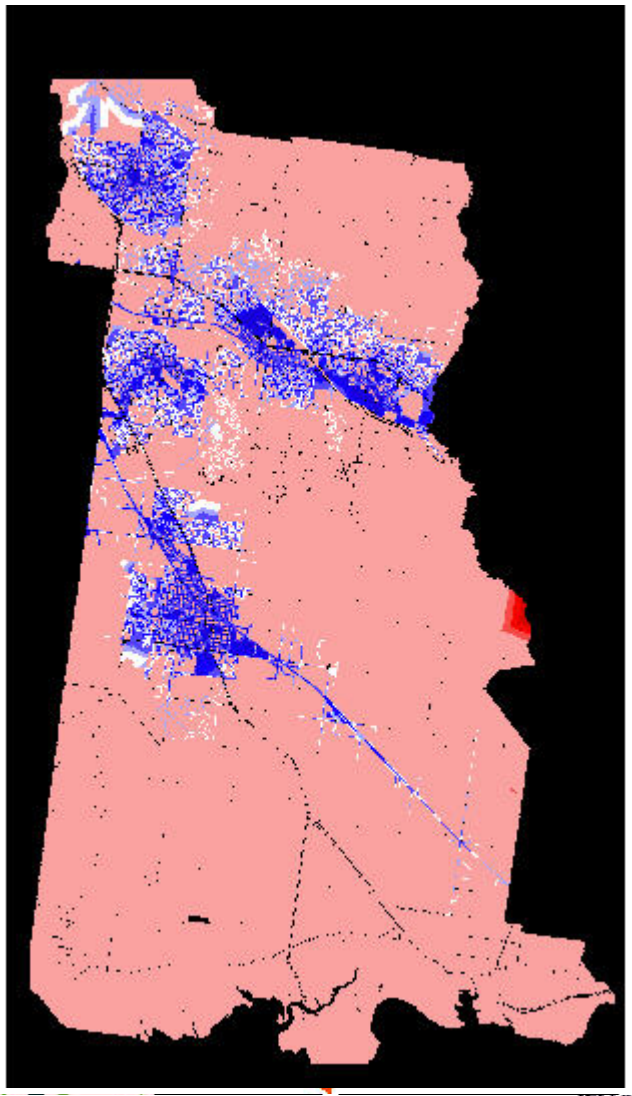
- Conversion Some data into ESRI shape Files
  - Used FME at City of Casey
- Linking List of Food outlets to Locations of Food premises.
  - Achieved over 95% success rate
- Conversion of all data into the same datum and projection (MGA 1994 zone 55).
- Combine Bus routes and determine frequency

Methodology

- Access Modelling
  - Using Accessibility Analyst
  - Determine average travel-time along the different road network, Highway/freeway, major and minor.
    - Bus time was reduced depending on bus frequency
  - Determine barriers – Railway, Freeway and Rivers
  - Modelling of walking including land parcels, shopping centres and reserves

