

Aviation Noise Attitudes Survey 2023-2024: Key findings from the first phase of reporting

June 2026

Recap: Study aims

- The CAA is responsible for delivering the **Aviation Noise Attitudes Survey (ANAS)**, a multi-year social research project into aviation noise attitudes in the UK, funded by the Department for Transport.
- ANAS is building on the SoNA 2014 noise attitude survey.
- ANAS and ANNE* were commissioned in 2022 and were designed to improve our understanding of the effects of aviation noise and add to the evidence base, in particular to reflect any changes since Covid. The findings will be relevant to a range of policy decisions, not just Heathrow expansion.
- The key outcome from ANAS 2023-2024 are the new **Exposure-Response Functions (ERFs)** for UK aviation noise annoyance.
- We hope to also investigate how annoyance to aviation noise varies across personal, social and environmental contextual factors, but these results would follow in a later report.

* Aviation Night Noise Effects study

Practical objective

- An **Exposure-Response Function (ERF)** is a statistical function correlating noise exposure in an established noise metric with the percentage of people estimated to be highly annoyed.
- We determine the percentage of people highly annoyed from social surveys by asking very specific questions on very specific scales according to ISO/TS 15666.
- We calculate the noise exposure using calculation models – it is not possible to measure noise at every location surveyed.
- We then determine the best function type and function form that fits the observed noise exposure and percentage of people highly annoyed.

Recap: Study design

- Online questionnaire, with a postal version available on request.
- Two waves of fieldwork, to enable the study to explore the effects of seasonality, and to mitigate the risk of an unforeseen event affecting a single wave:
 - Wave 1:** Sep to Nov 2023, c30,000 responses (77% online, 23% postal)
 - Wave 2:** Mar to May 2024, c16,000 responses (73% online, 27% postal)
- Fieldwork was conducted around **10 UK airports**.
- Targeted 500 responses per noise exposure band for each airport (six 3 dB bands, i.e. 3,000 response per airport, plus an additional band at three airports).

Questions analysed

The key question of the ANAS survey was this ISO standardised question:

Q5-8: *Thinking about [time period] when you are here at home, how much does noise from aeroplanes bother, disturb or annoy you?*

- The question was asked regarding “*the last 12 months or so*” and “*the last three months or so*”.
- Two different answer scales based on ISO/TS 15666:
 - 5-point **verbal** rating scale with options “*not at all / slightly / moderately / very / extremely*”,
 - 11-point **numerical** rating scale from 0 to 10.

Noise and annoyance metrics in scope

Exposure-Response Functions derived from logistic and non-linear regression modelling.

- Noise metrics:
 - $L_{Aeq,16h}$
 - L_{den}
 - N65
- Annoyance metrics as per ISO/TS 15666:
 - HA_v – Highly annoyed, top two categories on 5-point verbal scale (60% cutoff)
 - HA_{vw} – Highly annoyed, 40% of 2nd category and all top category on 5-point verbal scale weighted (73% cutoff)
 - HA_n – Highly annoyed, score of 8, 9 or 10 on 11-point numeric scale (73% cutoff)

Peer Review & Analysis QA

- We appointed two external peer reviewers to conduct:
 - A review of **social research components** of the study,
 - A review of the **environmental noise components** of the study.
- The peer review process commenced in December 2025 and concluded in March 2026.
- We also commissioned an external **statistics expert** to conduct quality assurance of the analysis methodology and outputs. This included reviewing the statistical syntax, calculations and outputs.
- The Analysis QA process concluded in early September 2025. We received feedback from the reviewer and applied minor adjustments to our methodology.

Summary of key findings (1)

- For *Summer average day* (L_{Aeq16h}) and *Annual average 24h* (L_{den}) noise exposure:
 - Annoyance was correlated with noise exposure.
 - The exposure-response functions found are not linear but follow a logistic function.
- Regarding *Number of events above 65 dB L_{ASmax} metric* (N65):
 - Annoyance was correlated with N65 noise exposure.
 - The exposure-response function was neither linear nor followed a logistic function.
 - A quadratic function was fitted up to a 'knot' at N65=124, where the function transitioned to a linear function.
 - A quadratic function is a curved function as opposed to a straight line – linear function.
 - A knot is the statistical term for where the quadratic function transition to the linear function. To avoid discontinuities, the two functions are forced to precisely join at N65=124, hence the term 'knot'.

