

# Obesity and local food environment

*A Perth Metropolitan Study*

Dr Grace Yun - Senior Research Analyst GIS, Public Health

Dr Laura Miller - Spatial Analysis Research Officer, Child and Adolescent Community Health

Shannon Carter - Research Analyst GIS, Public Health

Dr Sarah Joyce - A/Manager, Health Survey Unit, Public Health

*Department of Health, Western Australia*



# WA Health Department



Western Australia's public health system aims:

- To ensure healthier, longer and better lives for all Western Australians
- To protect the health of our community by providing a safe, high quality, accountable and sustainable health care system



# Epidemiology Branch Department of Health Western Australia

## Our Aim:

To monitor, assess and report on health profiles and service utilisation for the WA population.

## We provide information to:

- Guide policy development
- Identify emerging issues
- Prioritise service delivery
- Evaluate health system performance

For more info visit: <http://www.public.health.wa.gov.au>

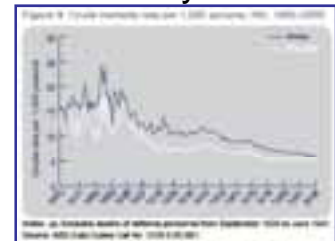
Email: [epi@health.wa.gov.au](mailto:epi@health.wa.gov.au)



GIS



Epidemiological  
Analysis



Health Surveys



Government of Western Australia  
Department of Health

# GIS in WA Health Department

- Epidemiology Branch within Public Health Division
- 3 FTE + 0.4 contractor position
- Historically MapInfo domain, changed to ESRI suite due to increased spatial analysis requirement



# USA

- ~3,790,000sq mi
- 310,467,000 people
- ~80 ppl/sq mi
- Spend 13.5% GDP on Health
- Life expectancy ~78



# Australia

- ~3,000,000 sq mi
- 21,000,000 people
- ~7 ppl/sq mi
- Spend 8.5% of GDP on Health
- Life expectancy ~82











# Overview

- Background
- Data source
- Research methods
- Preliminary results and future plan



67%



A close-up photograph of a person's large, protruding belly. Two hands are resting on the belly, one on the left and one on the right, emphasizing its size. The skin is light-colored and shows some texture. The background is dark and out of focus.

\$41,000,000,000,000

" obesity is worsening throughout the developed world and becoming the top public health concern"



Stroke  
Cancer  
Diabetes  
Heart Disease  
Osteoarthritis



GPs

Hospitals

Nursing homes

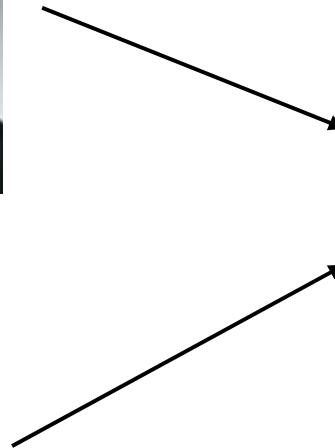
Pharmaceuticals



Carers  
Equipment  
Unemployment  
Tax revenue lost

# Project Aims

- Is the availability of different food outlets around peoples homes associated with obesity in the Perth metropolitan area ?
- Showing benefits of using GIS and statistics



?





*California, USA*

People living in neighbourhoods crowded with fast-food and convenience stores but relatively few grocery or produce outlets are at significantly higher risk of suffering from obesity and diabetes

(California Center for Public Health Advocacy (CCPHA) report, 2008)



*Edmonton, Canada*

The Lower the ratio of fast-food restaurants and convenience stores to grocery stores and produce vendors near people's home, the lower the odds of being obese.

(Spence et al 2009)



**Government of Western Australia  
Department of Health**



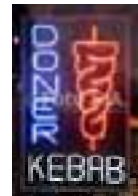
# Data Sources

- HWSS - **WA Health and Wellbeing Surveillance System**
  - Continuous data collection system.
  - Collected using a Computer Assisted Telephone Interview (CATI)
  - People are interviewed throughout the year with an accumulated sample of 7000 annually.
  - People aged 18+ was used in this study (9204 people from 2006-2008 survey)
- Food outlet dataset from all 39 Local Government Authorities



# Types of foods used

- Fast food (FF)



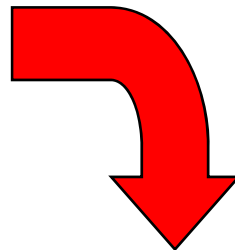
- Restaurant food (RE)

- Healthy food (HF)

– Supermarkets, fruit and veg shops, butchers



Individual people  
Fast Food  
Restaurant  
Healthy Food



Road network

Distance to nearest  
FF/HF/RE

2.5km (5min)