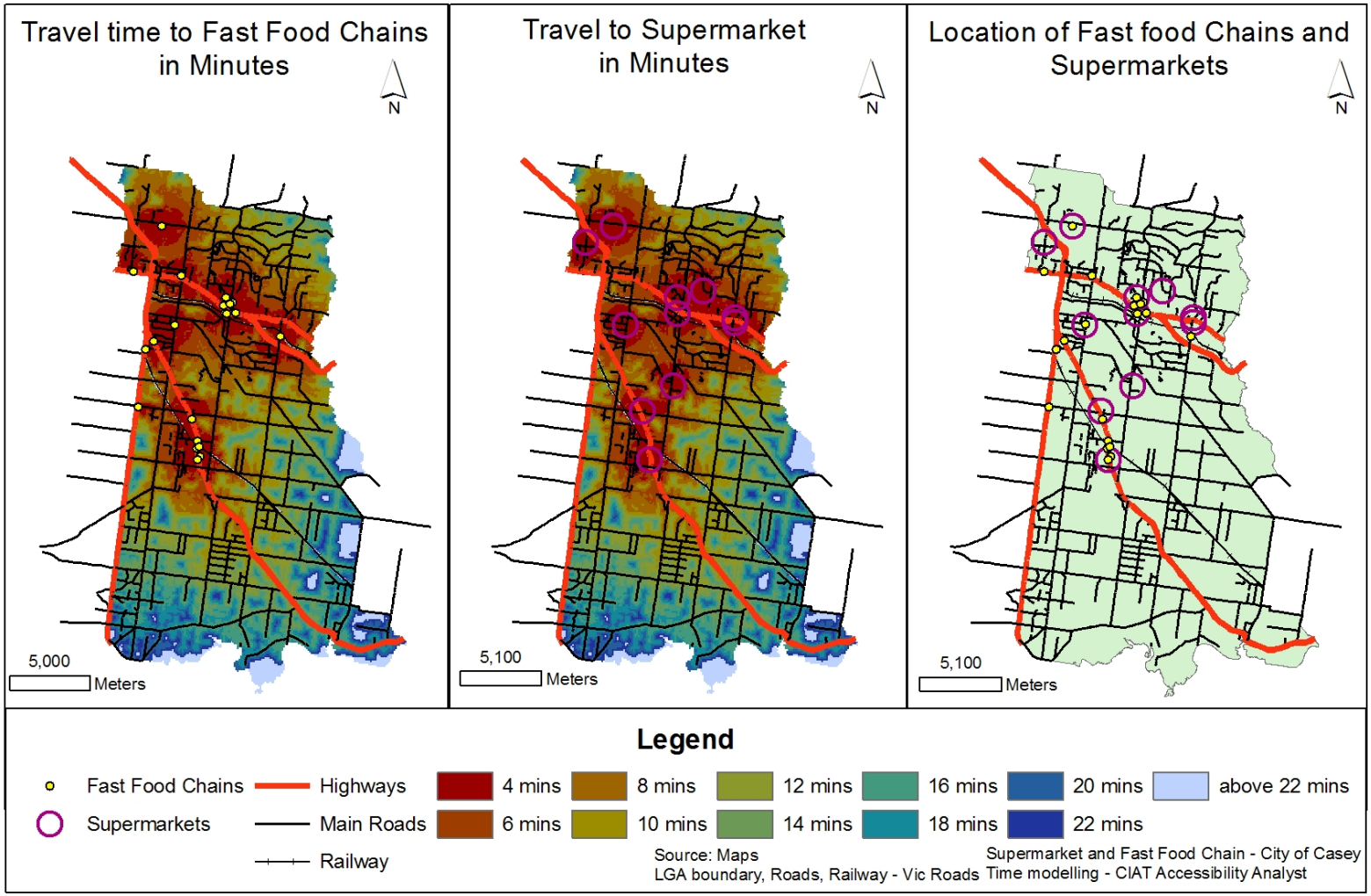
Methodology

- Steps in the Model
  - Add all the datasets
  - Define the target datasets
  - Defined Boundary
  - Converted all datasets to Grids
  - Reclassified Grids to reflect travel time
  - Combine Grids (cost grid)
  - Determine Travel Cost