Summary of key findings (2)

- Online vs Paper questionnaire responses:
 - 77% online/23% paper Wave 1, 73% online/27% paper Wave 2.
 - No significant difference in responses between online and paper.
- Respondents are more annoyed now than found in the SoNA 2014 survey.
 - The point at which 10% highly annoyed occurred in SoNA 2014 (54 dB L_{Aeq16h}) now occurs at 42.5 dB L_{Aeq16h}
 - Percent highly annoyed in region 42-72 dB L_{den} is similar to findings of international studies.
- Seasonality:
 - Respondents were more annoyed in Wave 1 (Sept-Nov) than in Wave 2 (Mar-May).
 - The difference is greater for the questions regarding attitudes for the last three months compared with attitudes reported during the last twelve months.

Distribution of analysed responses by airport for Wave 1 actual noise dose ($L_{Aeq,16h}$) by airport

Airport	<45	45-47.9	48-50.9	51-53.9	54-56.9	57-59.9	60-62.9	>63	Total
Birmingham	328	429	449	480	360	339	241	130	2,756
Edinburgh	164	399	487	712	658	333	332		3,085
East Midlands	191	1,288	1,726	436	173	49	81		3,944
Glasgow	276	375	358	442	650	425	81		2,607
Leeds Bradford	205	433	529	898	857	267	112		3,301
London City	40	340	382	399	407	247	185		2,000
London Gatwick	126	495	718	1,112	710	138	108		3,407
London Heathrow	26	365	407	398	469	419	270	556	2,910
Luton	87	408	479	371	370	396	200		2,311
Manchester	257	509	499	524	482	609	300	291	3,471
Total	1,700	5,041	6,034	5,772	5,136	3,222	1,910	977	29,792

Distribution of analysed responses by airport for Wave 2 actual noise dose ($L_{Aeq,16h}$) by airport

Airport	<45	45-47.9	48-50.9	51-53.9	54-56.9	57-59.9	60-62.9	>63	Total
Birmingham	133	239	349	202	247	282	138	17	1,607
Edinburgh	118	228	215	241	235	396	178		1,611
East Midlands	0	200	554	371	198	120	31		1,474
Glasgow	39	192	291	303	304	331	13		1,473
Leeds Bradford	135	203	291	460	406	150	0		1,645
London City	12	301	243	275	285	282	187		1,585
London Gatwick	24	192	216	311	318	225	71		1,357
London Heathrow	22	202	254	287	322	238	181	335	1,841
Luton	8	245	330	200	221	270	243		1,517
Manchester	9	238	222	266	265	267	125	192	1,584
Total	500	2,240	2,965	2,916	2,801	2,561	1,167	544	15,694

Key findings: noise attitudes by airport

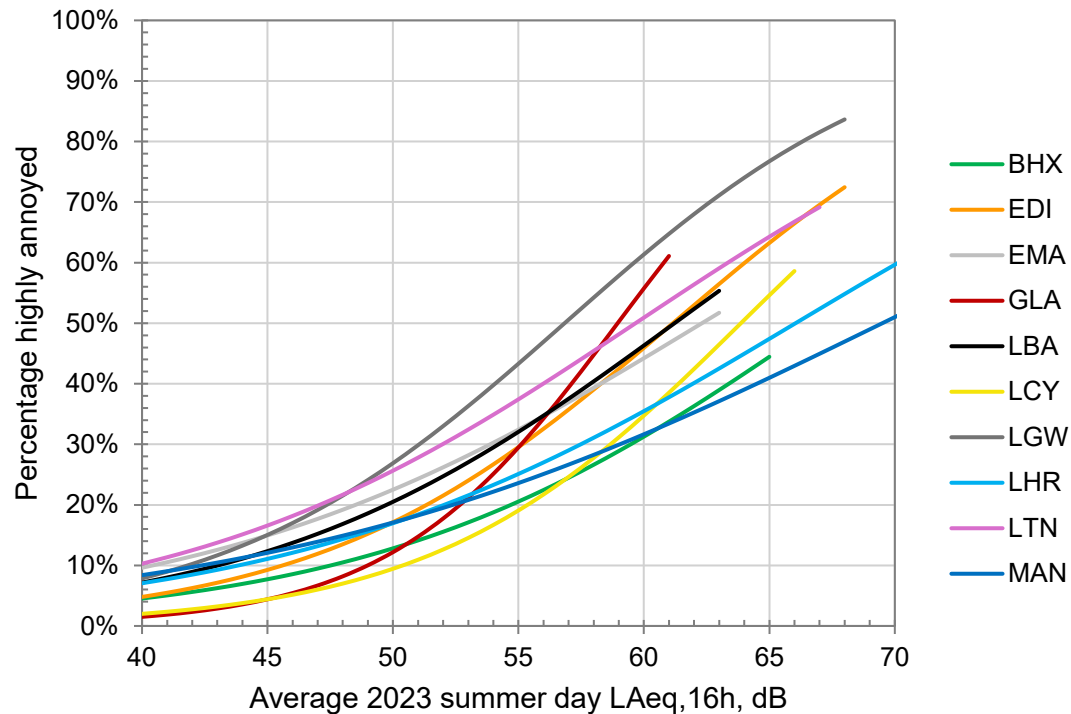


Figure 40 Percentage high annoyed by individual airport, annoyance during the last 3 months (Q8), HA_n , Wave 1

