option consommateurs
l'association des consommateurs du québec

Safety of Noisy Toys: A Current Assessment

Written by: Danielle Charbonneau and Catherine Goldschmidt
with scientific support of Richard Larocque, M.O.A.
For: Office of Consumer Affairs, Industry Canada

2004

OPTION CONSOMMATEURS

MISSION

Option consommateurs is a nonprofit association whose mission is to defend and promote consumers' rights by assisting them both individually and collectively, by providing them with information, and by advocating on their behalf to decision-makers.

HISTORY

The association has existed since 1983. In 1999, it merged with the Association des consommateurs du Québec (ACQ), an organization with a 50-year history and a mission similar to that of Option consommateurs.

PRINCIPAL ACTIVITIES

Option consommateurs's staff of 20 are grouped into four departments: the Budgeting Department, the Legal Affairs Department, the Media Relations Department, and the Research and Representation Department. Over the years, Option consommateurs has developed expertise in the areas of financial services, health, agri-food, energy, travel, access to justice, trade practices, indebtedness, and protection of privacy. Each year, we reach 7,000–10,000 consumers directly and many more through our extensive media coverage. We participate in working groups and sit on boards of directors, carry out large-scale projects with important partners, and produce research reports, policy papers, buyer's guides, and a consumer information and action magazine called *Consommation*.

MEMBERSHIP

Option consommateurs pursues a variety of activities aimed at making change, including research, class-action lawsuits, and lobbying of public- and private-sector bodies. You can help us do more for you by becoming a member of Option consommateurs at www.option-consommateurs.org.

ACKNOWLEDGMENTS

This project was carried out by Option consommateurs under the coordination of Geneviève Reed, Director, Research and Representation. The research and writing are by Danielle Charbonneau and Catherine Goldschmidt.

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EXECUTIVE SUMMARY

Over the years, Option consommateurs (co-publisher with *Protégez-Vous* magazine of *Guide Jouets,* a French-language toy consumers' guide) has noticed an increase in battery-operated toys that emit a variety of sounds, some louder, some softer. This increase is troubling because it means that young children are daily subjected to significant sources of noise that may retard their development (particularly in the area of language acquisition) as well as cause temporary or permanent hearing loss. There is little scientific data on the subject, but it appears that children do not hear as well as they used to and that this hearing loss is occurring at an increasingly early age. It also happens that many children are exposed to highly noisy toys.

These factors led Option consommateurs to assess the situation and to conduct a study on the subject. We focused our research on battery-operated toys designed for children ages 0–3, since the large majority of these toys are targeted at that clientele.

We commissioned the first part of the study from Richard Larocque, an audiologist with the firm Audio Conseil. His mandate was to review the scientific literature on noise and to measure the noise levels produced by a sample of 40 toys in the laboratory and in two daycare centres.

In Canada, toys sold, imported, or advertised are covered by a law dating back to 1970 which provides that toy noise levels may not exceed 100 dBA. This limit is higher than other international noise exposure standards such as that of the World Health Organization (WHO). The law also prescribes the distance at which noise levels must be measured as that at which the product "ordinarily" would be from a child's ear.

The laboratory tests showed that the majority of the toys (95%) in the sample conformed to the law but that 13% did not meet the WHO standards when the measurement methods prescribed by Canadian law were applied.

The field tests showed that the majority of the toys (53%) designed for the 0–3 age group were in fact held much closer to the ear than the distance specified in the current law's measurement protocol. In view of this finding and the toy noise levels measured as if the toy were held at the ear, we observed that a large majority of the toys tested are likely to cause hearing loss in the long run, even with very short periods of use (less than 10 minutes per day). This conclusion is based on generally accepted scientific criteria for such measurements.

Part Two of this report was prepared and written by Option consommateurs. We complemented Mr. Larocque's work with a review of the various regulations applicable to noisy toys internationally. We found that these regulations had significant weaknesses in all the countries studied. All are voluntary and their application depends on the good will of the manufacturer. Most often authorities inspect toys only in response to complaints, which rarely happens because consumers are unaware of the hazard that noise may represent. Canada is the only country with a law instead of a standard, but it has not been revised since 1970.

We proceeded to verify the quality of the information on 350 sound-producing toy packages and asked families to evaluate 40 of these toys. These surveys revealed numerous weaknesses:

1- The information appearing on noisy toy packaging is insufficient.
2- Few toys have volume and off buttons.
3- Parents' opinions of toy loudness vary from one person to another.
4- In general, parents are unaware of the hazard to their children's hearing that some toys represent.
5- Many children use their toys in ways that were not intended.

After an analysis of the data collected through our research, Option consommateurs puts forward the following recommendations:

Recommendation 1

Option consommateurs recommends that the Government of Canada revise the noise limit for battery-operated toys and the applicable calculation procedures in view of the unintended use that children may make of such toys.

