

Breathing clean
air and hearing
bird song in a
densified city- is
it possible?





Humans and cities

- Lack of space
- Conflicting needs for the space, infrastructure, green space, buildings
- Air pollution, noise and access to green space can create negative health impacts



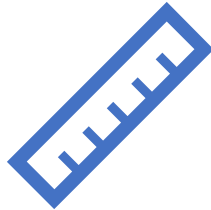
Aim

- We wanted to assess the health impact of densification and show solutions

Interdisciplinary work



Health impact assessment based on WHO recommendations at that time



Measurements and modelling
Soundplan for noise and dispersion
models and measurement for air
pollution



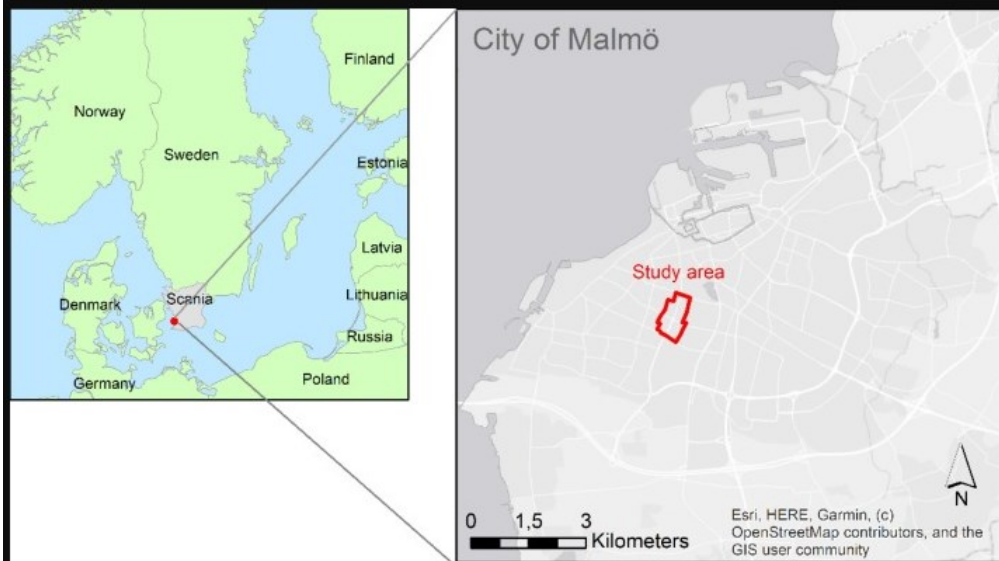
Evaluation of plans



Studies on the municipal processes

Densification

- Lorensborg
- ~2000 more apartments/homes



Lorensborgsgatans parallellgator och parkeringar ska byggas igen med nya bostäder.
Bild: Bengt Arvidsson

Present-day scenario

Planned municipal strategy

Health-centred scenario

0 500 1 000Meters

Study area Residential building Partly residential building Other building Vegetation Road surface Noise screen