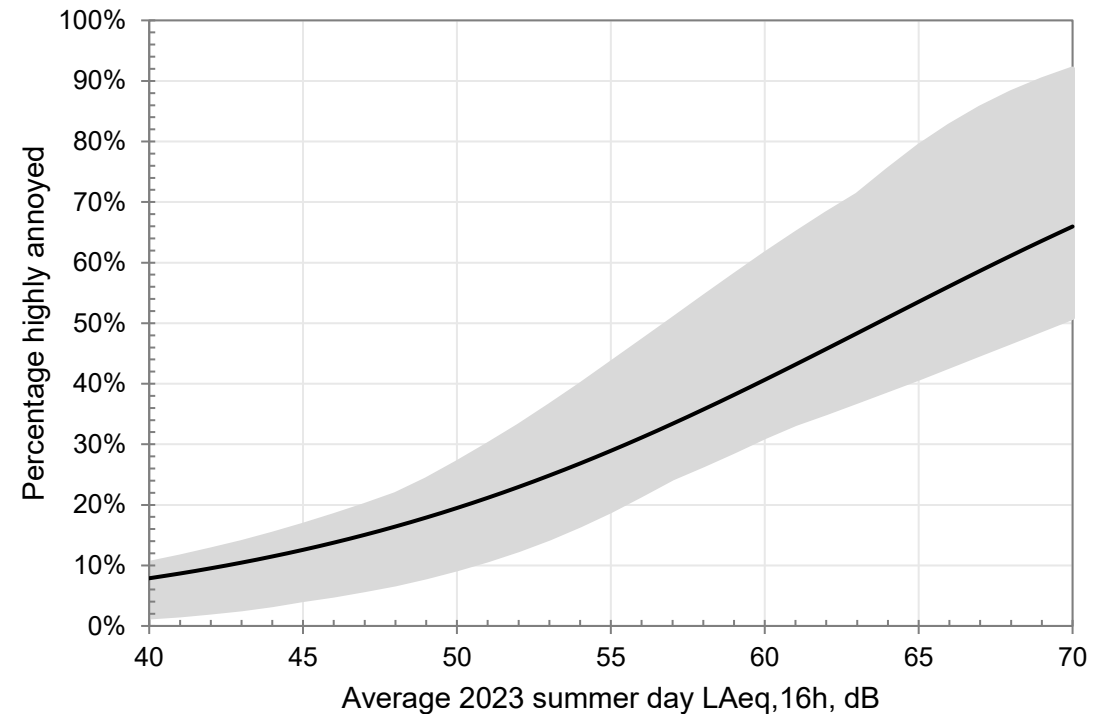
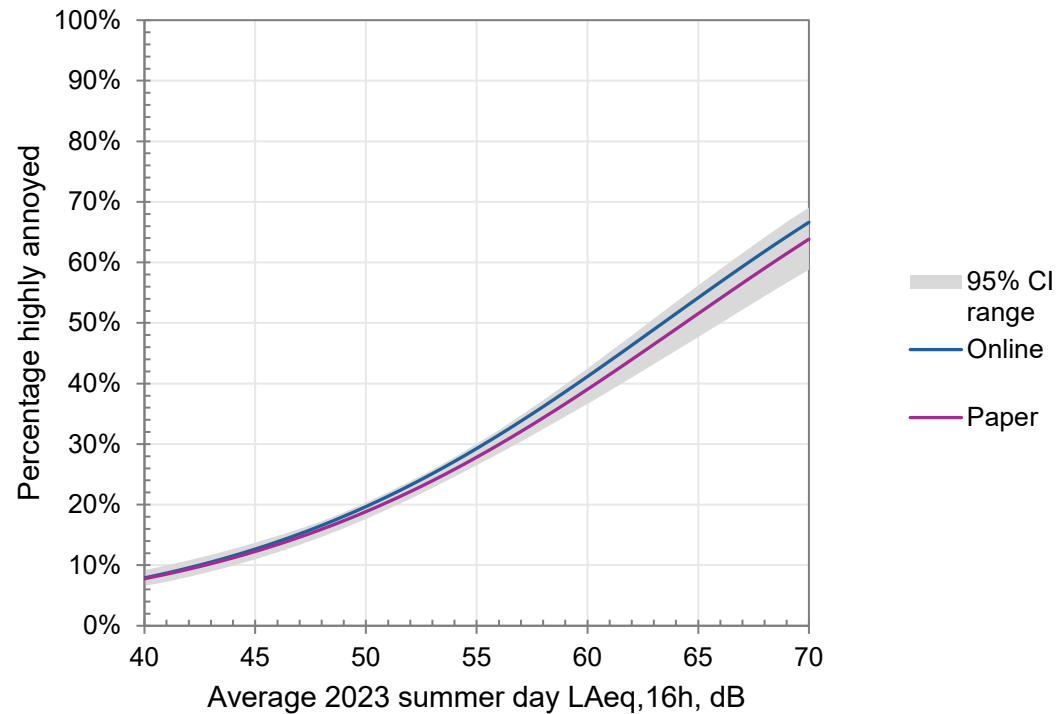


