Glasgow conurbation:
- Some of poorest public health statistics in Europe
- Complex geographical patterns in socio-economic (s-e) circumstances
- High dependency on road transport & poor provision for active travel
- Rel. high concs of traffic-related air pollution

Extant cohort studies:
- Long follow up: r.linked CV, resp o/c.
- Data rich: longitudinal s-e; genetic; biomarker; cognitive metrics

Ongoing clinical studies:
- Clinical/behav. interventions
- Longit. biomarker / physiol. assessment
- Record linked outcomes.

Research opportunities:
- Assess assoc. between residential exposure & o/c in cohorts
- Assess assoc. between personal exposure & o/c in clinical studies
- Assess impact of traffic, air quality management & public health interventions

Midspan cohort study 1973-1998:
Exposure model predictions for Renfrew/Paisley cohort study:

[1,632 postcode centroids for 15,331 participants]

Time series plots of daily black smoke & mortality - Glasgow 1974 –1998:

[Graphs showing daily black smoke and mortality trends over time]
Health effects of long-term exposure to air pollutants in Scotland:

**Association between long-term exposure to air pollutants & mortality in Scotland - Interim Conclusions:**

- Associations between mortality & long-term (10 y.) exposure > medium-term (31 d.) > short-term (3 d.) exposure in same population
- Consistency: √, Coherence: √, Confounding effects: √
- Exposure classification – **absolutely critical!**

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**Table 3. Comparison of estimated magnitudes of associations [percent change (95% CI)] between short- and long-term exposure to BS and mortality in the Renfrew–Paisley and Collaborative cohorts and in the population > 50 years of age of Glasgow, Renfrew, and Paisley conurbation with follow-up to 1998.**

<table>
<thead>
<tr>
<th>Mortality/population group</th>
<th>Short-term (3-day)$^{a,b}$</th>
<th>Medium-term (31-day)$^{a,b}$</th>
<th>Long-term (1970–1979)$^c$</th>
</tr>
</thead>
<tbody>
<tr>
<td>All-cause</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Time-series$^a$</td>
<td>0.2 (0.0, 0.4)</td>
<td>0.9 (0.3, 1.5)</td>
<td>—</td>
</tr>
<tr>
<td>Renfrew–Paisley cohort$^b$</td>
<td>1.8 (0.1, 3.5)</td>
<td>3.4 (–0.7, 7.7)</td>
<td>10 (4, 17)</td>
</tr>
<tr>
<td>Collaborative cohort$^{b,d}$</td>
<td>1.1 (–1.4, 3.8)</td>
<td>2.0 (–3.4, 7.6)</td>
<td>1 (–4, 6)</td>
</tr>
<tr>
<td>Combined cohort$^m$</td>
<td>1.6 (0.2, 3.0)</td>
<td>2.9 (–0.5, 6.2)</td>
<td>5 (1, 9)</td>
</tr>
<tr>
<td>Cardiovascular</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Time-series$^a$</td>
<td>0.1 (–0.2, 0.4)</td>
<td>0.3 (–0.7, 1.2)</td>
<td>—</td>
</tr>
<tr>
<td>Renfrew–Paisley cohort$^b$</td>
<td>1.4 (–1.2, 4.0)</td>
<td>4.1 (–2.2, 10.7)</td>
<td>11 (1, 22)</td>
</tr>
<tr>
<td>Collaborative cohort$^{b,d}$</td>
<td>–0.8 (–4.3, 3.2)</td>
<td>0.4 (–7.5, 8.9)</td>
<td>3 (–5, 12)</td>
</tr>
<tr>
<td>Combined cohort$^m$</td>
<td>0.9 (–1.4, 2.9)</td>
<td>2.7 (–2.4, 7.8)</td>
<td>7 (0, 13)</td>
</tr>
<tr>
<td>Respiratory</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Time-series$^a$</td>
<td>0.3 (–0.2, 0.8)</td>
<td>3.1 (1, 4, 9)</td>
<td>—</td>
</tr>
<tr>
<td>Renfrew–Paisley cohort$^b$</td>
<td>–0.4 (–6.4, 6.1)</td>
<td>7.2 (–7.5, 24.2)</td>
<td>26 (2, 55)</td>
</tr>
<tr>
<td>Collaborative cohort$^{b,d}$</td>
<td>1.1 (–7.8, 10.9)</td>
<td>–19.5 (–37.7, 4.0)</td>
<td>–3 (–21, 18)</td>
</tr>
<tr>
<td>Combined cohort$^m$</td>
<td>0.1 (–5.1, 5.3)</td>
<td>–2.6 (–15.2, 10.0)</td>
<td>11 (–3, 26)</td>
</tr>
</tbody>
</table>

Table details percent increases in mortality associated with 10-μg/m³ increments in average BS.
Health effects of long-term exposure to air pollutants in Scotland - publications:


NO$_2$ & traffic in Glasgow – optimisation of monitoring network design:
NO$_2$, NO$_x$, O$_3$ Passive Diffusion Samplers:

'Yoof resistant' version

Byron Road Station

Byron Road

Dunbar Road

Dunbar Road Station

Dunbar Road Station

0 85 170 340 Meters
NO\textsubscript{2} and BC by site and week:

Byres Road  
Dumbarton Road

Air quality monitoring - real-time sensors:

Black carbon  
Particle numbers  
NO\textsubscript{2} & O\textsubscript{3}
Core activities:

- Monitoring spatial-temporal variations in traffic-related air pollutants: passive & active systems for NO₂, O₃, PM₂.₅, black carbon, & particle no.
- Development & evaluation of land-use regression exposure models
- Application of exposure models to env epidemiology & LAQM

J. Gillespie:
- Development & evaluation of hybrid LUR & dispersion exposure models.
- Combination - passive, active & real-time monitoring for model dev & eval.

N. Masey:
- Development of high resolution passive & r-time sensor methods
- Optimised monitoring networks – diff. measurement timescales

E. Ezani & A. Tadsanprasittipol:
- Novel particle sampling methods - portable low power instruments
- ID markers of particle composition - env & occ settings

J. Barr:
- Evaluation of real-time sensors
- Exposure monitoring in development of intelligent transport systems (ITS)