Density of  
FF/RE/HF  
food

5km (10min)

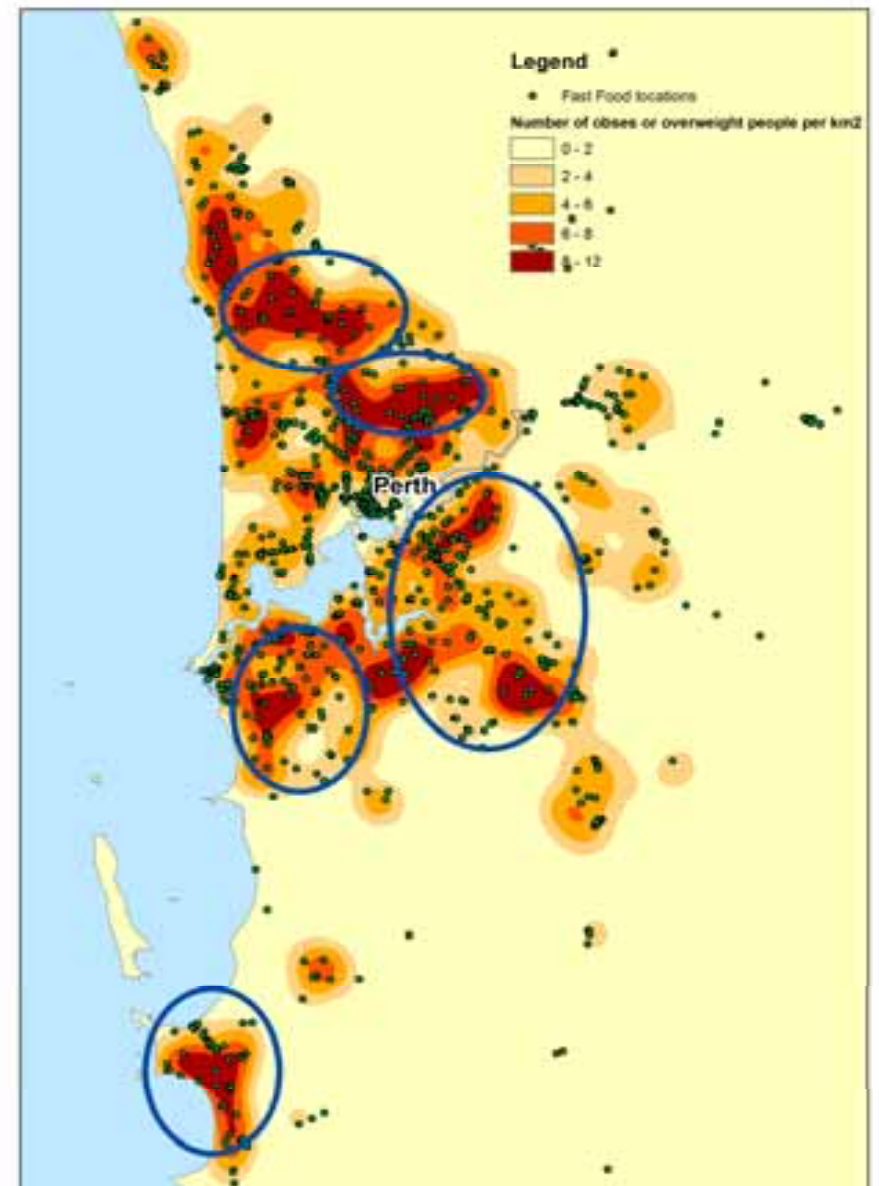
