Tools for evaluating environmental health:

An Overview of the EPOCH instruments
(Environmental Profile of a Community’s Health)

A/Prof Clara Chow
The George Institute, University of Sydney
Dept. of Cardiology, Westmead Hospital

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Heart Disease

Individual biological risk factors
  - e.g. obesity, cholesterol, diabetes

Individual behaviors
  - e.g. physical activity, smoking, diet

Environmental Influences
Terminology

- Population health determinants
- Community-level determinants
- Societal determinants
- Environmental determinants
- Distal determinants
Approaches to measurement of the community environment

1. Systematic description of communities - structured observations; municipal census and/or geographic data

2. Perception-based measures obtained through interviews with community residents
Existing instruments

• Systematic observations tools
• Built environment assessment tools
• Walkability assessment tools
• Food environment assessment tools
• Tobacco policy environment assessment tools
• ....etc
Limitations of existing instruments

• Single risk factor focused
• Mainly developed in Western high income countries (Nth America, UK, Australia)
• Assessment time long and requiring of specialised skills – impractical for large scale studies
Aim of EPOCH studies

To collect information on a range of environmental characteristics potentially associated with cardiovascular disease/risk factors
Conceptual framework

Domains of EPOCH

Tobacco Environment
Social & Economic
Physical activity Environment
Nutrition/Food Environment

Reference: Chow, et al. IJE 2009
Data collection Instruments

- **EPOCH 1**: Objective environmental audit tool
- **EPOCH 2**: Survey of resident’s perceptions of their community
EPOCH 1: Audit of Communities

- Community demographics
- Observation walk
- Photographic assessment
- Location, connectedness, facilities
- Advertisements, Shops, Built environment.
- Built environment
- Location of facilities & health services

- Tobacco store assessment
- Chips & biscuit pack
- Advertisement, health promotion, brand variety, cost

- Grocery store assessment
- Menu, health promotion
- Cost & Availability of basic drugs

- Pharmacy assessment
- Cost & Availability Fruit/Veg + Other foods
Methods: How photos were taken

- Back View
- Across Street View
- Front View
- Starting Point
- Left side view
- Right side view
EPOCH 2 – Perceived Environment

What participants observe in their community

Their awareness of local laws, regulations, and health programs

Their opinions about behaviors and laws

Tobacco
Nutrition & Physical activity
Social
Home & Work
Instrument development and Reliability testings

• Feasibility and pre-testing:
  – 25 rural and urban communities in Brazil, Canada, China, Colombia and India.
  – Quantitative and qualitative reviewed by three working groups involving international collaborators → further refinements of the instrument, training manuals and training program.

• Reliability testing
  – 93 communities in PURE (China, India, Colombia, Brazil, Canada)
Reliability for EPOCH 1

3 observers administered EPOCH 1 independently in each community and agreement calculated.
Reliability for EPOCH 2

Overall

- Reliability >0.8 achieved after 28 interviews on all measures (EPOCH 2 targeted 34 individuals per community)

![Graph showing reliability for Knowledge of health effects of smoking and Tobacco Advertising.](image-url)
3 further instruments developed

- Tobacco pack assessment
- Snack food pack assessment
- Photo assessment
Cigarette pack instrument

- Health warnings
- Promotional labels

Quality Label “20 Class A Cigarettes”

Deceptive Label “Triple filter charcoal technology”

General Label “Filter Cigarettes”

AUSTRALIA

CHINA
Snack food pack instrument

Six domains:

• Basic labelling requirements,
• Quality of nutrition labelling,
• Health and nutrition claims,
• Promotion of health and wellbeing,
• Promotion to children and
• Promotion of special characteristics.
Health Claims and Promotion of Healthfulness

- Health Claims (e.g. “free of trans fat”)
  - Location
  - Content

- Promotion of Healthfulness
  - Wholesomeness of ingredients
  - Image(s) of ingredients
  - Nutrition content claims
  - Summary of nutrient information
  - “Healthy Line” from a brand
  - Free of artificial colours, flavours and preservatives
EPOCH photo instrument

Pedestrian Facilities
- Sidewalks
- Crosswalks
- Bicycle lanes

Safety
- Traffic Signals/Signs
- Street Width
- Median Strip

Aesthetics
- Natural Features
- Man-made landscaping
- Building design/architecture
- Street furniture

Cleanliness/Street Maintenance
- Litter/garbage present
- Graffiti
- Building maintenance

Overall Appeal
- Likert scale
Photo analysis

- Traffic signals, Planted trees,
- Complete sidewalks, well maintained buildings
- Street lights, street benches
Reliability assessment: Epoch Photo

- 58 items ‘scored’ by 3 independent raters using 5-10 photos per community
- 45/58 (78%) of items had ICC>0.75

![Bar chart showing reliability distribution]

Items

Reliability (ICC)
Summary of Method papers


Instruments and manuals available as appendices to papers
HOW CAN MEASURES BE USED
# Tobacco Policy implementation score