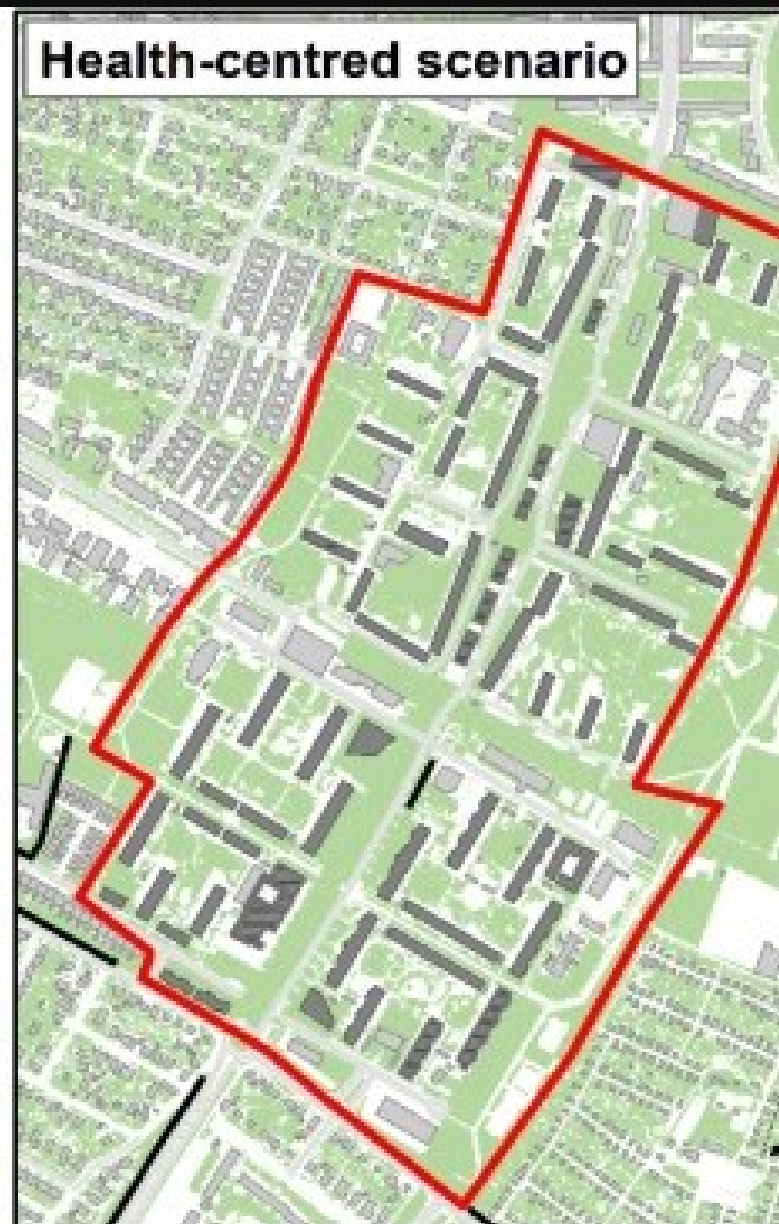


Fig. 3. Proportion of inhabitants exposed to L_{den} in 5 dB(A) intervals for the three urban planning scenarios.