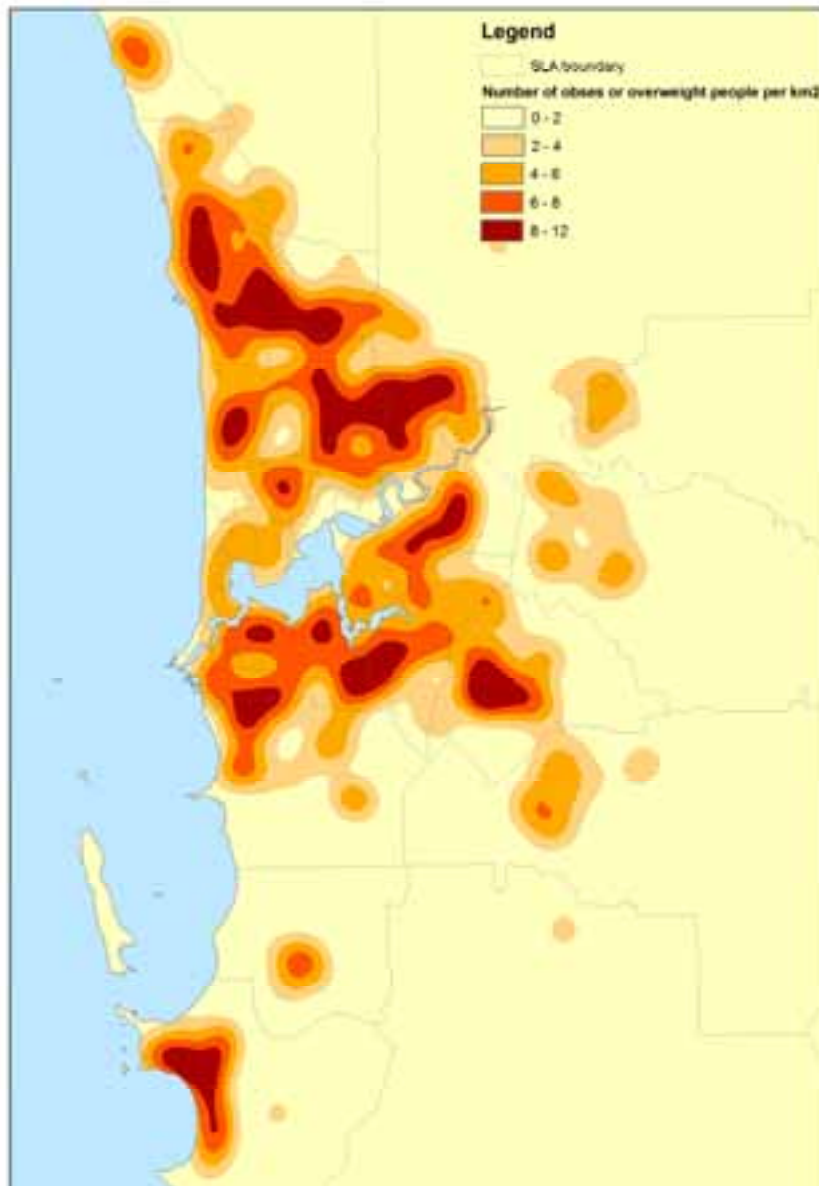
Ratio of  
FF/HF