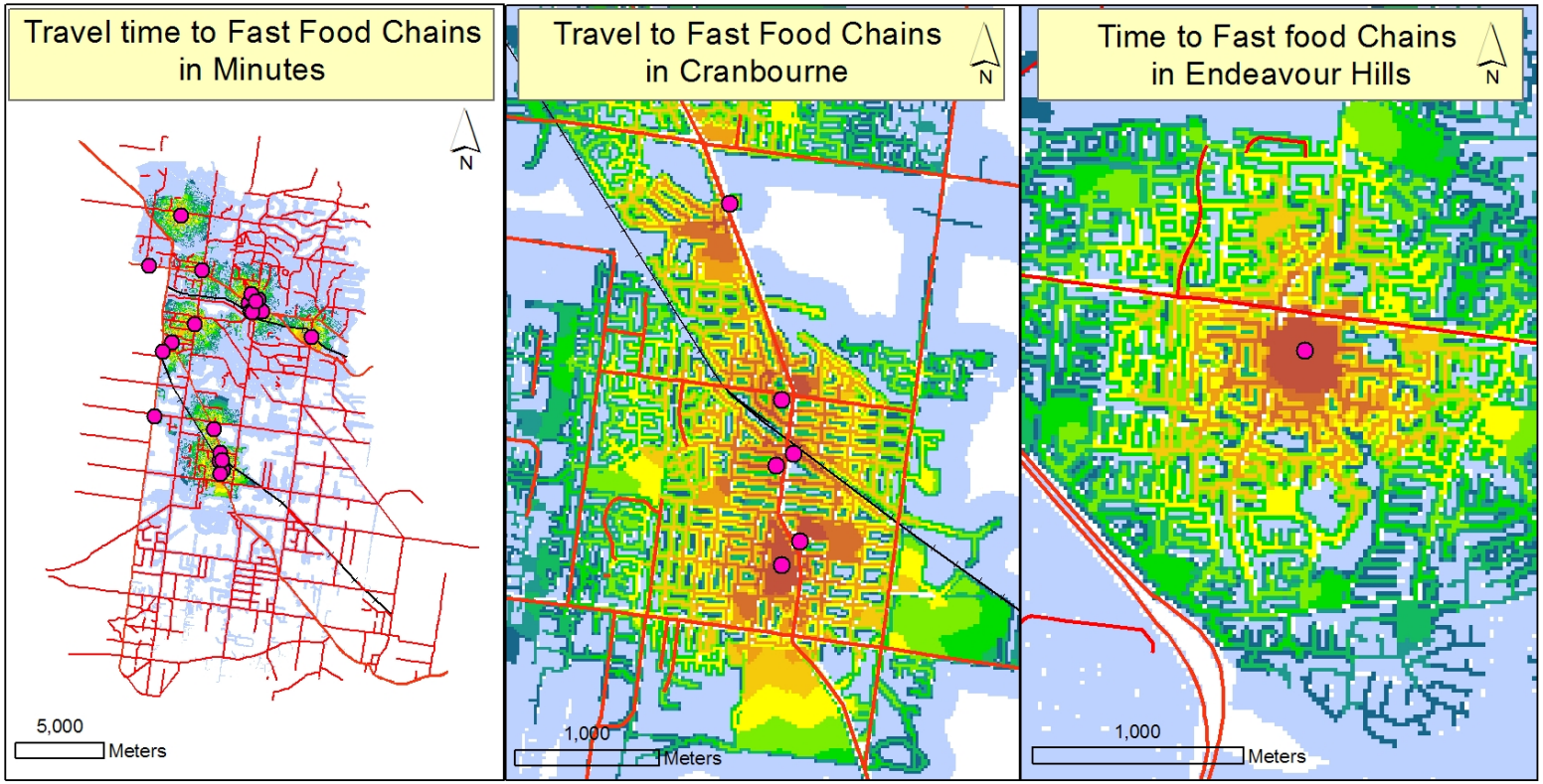
Supermarket Access via Motor Vehicle

Travel Time to Fast food Chains and Supermarkets via motor vehicle in the City of Casey in 2005



