



Road traffic noise and cardiovascular health

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Direct effects of noise



Stress response

- Stress hormone (adrenalin, cortisol)
- Blood pressure
- Heart rate

Sleep disturbances

- *Conscious*: difficulties falling asleep, wakes up earlier or during night, sleeping medication
- *Unconscious*: changes in sleep stages, body movements during sleep, blood pressure, heart rate, morning cortisol

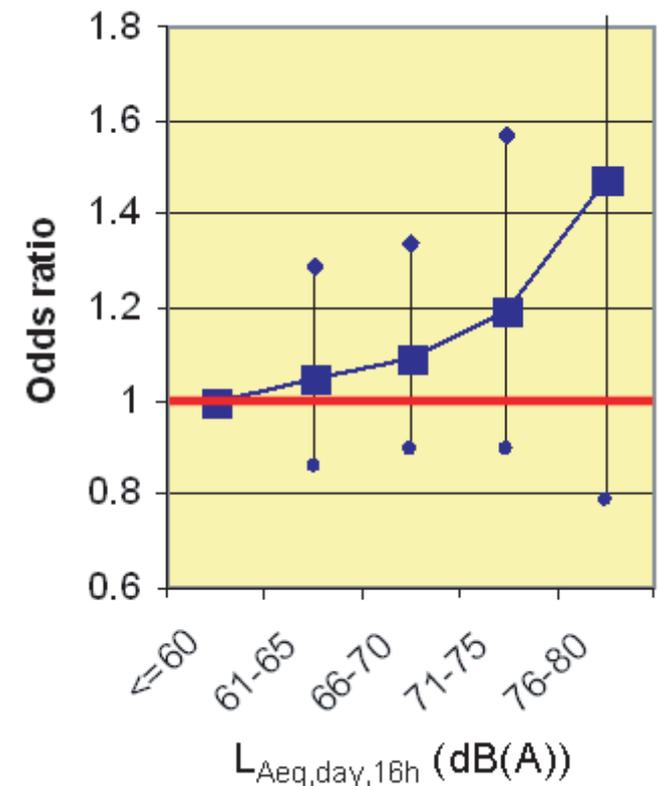
Chronic effects of noise



Babisch 2006

- Based on 61 studies
- Hypertension in adults
- Myocardial Infarction (MI)

Babisch 2008



Stroke



- Many risk factors in common with MI and hypertension
- Ischemic or hemorrhagic event in the brain
- According to WHO, 15 million people suffer stroke worldwide each year
- 3. most common cause of death
- About half suffers from permanent disability

Noise and stroke



Diet, Cancer and Health cohort

- 57 000 participant (elderly)
- 50-64 years in 1993-1997 (enrolment)
- Questionnaire: smoking, alcohol, BMI, education
- Unique Danish registers
 - All addresses from 1993-2006 (in total 61 873)
 - Follow-up for stroke (1881 cases)