Analyse  
patterns

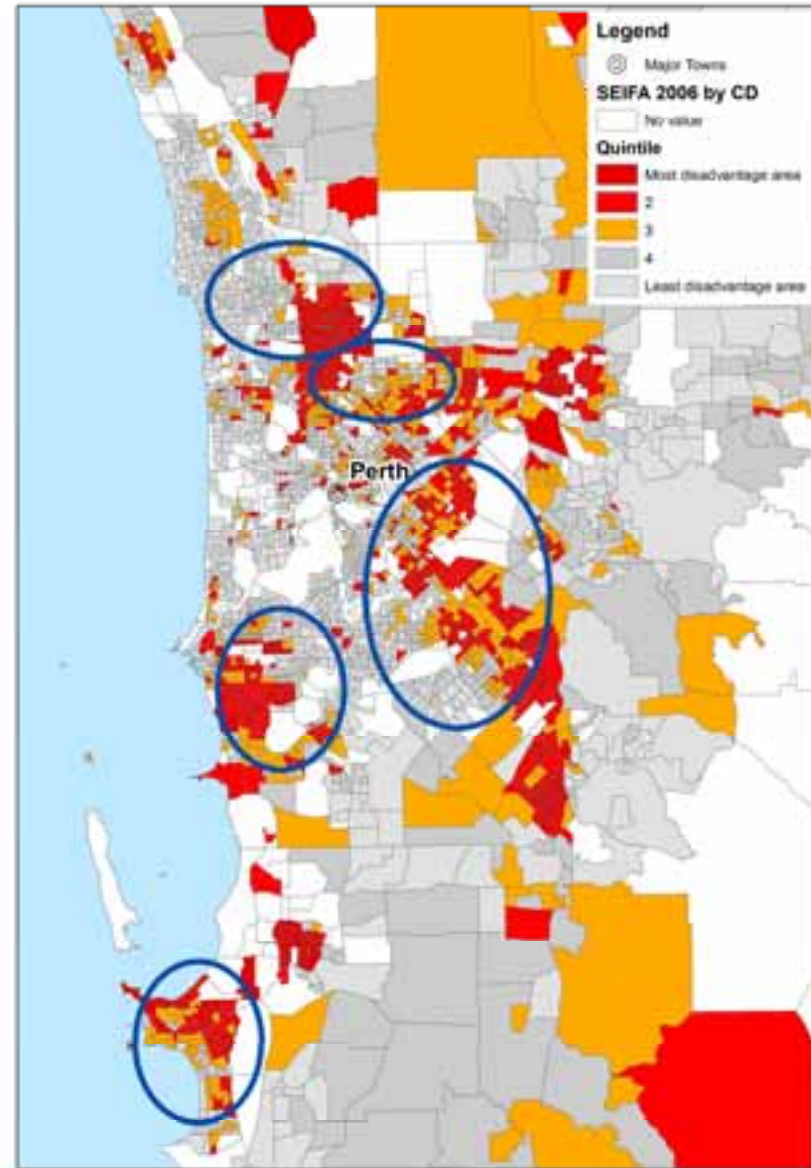
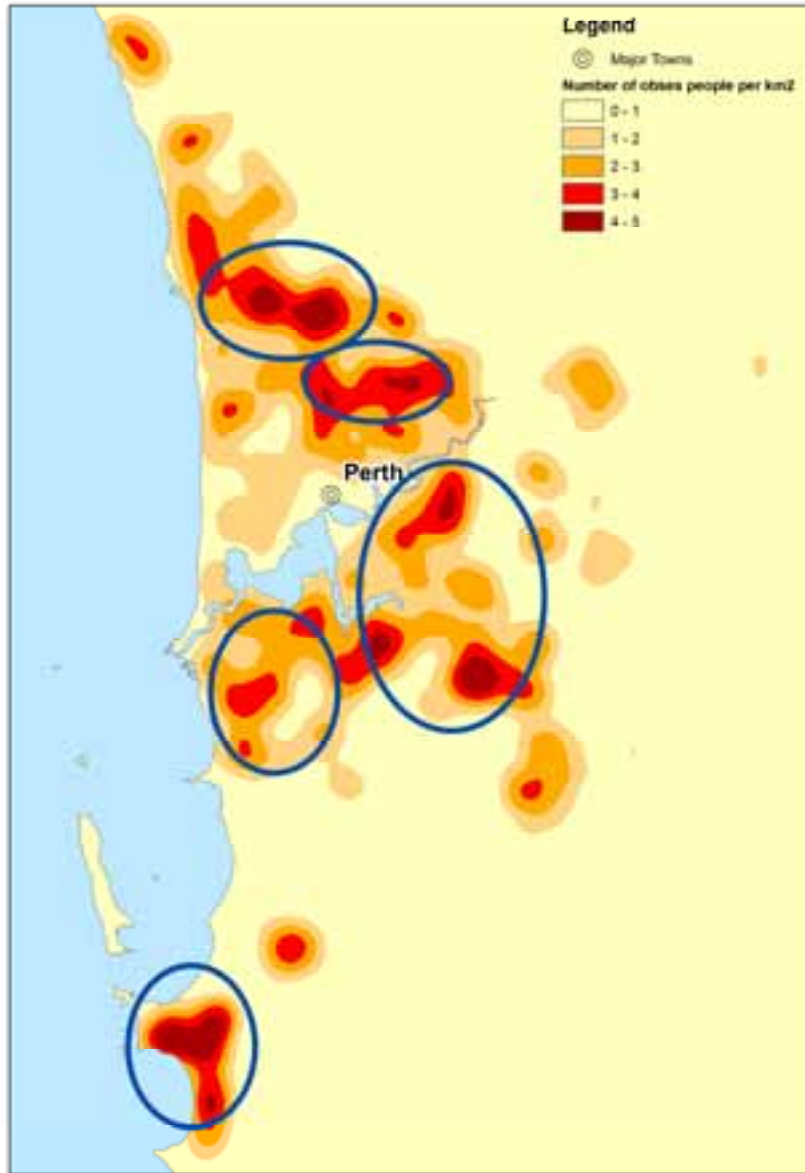


# Density of Obese or Overweight people and Fast Food locations



# Density of Obese people and SEIFA

*SEIFA – Socio Economic Indexes for Area, a measure of disadvantage*



# Statistical analysis



- Logistic regression analysis
  - Obesity as outcome variable
  - Controlled for age, sex, self reported fruit, veg & takeaway consumption, area disadvantage
- Spatial Variables of Interest
  - Distance to nearest FF, HF & RE
  - Density of FF, HF & RE (in 2.5 & 5km buffers)
  - Ratio of FF to HF