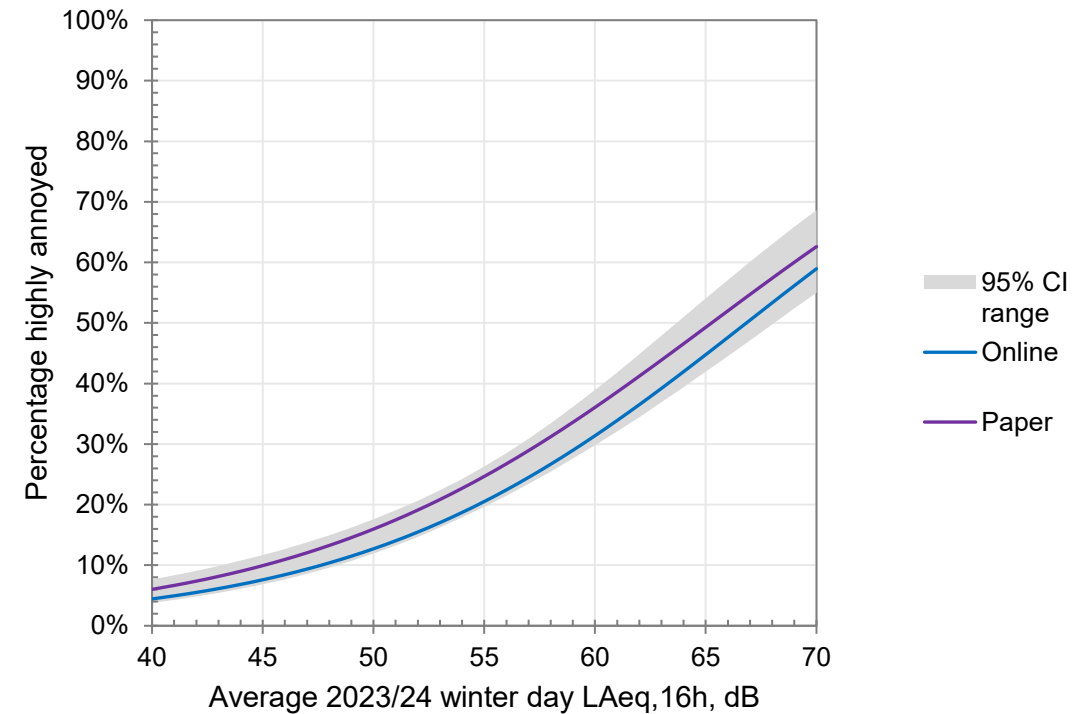
Figure 41 Percentage highly annoyed exposure-response function during the last 3 months for Wave 1, HA_n , (Q8) and the envelope of all individual airport exposure-response functions