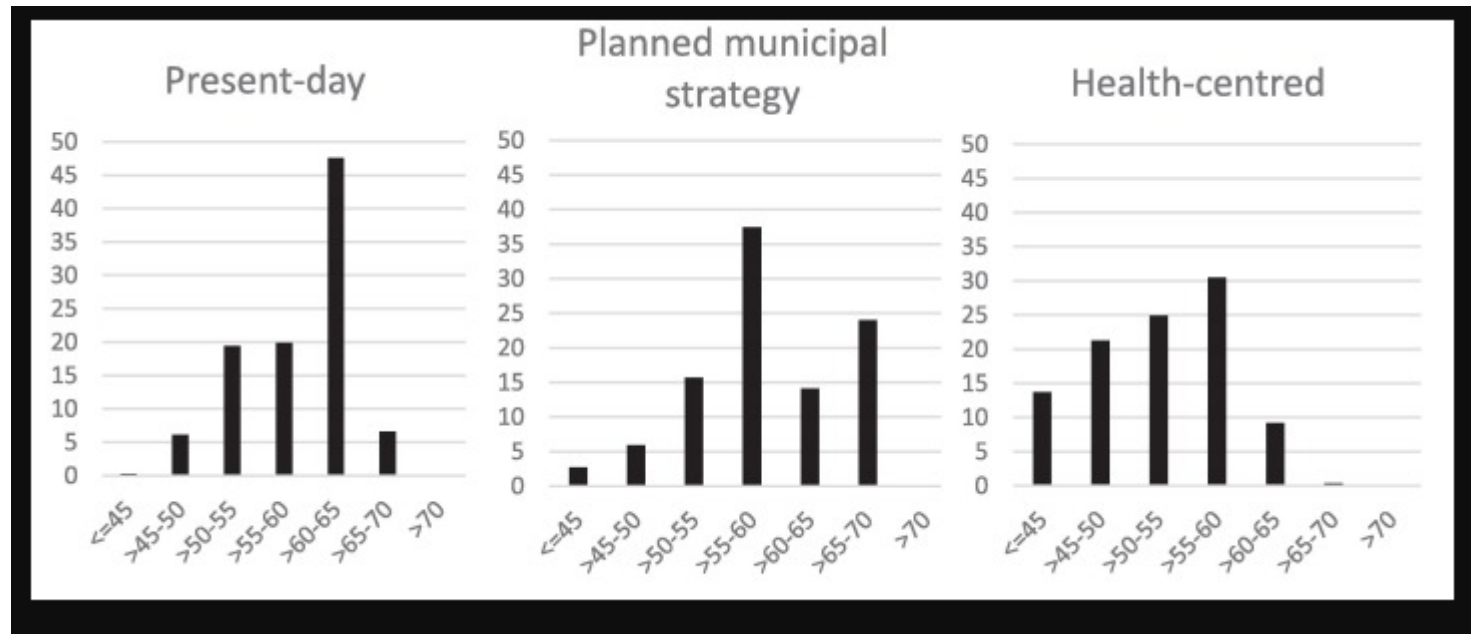


Table 4. Estimated attributable cases of highly annoyed, highly sleep disturbed, IHD incidence and IHD mortality due to road traffic noise exposure among inhabitants aged 18years or older in the three urban planning scenarios based on exposure–response functions from WHO.



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Full length article

Health impact assessment of road traffic noise exposure based on different densification scenarios in Malmö, Sweden

Erin Flanagan ^a, Ebba Malmqvist ^a, Anna Oudin ^a, Karin Sunde Persson ^a, Johanna Alkan Ohlsson ^b, Kristoffer Mattisson ^a

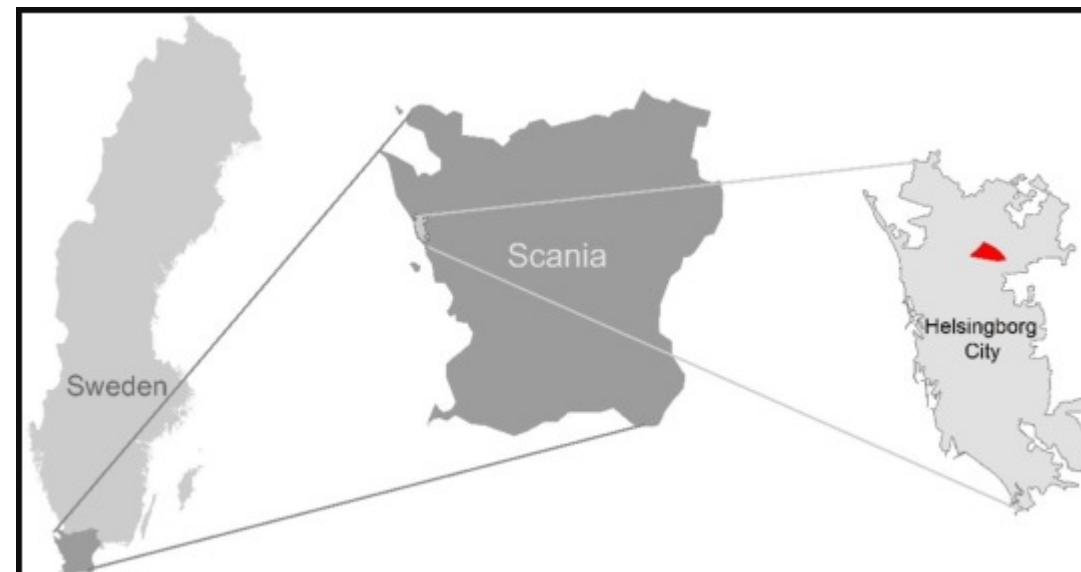
Here we used Soundplan and a dispersion model with higher resolution (100m)

Table 4. Estimated attributable cases of highly annoyed, highly sleep disturbed, IHD incidence and IHD mortality due to road traffic noise exposure among inhabitants aged 18years or older in the three urban planning scenarios based on exposure–response functions from WHO.