# Preliminary Results



- More likely to be obese if you are 40+



Government of Western Australia  
Department of Health

# Preliminary Results

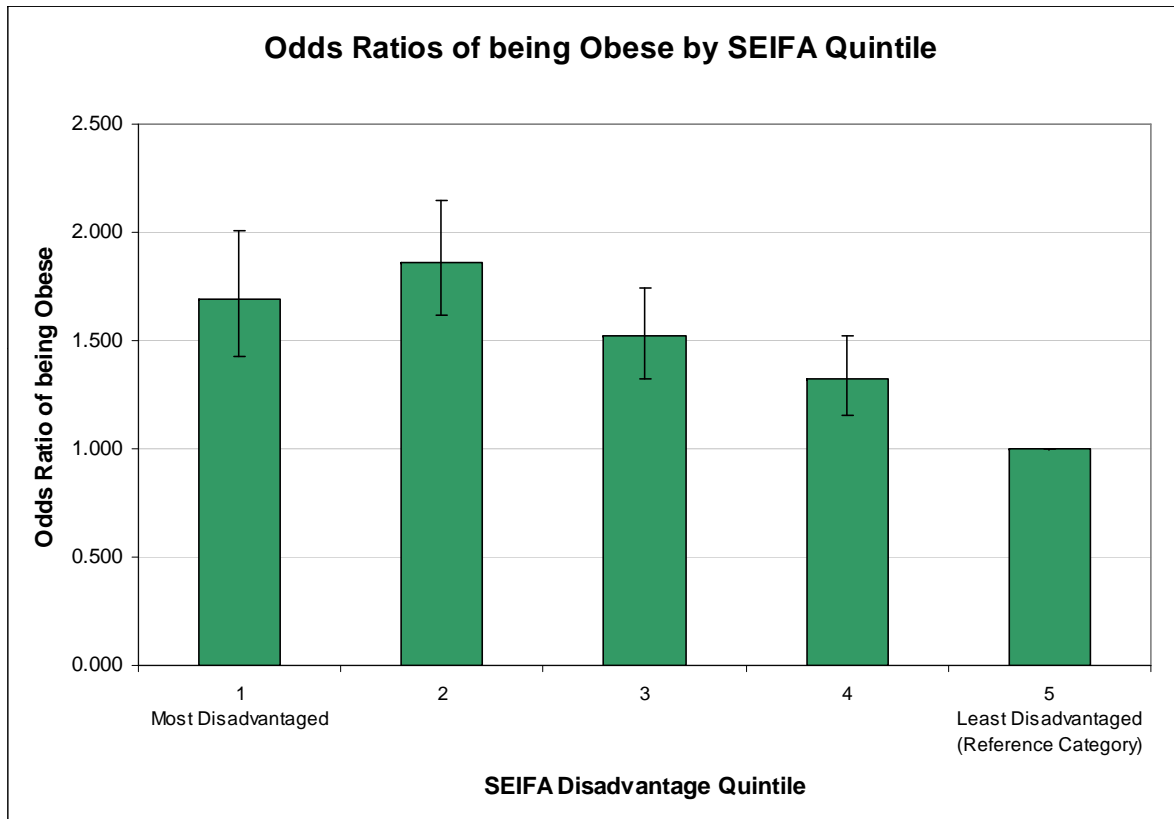


- More likely to be obese if you consume more takeaway





# Preliminary Results



- More likely to be obese if you live in more deprived areas

*SEIFA – Socio Economic Indexes for Area, a measure of your disadvantage*



**Government of Western Australia  
Department of Health**

# Preliminary Results

No relationship found with:

- Sex
- Fruit & veg consumption

Took these variables out of the analysis as they were not significant



# Preliminary Results Cont.



Odds of being obese is lower:

- Where high density of FF within 2.5km
  - (OR: 0.996 CI: 0.994 - 0.997)
- Where high density of HF within 2.5km
  - (OR: 0.990 CI: 0.985 - 0.994)
- Where high density of RE within 2.5km
  - (OR: 0.987 CI: 0.981 - 0.992)

These variables were run in separate models because they were strongly correlated.

NO relationship with distance to nearest or FF/HF ratio



# Preliminary Conclusions



Probability of being obese is lower where high density of food options within 2.5km

- Perhaps the greater range of food outlets close by means more healthy options are chosen?
- Perhaps people walk more to get food?

## Limitations:

- Only ~7% of variation in obesity accounted for
- Model fit is OK but not good at determining categories
- Availability of food outlets only plays a small part in predicting obesity (small effect size)



# Where next??



- Improving the obesity models
  - Use multiple linear regression
  - Control for more explanatory variables e.g. physical/sedentary activity, individual income, occupation etc
- Sharing information
  - Back to local bodies so they can make informed planning decisions





**Thankyou**

**[Grace.Yun@health.wa.gov.au](mailto:Grace.Yun@health.wa.gov.au)**



**Government of Western Australia  
Department of Health**