Key findings: noise attitudes – online/paper

Wave 1

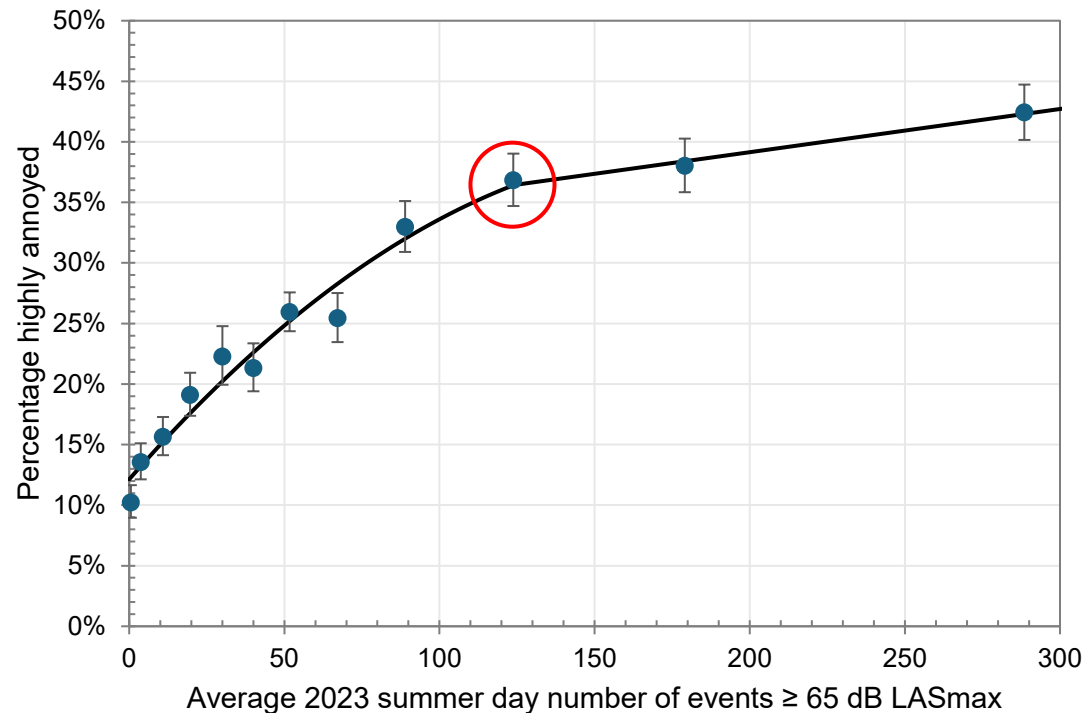


Wave 2

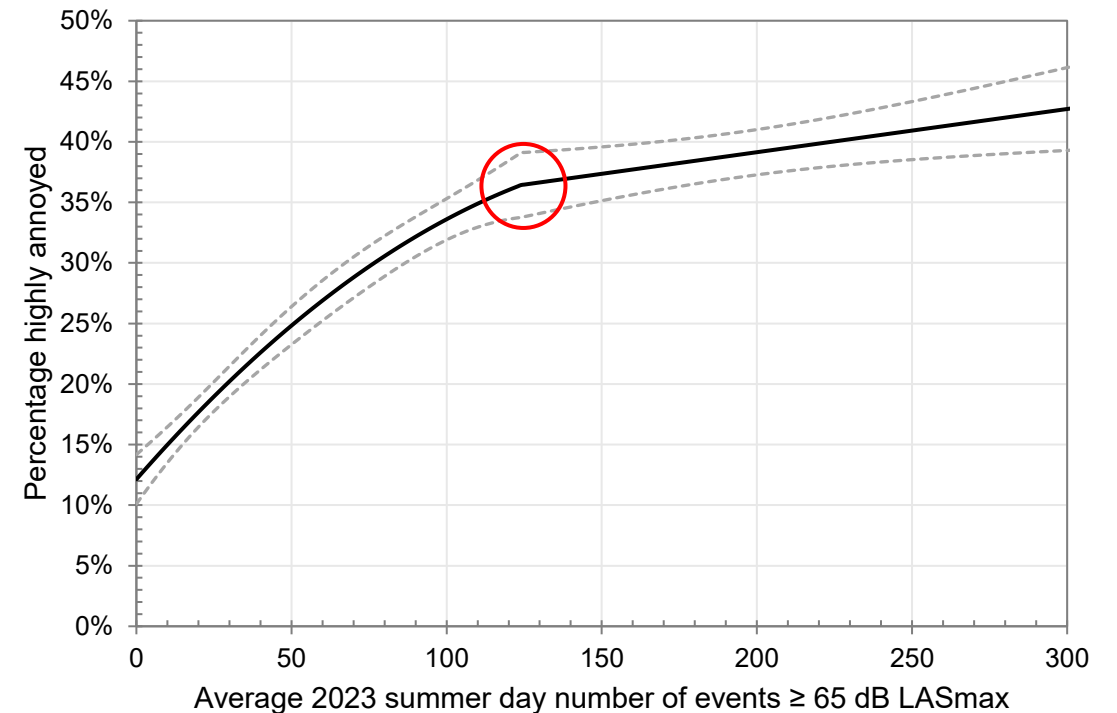


Key findings: noise attitudes - N65

