

# Study reveals noisy Christmas toys can damage hearing

December 11 2006

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Many toys available this Christmas could damage your child's hearing according to the UK-based charity Deafness Research UK.

Working with researcher Dr. Brad Backus from University College London (UCL), the charity tested the noise levels produced by a selection of toys available to buy this Christmas.

Almost all (14 out of 15) of the toys tested produced noise levels above the recommended safety limit of 85dB(A) when held close to the ear. Half of the toys tested had levels above or very near recommended safety limits when measured at 25cm - about an arm's length away.

The most dangerous toys by far were found to be toy guns. A mechanical toy machine gun, a plastic tommy gun, and a cap gun were tested and all were found to have noise levels that exceed recommended limits, making them the most dangerous toys available on the high street. These guns have the potential to cause serious damage to your child's hearing and could cause instant hearing loss.

The research was commissioned by Deafness Research UK, the country's only charity dedicated to finding new cures, treatments, and technologies for deafness and hearing loss. It was carried out by Dr. Brad Backus, a research fellow at UCL's Ear Institute. 15 noise-emitting toys were tested including those aimed at children from 3 months up to 15 years-old. All the toys tested are available this Christmas and they include bestsellers such as Pixar Cars 'Lightning McQueen', Fireman

Sam's Action Jupiter and Tomy's 'Spin n'Sound' remote-controlled car\*.

For toys, 85dB(A) is the recommended safety limit for noise exposure, prolonged exposure to anything above this level has the potential to cause damage to hearing. 14 of the 15 toys were found to have average noise levels of between 84dB(A) and 115dB(A) when held close (2.5cm) from the microphone. Only one, a VTECH mobile phone for babies, was found to have a noise level below the safety threshold.

When tested at 25cm, a realistic distance a child would hold the toy during normal play, 8 of the 15 toys had average levels ranging from 81dB(A) to 105dB(A). Laser Command, an electronic phaser game, had a level of 88.6dB(A) while Pixar Cars 'Lightening McQueen' had a level just below the threshold at 82.5dB(A).

How a child plays with a toy can strongly influence the risk to his or her hearing. How far the child holds the toy from their ear and how long and how often the child plays with a toy are the critical factors.

Dr. Brad Backus said: "Children's toys clearly have the potential to do harm to their hearing so it's important that people are aware of the dangers and what to do about them. With most of the toys we tested, apart from the guns, there is a potential for harm but they're safe if used sensibly. With most toys, your child will only damage their hearing if they use them too often and for too long a duration, or if they stick them in their ear."

He continued: "Our advice is pretty simple: don't let your child hold noisy toys too close to their ear and don't let them play with them for more than an hour a day. Most parents probably don't want to listen to these toys for too long anyway!"

Three mechanical toy guns were tested – a machine gun, a tommy gun

and a cap gun. These were found to have noise levels between 130db(C) and 143 dB(C) at 2.5cm and of between 120 – 140dB(C) at 25cm from the toy.

Dr. Backus continued: "While many of the toys had noise levels that were loud enough to be of concern, the toy guns we tested were extremely noisy and these are what we're most concerned about. They were so loud that my ears were ringing for a while after the testing. If I had children, I wouldn't give any of these gun-toys to them, and I would recommend that people avoid them. They have the very real potential to cause permanent hearing loss."

How loud is too loud"

Noise is measured in dBA, which is a decibel scale modified to take into account the sensitivity of human ears to different pitches of sound. It is a logarithmic scale, which means that an increase or decrease of 3 dBA represents a doubling or halving of intensity, the energy it contains. So, for example, 73 dBA is twice as intense as 70 dBA. However, due to the way we hear sounds, a person with normal hearing will only think a sound has doubled in loudness when it is ten times more intense. For example: 80dBA will only sound twice as loud as 70dBA despite actually having ten times as much energy! An average conversation will reach around 60 dBA while a busy street can peak at 80 to 90 dBA.

Generally, exposure to sound levels below 80 dBA are unlikely to cause any hearing damage. Prolonged exposure to sounds over 80 dBA can damage your hearing and the risk increases as the sound level increases. So at 140 dBA noise causes immediate injury to almost any unprotected ear.

Although there are laws about acceptable levels of noise in different situations, it is impossible to set an objective noise level that is safe for

all. Provided the ear is allowed ample rest afterwards, a level of 80 dBA might be tolerated for up to 8 hours, but increase that level by just 3 dBA and the time is reduced to just 4 hours. By 95 dBA the tolerance is less than 15 minutes. However, no two people will have an identical tolerance to noise. Research suggests that a genetic predisposition towards hearing loss is an important factor.

How the toys were tested:

Toys were measured using a Cel 450 handheld recording SPL meter. Measurements were carried out in a medium-sized carpeted room with background levels below 40 dB(A). Each toy was measured at 2 distances: (1) 2.5cm, simulating close to the ear use and (2) 25cm, simulating normal arm length use. Thirty second recordings were made while the toy was activated and the average equivalent dB(A) was measured along with the peak dB(C) level. Since the cap gun only produced impulse sounds, only the peak level dB(C) was recorded for that toy.

Regulations and safety standards for toys British Standards are not compulsory, they're recommendations. The latest British and European Standard for toys (BS EN 71-1:2005) states that:

- The noise from a toy held close to the ear should not exceed 80dB(A) for a daily exposure of 8 hours. This equates to approximately 85dB(A) for a normal playtime situation (2.5 hours).
- The peak noise level of any toy except cap guns should not exceed 110dB(C)
- The peak noise level of a cap gun should not exceed 125dB(C)

This Standard also recommends that:

- If the peak noise produced by a toy exceeds 110db(C), the potential danger to hearing shall be drawn to the attention of the user.

-- Toys which produce high impulse sound levels, or their packaging, shall carry the following warning: "Warning! Do not use close to the ear! Misuse may cause damage to hearing." For toys using percussion caps add: "Do not fire indoors!" American safety standards are also available.

Source: Deafness Research UK

Citation: Study reveals noisy Christmas toys can damage hearing (2006, December 11) retrieved 22 March 2023 from <https://medicalxpress.com/news/2006-12-reveals-noisy-christmas-toys.html>

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