Recommendation 2

Option consommateurs recommends that the Government of Canada conduct a public information campaign on noisy toys.

Recommendation 3

Option consommateurs recommends that manufacturers systematically indicate on toy packaging the inclusion of an off and/or volume button, as applicable.

Recommendation 4

Option consommateurs recommends that manufacturers equip all their toys with an off button and a volume button.

Option consommateurs also supports the following recommendations of Richard Larocque, audiologist with the firm Audio Conseil:

Recommendation 5

Option consommateurs and Audio Conseil recommend that noise levels of toys designed for children ages 0–3 not exceed 87 dBA, where these levels are measured under conditions simulating significant proximity between the toy and the ear (if possible, measured at 1 cm from the sound level meter microphone or through an ear coupler).

Recommendation 6

Option consommateurs and Audio Conseil recommend the formation of a multidisciplinary committee of experts in the fields of audiology, acoustics, and ergonomics to make recommendations for the revision of the legislative framework covering the sale, distribution, and advertising of toys designed for children, particularly those aged 0–3.

Recommendation 7

Option consommateurs and Audio Conseil recommend that the committee of experts take a position on a suitable acoustic measurement methodology that is sensitive to the proposed legislative framework, the nature of the industry, and the ergonomic constraints inherent in each age group targeted by toy products.

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NOISY TOYS: A LITTLE-KNOWN HAZARD

Noise poses a significant health hazard and there are not many places where we can escape from it. Outside, highway traffic, airplanes, public works, and more disturb the silence. At work, there are machines humming and telephones ringing. At home, the noise generated by TV, radio, and household appliances is often augmented by the noise of our children's toys. Over the years, Option consommateurs, which produces the *Guide Jouets* in collaboration with *Protégez-Vous* magazine, has noted an increase in battery-operated toys that emit a variety of sounds, some louder and some softer. Each year, parents complain about the noise emitted by certain products. In the 2003 edition of the *Guide Jouets*, 5 noisy toys were the subject of complaints, and Option consommateurs found one of them to be very noisy. For safety reasons, we asked Health Canada to verify the noise level produced by this toy, since under section 10(a) of Part 1 of the schedule to the *Hazardous Products Act* (HPA), toy noise levels must not exceed 100 decibels. In her evaluation, the Health Canada inspector specified that although the toy in question was indeed very noisy, it did not violate the HPA (see Appendix A, "Letter from Health Canada"). This result is troubling and raises numerous questions about the currency of the noisy toy provisions contained in the HPA. The result is even more worrisome in that the hazard represented by these toys is not obvious to consumers. It is not a matter of sharp edges or small parts on which kids could choke, but developmentally valuable sound effects that they greatly enjoy. Yet some of these products emit noise in excess of 100 decibels, posing a genuine risk to young children's hearing. This phenomenon is especially alarming in that certain parents, unaware of the dangers noisy toys represent, do not hesitate to buy them.

These factors led Option consommateurs to take stock of the situation by conducting a study on the subject. We focused our research on battery-operated toys designed for children up to three years of age, since the great majority of noisy toys fall into that category.

This report is divided into two parts. The first was commissioned from Richard Larocque, an audiologist with Audio Conseil. It contains a review of the literature on noise as well as a

description of an experimental study performed on 40 toys selected by Option consommateurs. The second part of the report was written by Option consommateurs. It reviews the noisy toy regulations applicable in certain countries. It also reports on an in-store survey on the quality of the information appearing on 350 noisy toy packages. Finally, we present the results of a survey of families in which we elicited parents' opinion on 40 toys selected by Option consommateurs.

We conclude this report with a set of recommendations arising from our research.

PART ONE

Researched and written by Richard Larocque, M.O.A., audiologist

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INTRODUCTION

In the first part of this document, we introduce the issue of noisy toys with reference to the broader concepts of "harmful noise" and "nuisance noise." We then review the history of the concept of "noisy toys," particularly within the Canadian and Québec context. We go on to present the experimental results of this project, including the methodology and the results of the two parts to the experiment (noise level measurements for the noisy toy sample and the "field trials" in daycare centres) and the results of each of these two phases. We discuss the results with reference to various aspects, including different legislative frameworks. Finally, in light of this information, we put forward some recommendations on toy noise levels, particularly those designed for children ages 0–3.

1. BACKGROUND: THE HISTORY OF NOISE

For long, the effects of noise on auditory health and overall health were little known in the scientific community and to the general public. In the last two centuries we have learned more about the potential negative impact of noise on the auditory system, which is so important in our everyday lives. We shall describe the effects of noise with reference to its two main negative characteristics: its nuisance value and its potential to cause temporary or permanent harm to hearing.