Quadratic function up to knot at
N65=124, thereafter linear function

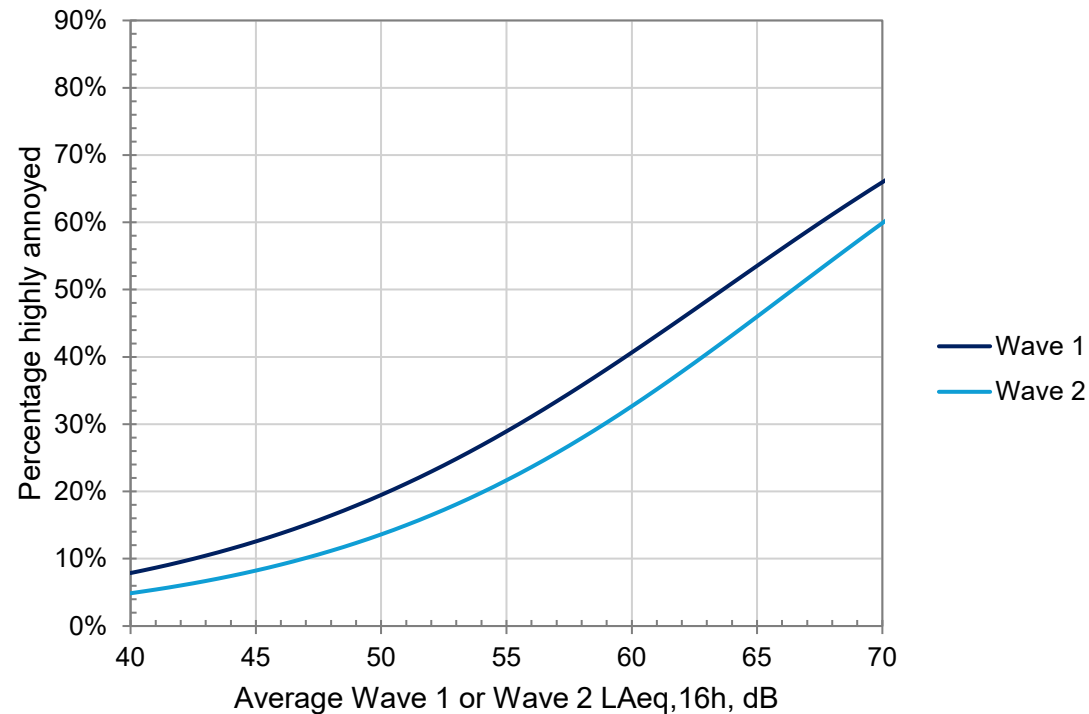


95% CIs of piecewise function

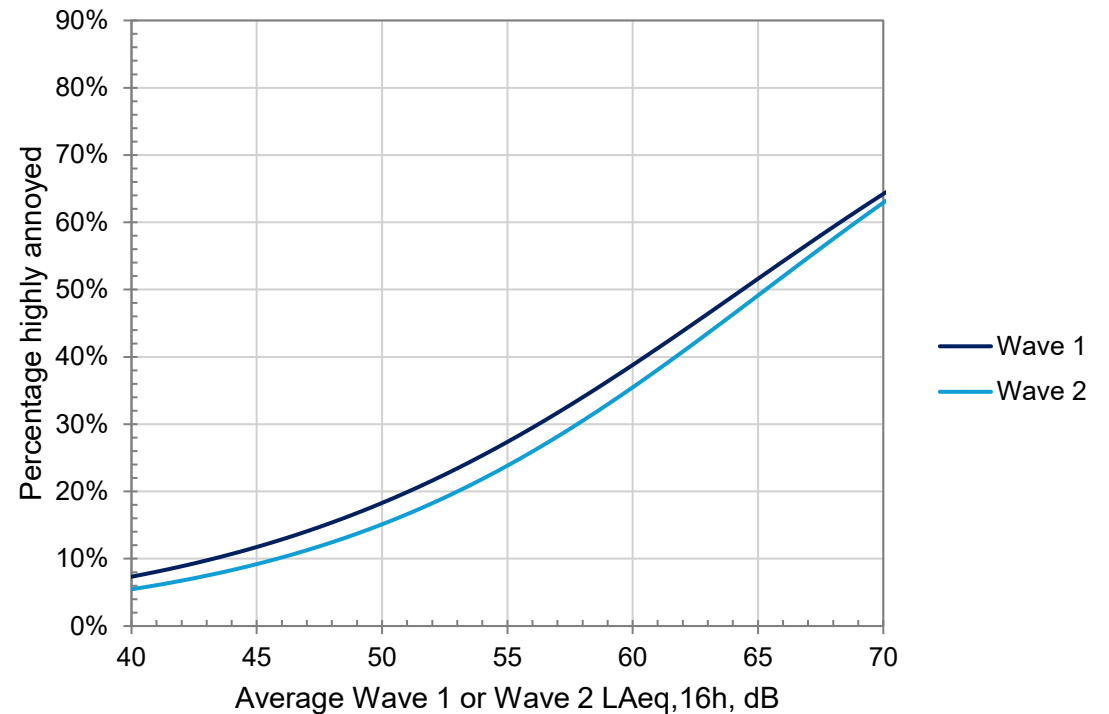