Noise and stroke, exposure

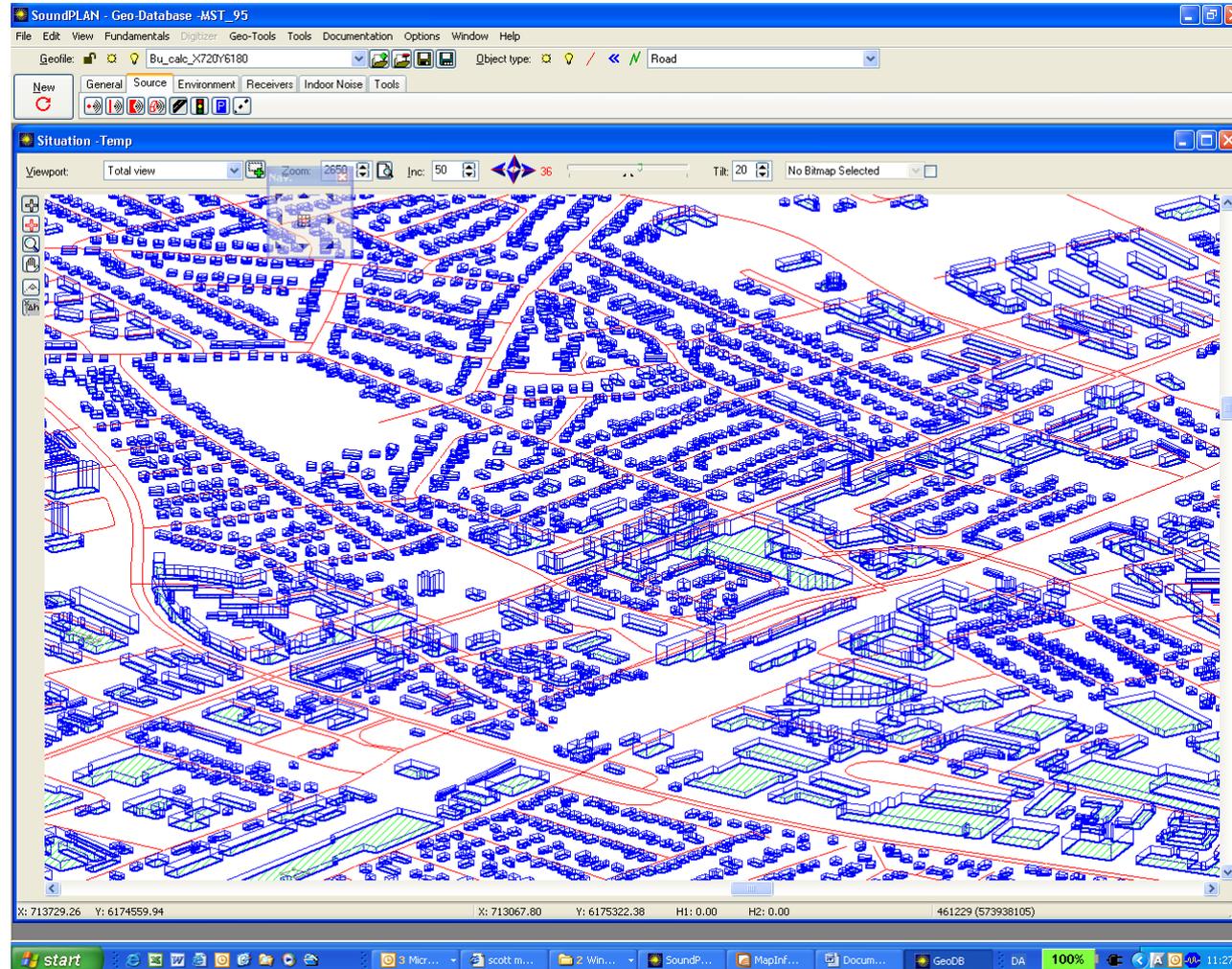


SoundPLAN – the Nordic Prediction Model

- Geographical coordinates for each address
- Height (floor) for each address
- Building polygons
- For all road lines
 - Traffic composition
 - Yearly average daily traffic
 - Traffic speed

AirGIS - dispersion model (regional, urban, street)

