

Supplement 3: Details on the quadratic model evaluating the relationship of prevalence of exposure to excessive noise from loud entertainment venues as a function of loudness intensity and duration thresholds.

Table S3. Studies from systematic review that equated intensity and duration of sound levels to LAeq values for exposure to loud entertainment venues. These studies were used to build and evaluate the quadratic model.

<b>Loud Entertainment Venues</b>				
<b>First author (year)</b>	<b>Risk criteria</b>	<b>Number, sample size</b>	<b>Number, exposed</b>	<b>Prevalence estimate (%)</b>
Vogel (2014) <sup>a</sup>	LAeq ≥ 80 dB for ≥56 hours/week	943	454	48.1%
	LAeq ≥ 85 dB for ≥56 hours/week	943	171	18.1%
	LAeq ≥ 90 dB for ≥56 hours/week	943	68	3.1%
Vogel (2010b) <sup>b</sup>	LAeq ≥ 85 dB for ≥40 hours/week	1512	267	17.7%
Mercier (2002) <sup>b</sup>	LAeq ≥ 87 dB for ≥40 hours/week	700	68	9.7%

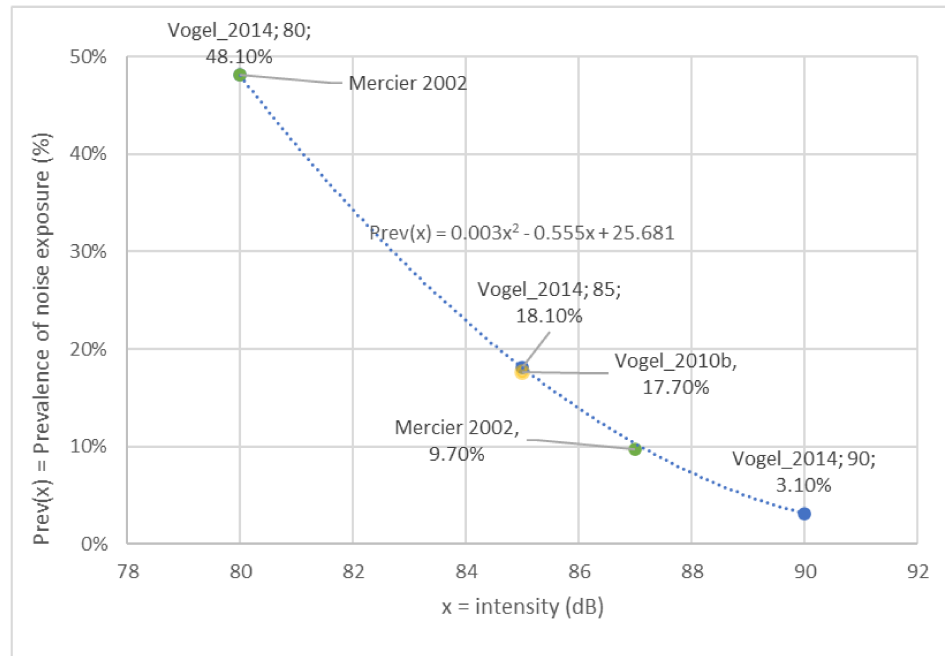
<sup>a</sup>Prevalence estimates for several different risk criteria definitions were provided in this publication and thus it was chosen to build the first quadratic model.

<sup>b</sup>Prevalence estimate from studies were used to evaluate consistency of estimates across populations and eventually added to the second model.

As a first step, we produced a quadratic spline model, which approximates the relationship of prevalence of exposure to excessive noise from loud entertainment venues as a function of the exposure thresholds of loudness/intensity. The quadratic model was fitted to data points from Vogel (2014), which was chosen because authors report the prevalence of exposure for several cut points of intensity level (LAeq ≥80 dB; ≥ 85 dB; ≥ 90 dB) and several data points from the same population are needed to fit the model.

Next, we compared the estimates of the other two studies that defined risk of exposure to excessive noise from loud entertainment venues using LAeq (Supplement 3) and the values predicted by the quadratic model to evaluate consistency of prevalence estimates among the relevant studies. All three studies lie closely on the estimated quadratic, indicating that prevalence estimates among these studies are commensurate (see Fig. S3a).

Figure S3a: Quadratic model showing the prevalence of excessive noise exposure from loud entertainment venues as a function of loudness intensity. The model was built with estimates from Vogel (2014). Estimates from Vogel (2010b), and Mercier (2002) were plotted on the model and results indicate that prevalence estimates across risk criteria definitions are consistent.



As last step, we produced a quadratic model for the prevalence as a function of both the loudness intensity and duration thresholds that fitted very well all five studies, (see Fig S3b).

Figure S3b: Quadratic model showing the prevalence of noise exposure from loud entertainment venues as a function of  $y$  = Intensity (dB) and  $x$  = Duration (hours per week). The model was built with estimates of Table S3, the fitting equation  $\text{Prev}(x,y)$  is shown below the 3D figure.