Key findings: noise attitudes - seasonality

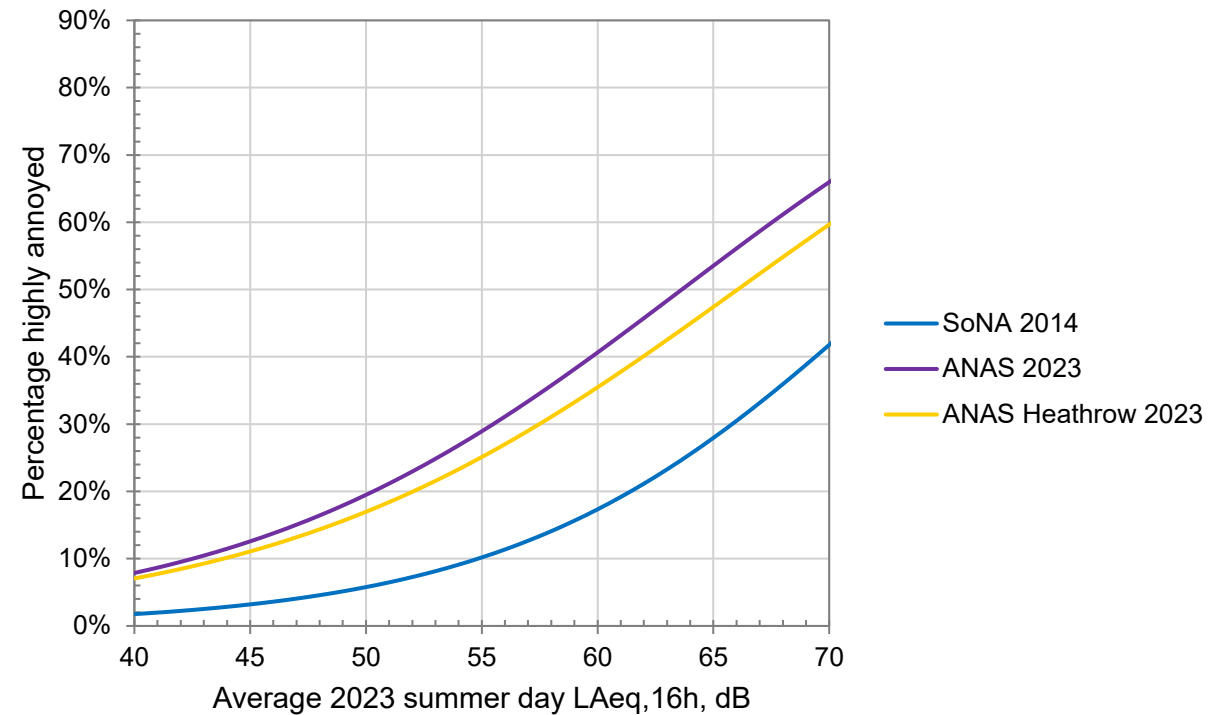
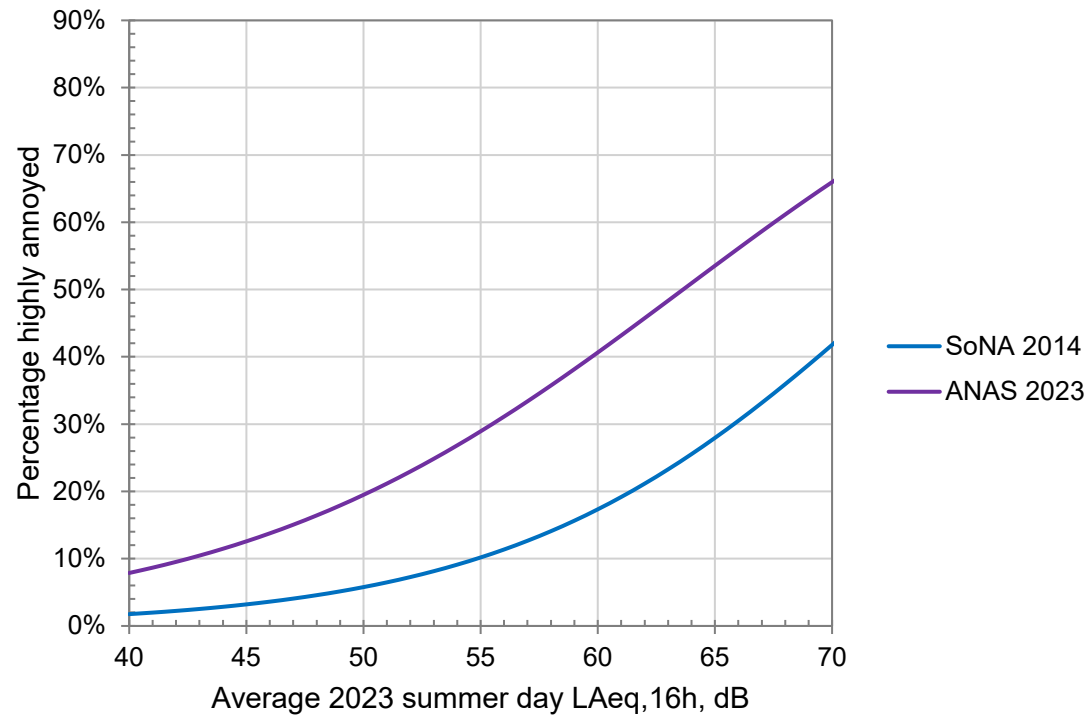
Attitudes during the last 3 months