Health outcome	Present-day		Planned municipal strategy		Health-centred	
	Estimated cases (% of total population)	Cases per 100,000	Estimated cases (% of total population)	Cases per 100,000	Estimated cases (% of total population)	Cases per 100,000
Highly annoyed	760 (11,2%)	11,200	1,108 (11,5%)	11,500	559 (5,8%)	5,800
Highly sleep disturbed	285 (4,2%)	4,200	404 (4,2%)	4,200	212 (2,2%)	2,200
IHD incidence*	9.8 [1.0–21.9] (35.2)	144	13.6 [1.4–30.6] (34.8)	141	8.9 [0.9–19.7] (25.9)	92
IHD mortality**	3.2 [-1.55–10.02] (35.3)	47	4.4 [-2.1–14.0] (34.8)	46	2.9 [-1.4–9.1] (17.0)	30
Population size						

Estimated cases [CI] (% of total cases) | Cases per 100,000 | Estimated cases [CI] (% of total) | Cases per 100,000 | Estimated cases [CI] (% of total) | Cases per 100,000

Drottninghög



Health impact assessment of exposure to road traffic noise and air pollution according to pre- and post-densification scenarios in Helsingborg, Sweden

Erin Flanagan ^a✉, Kristoffer Mattisson ^a✉, Anna Oudin ^{a,b}✉, Susanna Gustafsson ^c✉, Ebba Malmqvist ^a ✉

City and Environment Interactions

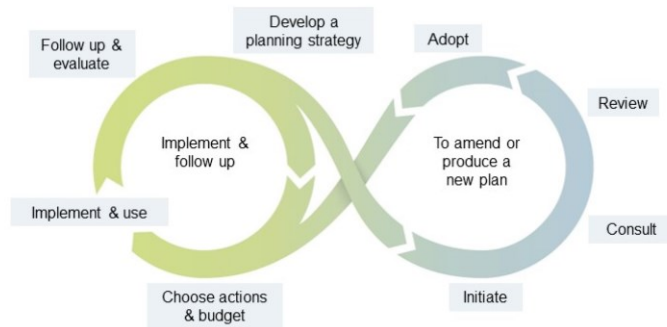
Volume 24, December 2024, 100176

	Pre-densification scenario (2012)		Post-densification scenario (2030)		Relative change
Road traffic noise					
	Estimated cases (% of total population)	Cases per 100,000*	Estimated cases (% of total population)	Cases per 100,000*	
Highly annoyed	159 (7.4%)	5949	653 (13.9%)	11,108	87%
Sleep disturbance	64 (3.0%)	2392	229 (4.9%)	3911	64%
	Estimated cases (95% CI)	Cases per 100,000*	Estimated cases (95% CI)	Cases per 100,000*	
IHD incidence	2.7 (0.28–5.9)	99.6	7.0 (0.73–15.7)	148.2	49%
IHD mortality	0.9 (–0.43–2.7)	32.9	2.2 (–1.1–7.2)	47.5	44%
Road traffic- related air pollution (NO ₂)					
	Estimated cases (95% CI)	Cases per 100,000*	Estimated cases (95% CI)	Cases per 100,000*	
Mortality, natural cause	3.1 (2.5–3.4)	115.7	7.1 (5.6–7.7)	120.0	3.7%
Pediatric asthma	4.2 (1.6–6.0)	156.8	9.6 (3.7–13.8)	163.3	4.9%
Respiratory admissions	1.0 (0.52–1.58)	35.5	2.2 (1.2–3.6)	37.4	5.6%

Growing Inwards: Densification and Ecosystem Services in Comprehensive Plans from Three Municipalities in Southern Sweden

by Ebba Lisberg Jensen ^{1,*}✉, Johanna Alkan Olsson ²✉ and Ebba Malmqvist ³✉

Process for comprehensive planning



The plans are publicly approved documents and written to reflect ideas and ideals with which to form the physical reality, and should, ideally, function as documents intended to eventually be transformed into reality, or “trigger chains of interactions”

The question is how this is simultaneously viable?