SoundPLAN



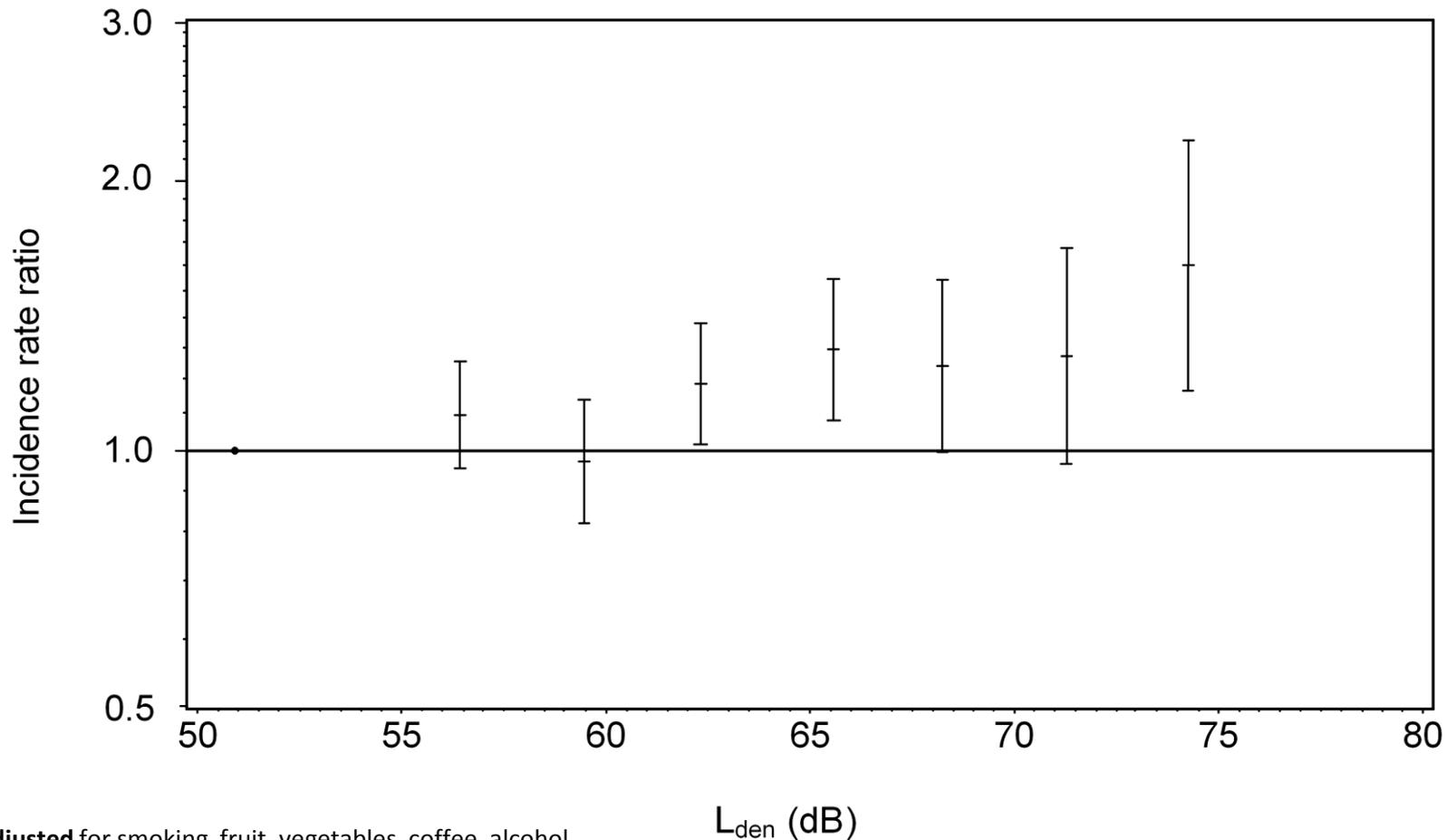
Road noise at enrolment



L_{den} dB	N	Percent
< 50	5541	10
50 – 55	16389	31
55 – 60	12684	24
60 – 65	10011	19
65 – 70	5728	11
70 – 75	2490	5
≥ 75	319	1