Attitudes during the last 12 months

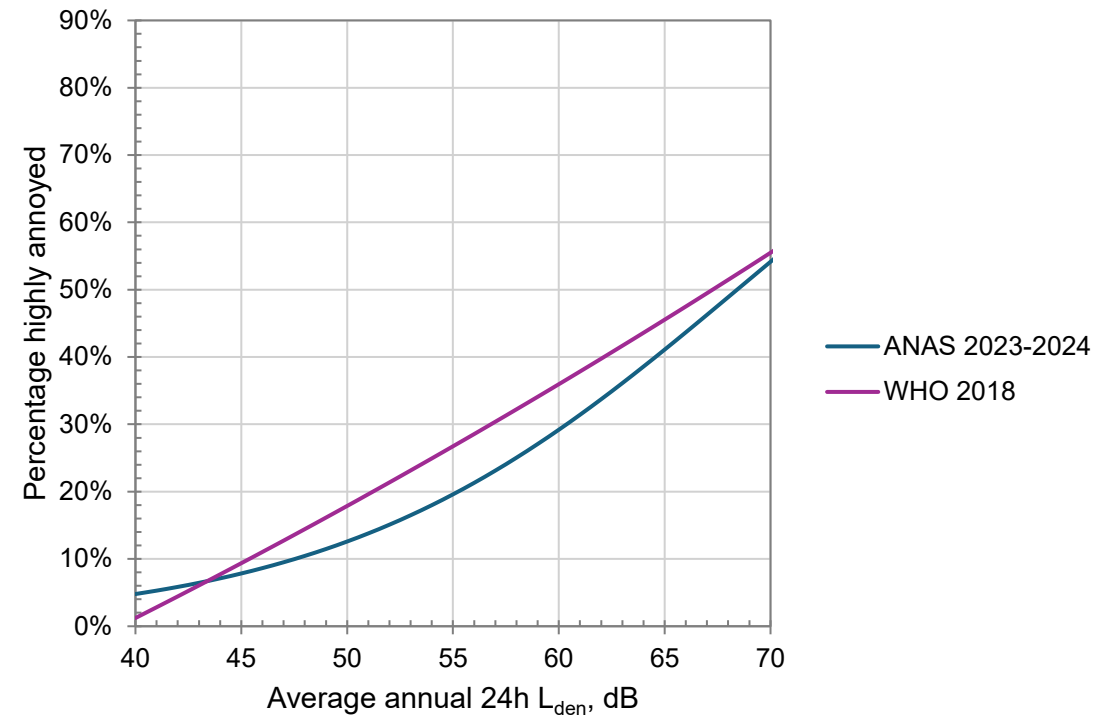


Key findings: comparison to SoNA 2014



Key findings: international studies

- Comparison with WHO 2018 meta-analysis of 14 studies



Thank you. Any questions?