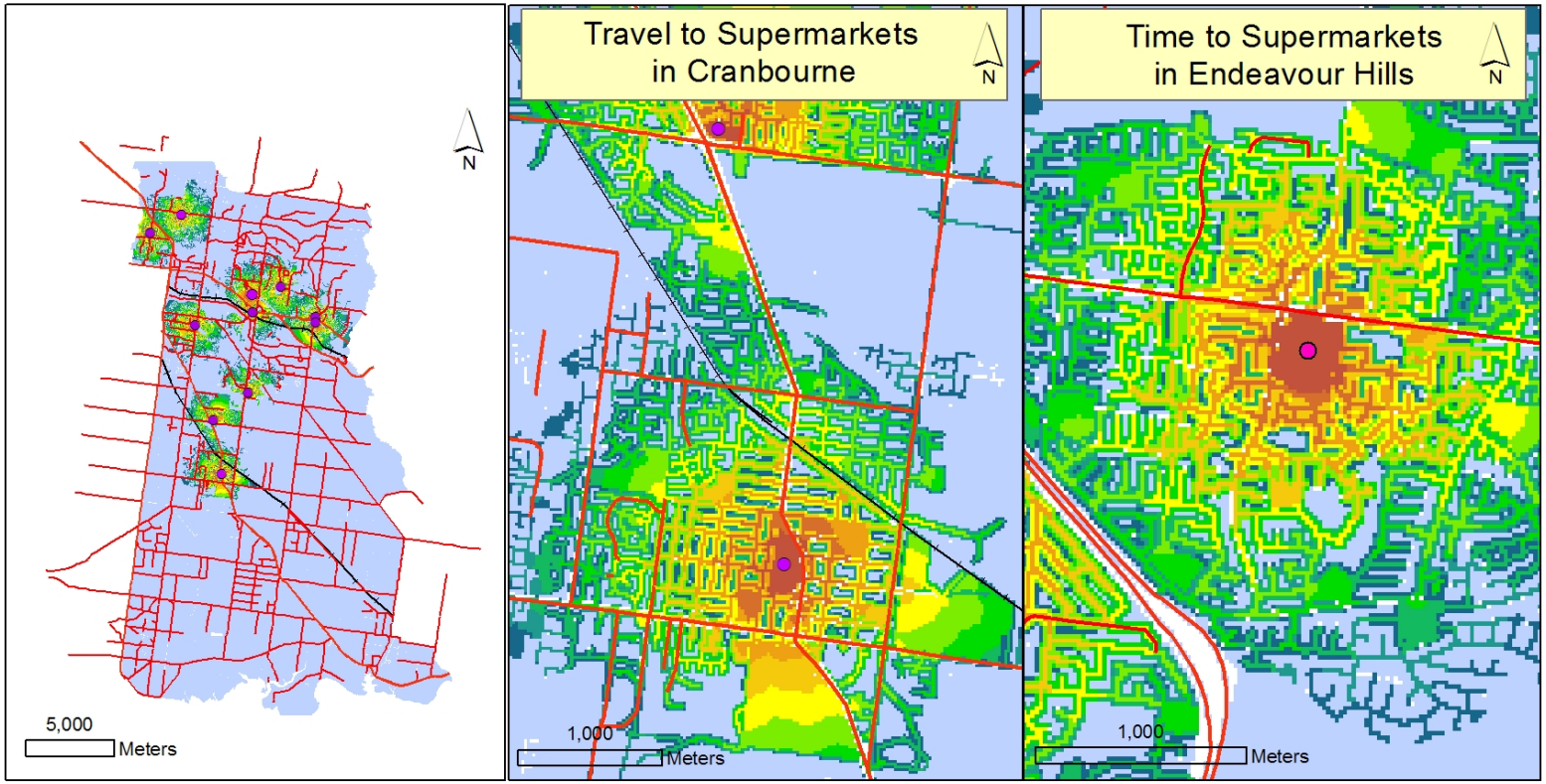
Fast Food Access via Walking

Travel Time (minutes) to Fast Food Chains via Walking in the City of Casey in 2005