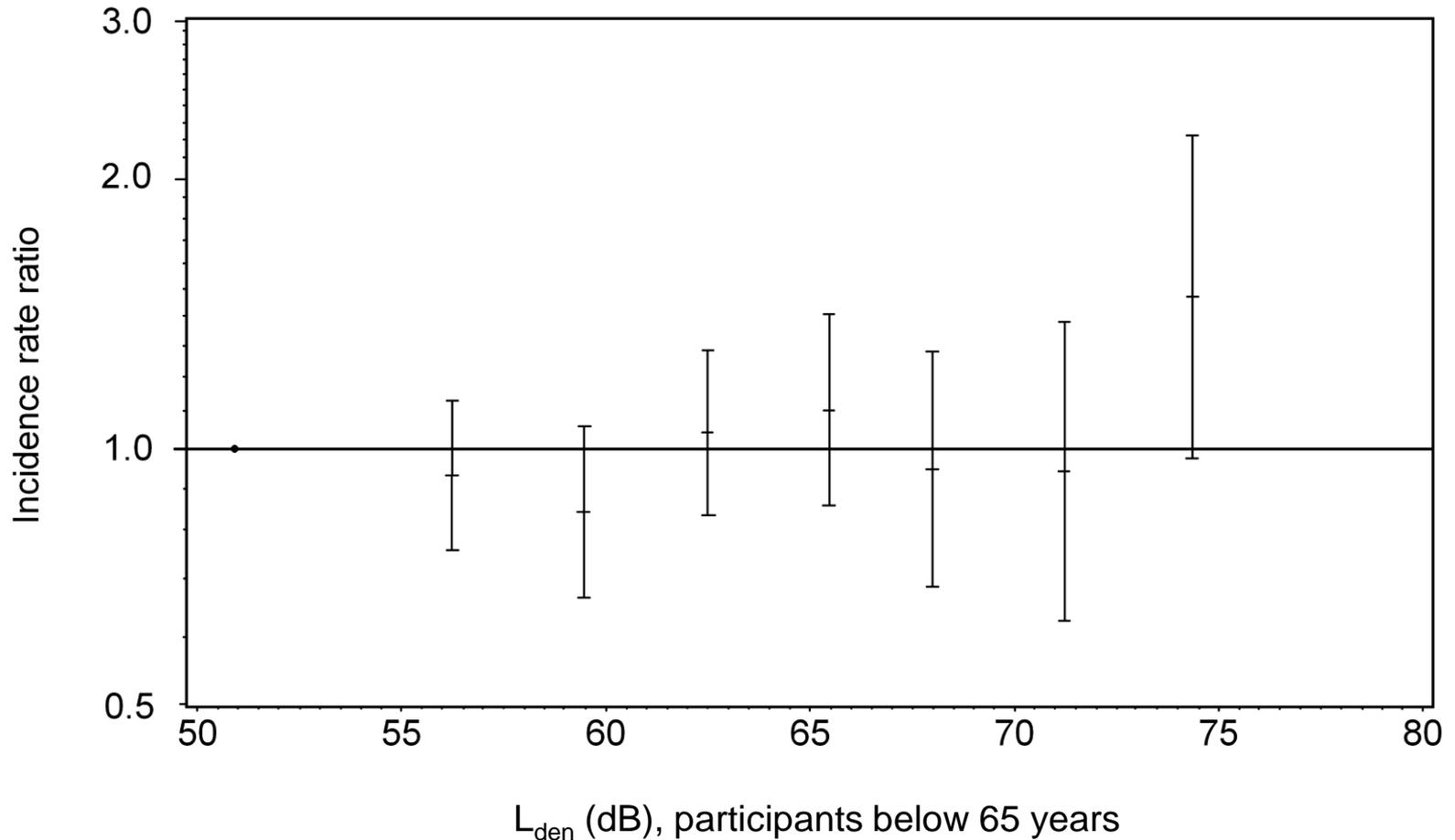
Limit value
58 dB

Results, all

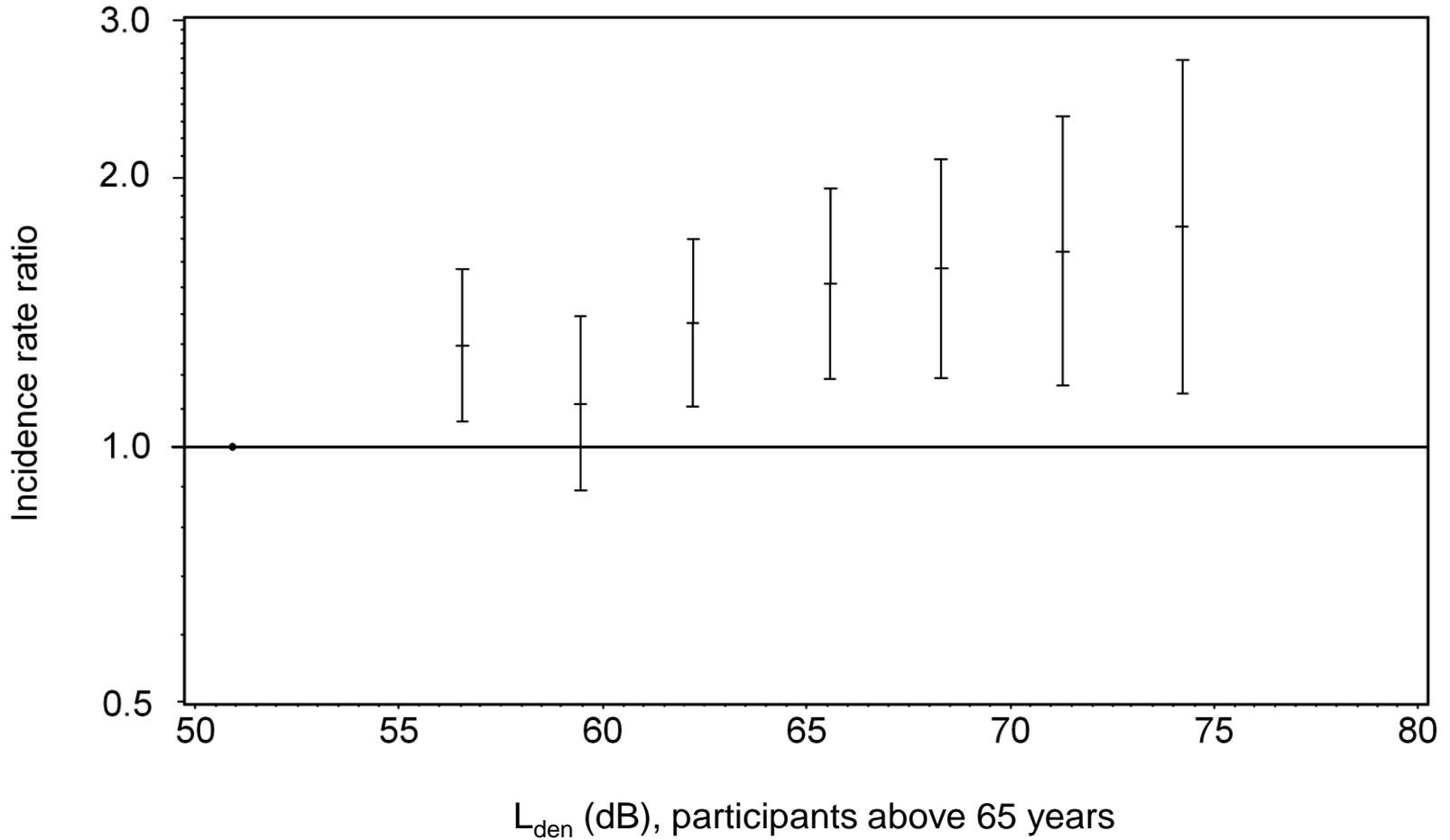


Adjusted for smoking, fruit, vegetables, coffee, alcohol, BMI, physical activity, education, municipality income, noise from railways and airports and air pollution

Results, 50-65 years



Results, > 65 years



How many extra strokes?



- 5.5 mill inhabitants
- 12 400 new strokes each year
- Exposure distribution of all dwellings in Denmark
- **600** strokes each year due to road traffic noise
- Corresponding to 5 % of all strokes