According to the plans, the cities will continue to grow, although not at the cost of their agriculturally productive hinterlands. The economy will flourish while causing neither increased traffic nor air pollution.

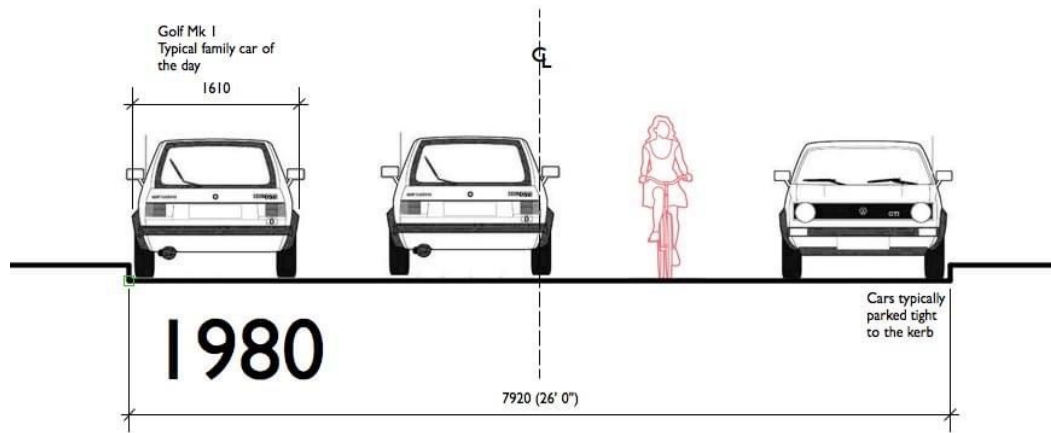
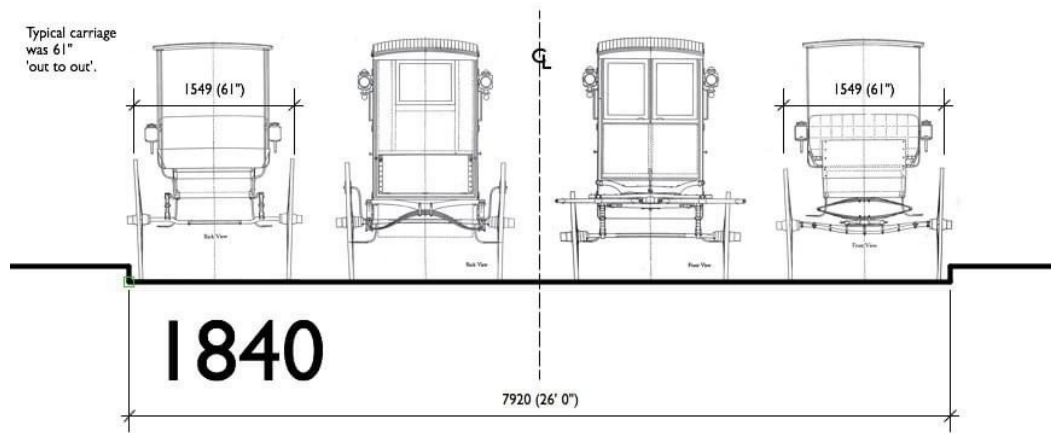
Densification of Malmö should not happen [at] the cost of the green and blue environments of the city



Most important in the city planning

Human or car? Densifying a city without reducing traffic would likely lead to increased health costs







Swedish research council for spatial
planning FORMAS funded this study