Supermarket Access via Walking

Travel Time (minutes) to Supermarkets via Walking in the City of Casey in 2005

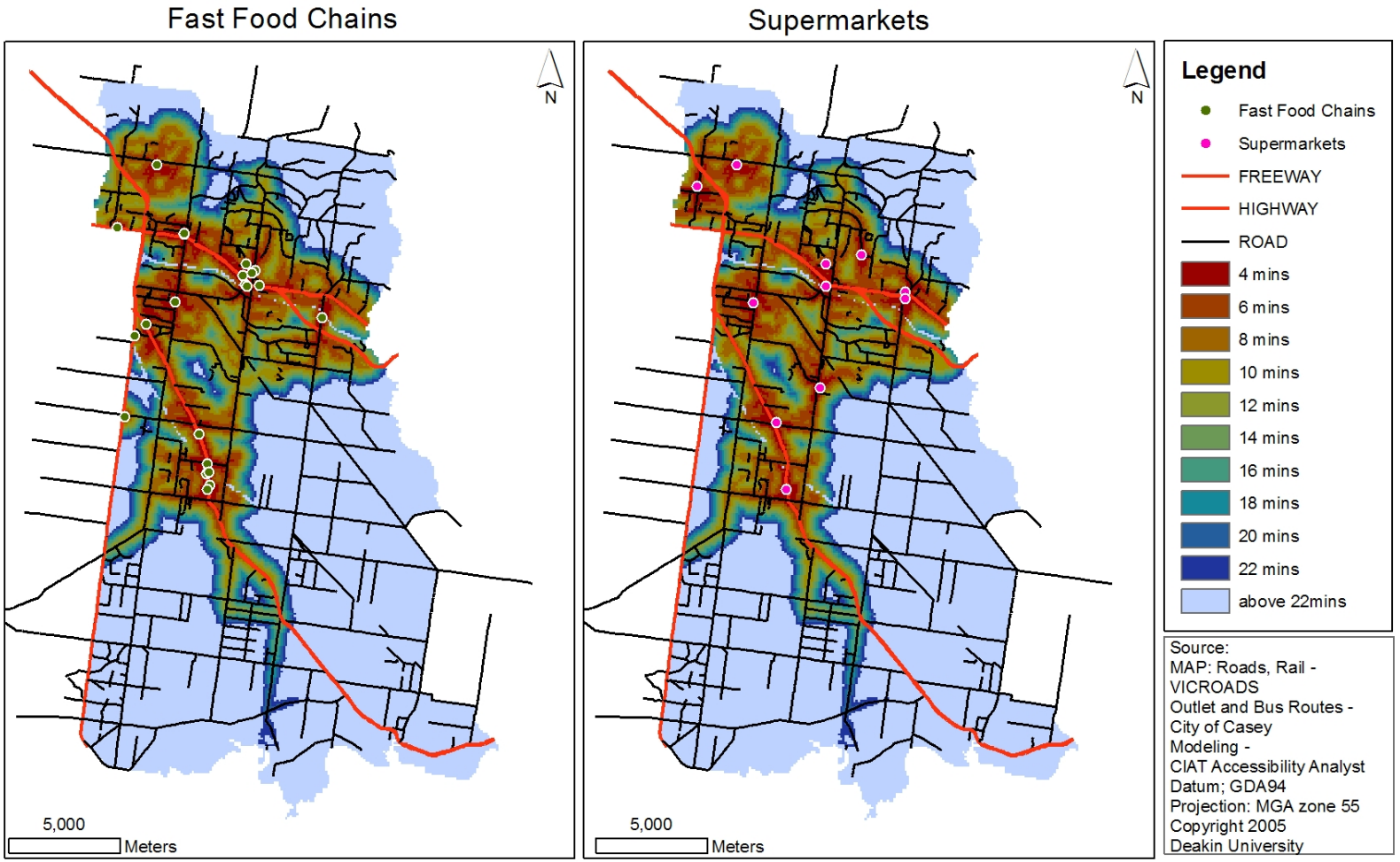


Source: Maps
LGA boundary, Roads, Railway - Vic Roads

Supermarket and Fast Food Chain - City of Casey
Time modelling - CIAT Accessibility Analyst

Food Access via Bus Routes

Accessibility to Supermarkets and Fast Food Chains via Bus Routes during Peak periods (7am to 10 am, 3pm to 7pm)



Area-level SES differences (SEIFA) in food access

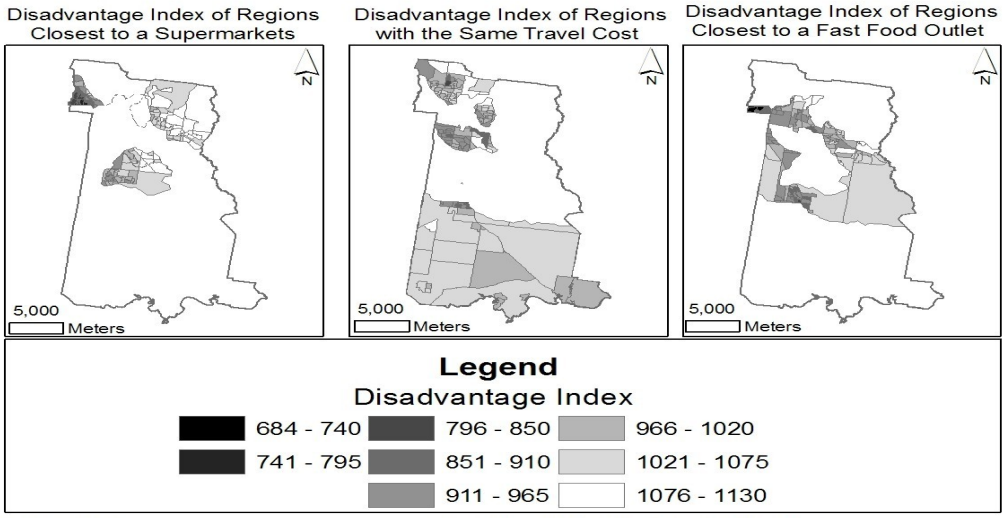


Figure 5. Disadvantage Index in the regions cloest to Fast food Outlets, Supermarkets and Same Travel Cost to both Fast Food and Supermakets via a Car in the City of Casey in 2005

Area-level SES differences (SEIFA) in food access

	SEIFA
Shorter travel time to supermarket	1016.2 ± 81.6 *
Equal travel time to both supermarket and fast food	988.0 ± 54.2
Shorter travel time to fast food	957.9 ± 75.9

* p<0.05 statistical difference Dunnett T3

Relative Access in Relation to SEIFA

- Higher SEIFA closer to supermarket ($p<0.05$)
- Lower SEIFA closer to fast food ($p<0.05$)

Results

- Over 80% population is within an 8 minute drive of Supermarket or Fast Food Outlet
- Approximately 50% access healthy and fast food within 8 minutes by bus
- 4% have access healthy and fast food within 8 minutes by foot
- More disadvantaged neighbourhoods more likely to have better access to fast food

City of Casey Study

- Food access in Casey is good – if you have a car!

20% resident do not have regular use of a car

- Low SES areas have better access to fast food

Poor Neighbourhoods, Poor Food ?

- Depends on country and food
- International differences for healthy food
- National and international data show consistent patterns for fast food
- Differences due to dynamic food retailing environment
- Need for local food access assessments

Further questions

- SES differences in independent fast food outlets?
- Ground truth of mapping – how do residents experience physical access to food on the ground?
- Drivers for SES differences in fast food access – supply or demand?

Thank you to

- Prof James Dunbar, Susan Baudinette Greater Health, University Dept of Rural Health
- Deakin University MND students 2002
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