<table>
<thead>
<tr>
<th>Domain</th>
<th>Items from EPOCH 1</th>
<th>Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>Price and availability</td>
<td>Places to buy cigarettes</td>
<td>1 point</td>
</tr>
<tr>
<td></td>
<td>Cost of Cheapest brand</td>
<td>3 points</td>
</tr>
<tr>
<td>Bans on advertising</td>
<td>No tobacco advertisements</td>
<td>1 point</td>
</tr>
<tr>
<td></td>
<td>No in-store tobacco advertisements</td>
<td>1 point</td>
</tr>
<tr>
<td>Anti-tobacco</td>
<td>Signs prohibiting smoking</td>
<td>1 point</td>
</tr>
<tr>
<td></td>
<td>In-store health promotion signs</td>
<td>1 point</td>
</tr>
<tr>
<td>Health warnings</td>
<td>≥2 warnings on pack</td>
<td>1 point</td>
</tr>
<tr>
<td></td>
<td>Front of pack warnings</td>
<td>1 point</td>
</tr>
<tr>
<td>Support to quit</td>
<td>Stores with cessation aids</td>
<td>1 point</td>
</tr>
</tbody>
</table>

Distribution of points based on Joosen’s ‘Tobacco Control Scale’ (Point allocation was based on expert opinion). 

Total 11 points
By economic region

Tobacco policy implementation score

Graphs by World Bank Income

- HIC: Median = 8
- UMIC: Median = 6
- LMIC: Median = 3
- LIC: Median = 4

Frequency vs. Tobacco policy implementation score
By region:
Social unacceptability score

<table>
<thead>
<tr>
<th>Region</th>
<th>Frequency</th>
<th>Social acceptability score</th>
</tr>
</thead>
<tbody>
<tr>
<td>HIC</td>
<td>Median= 2.5</td>
<td></td>
</tr>
<tr>
<td>UMIC</td>
<td>Median= 1.9</td>
<td></td>
</tr>
<tr>
<td>LMIC</td>
<td>Median= 2.1</td>
<td></td>
</tr>
<tr>
<td>LIC</td>
<td>Median= 2.3</td>
<td></td>
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</tbody>
</table>

Graphs by WB Income
By region
Knowledge score

<table>
<thead>
<tr>
<th>Region</th>
<th>Median</th>
</tr>
</thead>
<tbody>
<tr>
<td>HIC</td>
<td>0.86</td>
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<tr>
<td>UMIC</td>
<td>0.80</td>
</tr>
<tr>
<td>LMIC</td>
<td>0.69</td>
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<tr>
<td>LIC</td>
<td>0.76</td>
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</tbody>
</table>

Graphs by WB Income
Knowledge of smoking health effects
Tobacco scores and quit ratio

Unpublished, under review
Relation of overall tobacco environment score and quit ratio

<table>
<thead>
<tr>
<th>Overall score</th>
<th>Odds ratio (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>M: 1.3, W: 1.6</td>
</tr>
<tr>
<td>2</td>
<td>2.1 - 2.9</td>
</tr>
<tr>
<td>3</td>
<td>1.5 - 2.9</td>
</tr>
<tr>
<td>4</td>
<td>1.8 - 5</td>
</tr>
<tr>
<td>5</td>
<td>1.8 - 3.7</td>
</tr>
<tr>
<td>Q1</td>
<td>1.3 - 3.1</td>
</tr>
<tr>
<td>Q2</td>
<td>0.9 - 1.8</td>
</tr>
<tr>
<td>Q3</td>
<td>1.5 - 2.9</td>
</tr>
<tr>
<td>Q4</td>
<td>2.1 - 2.9</td>
</tr>
<tr>
<td>Q5</td>
<td>1.8 - 3.7</td>
</tr>
</tbody>
</table>

Unpublished, under review
Low scoring community
High scoring community
Acknowledgments

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Conclusions

• It is difficult to measure the environment
• EPOCH tools offer a means to collect multiple environmental measures within population studies
International/ Visiting fellows – please think of us at TGI!

Postdoc and postgrad scholarship in cardiovascular and metabolic medicine - closing March 27

Affiliated with the University of Sydney
Reserve
Reliability for EPOCH 1

- Low (<0.4)
- Medium (0.4-0.75)
- High (>0.75)

% of 38 items:

- All (93)
- Urban (56)
- Rural (37)
- Canada (39)
- Brazil/Colombia (20)
- India (15)
- China (19)
Reliability for EPOCH 2

- Reliability increases with number of interviews
- Reliability >0.8 achieved after 28 interviews on all measures (target 34 individuals per community)
How do we measure the environment?

- Indirect measures
  - Routine data sources
  - Geographic Information Systems

- Direct measures
  - Audits of environmental characteristics
  - Pollution monitor measures
  - Aggregate information from surveys including perceptions of residents in a community
Overview

• Introduction
• Application, Development and reliability of the EPOCH instruments
• From measures to indices