1.1 NOISE POLLUTION

As early as the Egyptian and Roman empires, noise was considered a major nuisance. Ancient writings mention certain edicts or regulations for noisy activities such as chariot driving:

> *Many are our ancestors whose loss of sleep was caused by the din of wheels on paving stone. Citizens acquired the habit of spreading straw in front of their*

> *homes to deaden the clack of horses' hooves and the rolling of metal wheels on the pebbly surface of the narrow streets. (1)*

But it was not until the Industrial Revolution and the concomitant mechanization that noise became a public nuisance. The second half of the twentieth century was truly the golden age of noise pollution as a public health problem. The Wilson report (2), the first to address this issue, reported a 27% increase in the number of people who stated that they had been bothered by exterior noise between 1948 and 1961.

Since "noise pollution" is a somewhat vague concept, some specialists prefer the term "nuisance noise" (*gêne*), which Vallet (3) defines (and we adopt this definition) as "a negative perceptual and affective sensation expressed by people who hear noise." That is, it is a subjective phenomenon that may be quite far removed from the objective physical reality measurable with a wavemeter or sound level meter. As we have mentioned, noise that is horrible to some may be appreciated by others, depending on the connotation it has for each person. For example, noise may be better tolerated when it represents the price to be paid for something gained. In a large study on nuisance noise, Levy-Boyer and Moser (4) found that people who had recently left a low-noise (rural) area were less bothered by noise then a group of longtime city dwellers. Noise was in some sense the price of enjoying the advantages of urban life.

Be that as it may, the numerous studies on the extra-auditory effects of noise are unanimous. Nuisance noise has a negative impact on the cardiovascular, neuroendocrine, digestive, respiratory, ocular, and vestibular systems (5), not to mention more subjective parameters such as mood, sleep, and depression.

The effect of nuisance noise on children has begun to be studied recently. Picard and Bradley (6) and others indicate that the child's auditory system completes its maturation around 10–12 years of age. Before then, a relatively quiet environment is necessary for a child to understand all the information conveyed to him or her. This is especially important for children ages 0–6, the crucial language learning period.

Picard and Bradley summarized the problems facing young language learners as follows:

> The masking of speech by noise forces children to pay more attention to phonetic decoding in order to achieve recognition. From the standpoint of an information processing system with limited capacity, the listener is obliged to reassign cognitive resources to this level of processing, limiting his or her capacity to perform the other tasks necessary for comprehension and, ultimately, learning as such. [Back-translation.]

It has been empirically demonstrated that, in a typical environment, first-grade students (without special problems such as second-language learning or permanent or temporary hearing loss) only decoded 40% of monosyllables (one-syllable words spoken out of context). Sixth-grade students correctly decoded 67% of monosyllables, while an adult without special problems would easily decode nearly 100%. To date, no studies have been done of preschool children. It is quite probable that the results would be significantly poorer than those of first-grade students, since preschoolers are in the midst of developing psycholinguistic competencies and have more difficulty extracting linguistic information in an unfavourable acoustic setting. If we factor into this group those children suffering from ear infections and those exhibiting delayed language development, it is very likely that children without special hearing problems represent a minority in a number of daycare centres in Québec.

Noisy toys add to the problem of noise endured by school-age children, particularly those aged 0–3 who are in a decisive phase of their language development. Unfortunately, we found no scientific papers that examined the impact of noisy toys on the sound environment of children ages 0–3, particularly in daycare. One part of our experimental work for this project dealt with this issue.

1.2 NOISE AS A HAZARD TO HEARING

We have long known that exposure to loud noise causes hearing loss. But it is only since the Industrial Revolution, and more particularly since the development of the railways (when engineers deafened by locomotive noise had to listen for the sound of bells at level crossings!) that scientists have taken an interest in hearing loss as a function of exposure to noise.

Today, we also know that there are two hearing loss mechanisms caused by noise exposure, one temporary and the other permanent (7). These mechanisms involve the workings of the inner ear, more specifically the internal and external ciliated cells.

1.2.1 TEMPORARY HEARING LOSS

In metabolic terms, noise exhausts the biochemical/mechanical function of the inner ear structures. The rate of exhaustion of different structures is directly correlated with the noise "dose." This "dose" results from several factors, the main ones being the "force" (sound pressure) of the noise/sound, the duration of exposure, the nature of the sound (continuous or impulse) and the sound quality or frequency content (8). In the case of temporary hearing loss (technically known as temporary threshold shift (TTS)), the recovery time between noise exposure events is another factor to be considered. The inner ear structures can recover from noise exposure if and only if the ear is "at rest" (in relative silence) for a certain number of hours. The relationship between this resting period and the degree of exposure is controversial. There have been very few systematic studies of the onset of and recovery from TTS in humans. A classic study dating from 1985 (9) describes the onset of hearing loss following different stimuli at different levels. The figure below summarizes these results.

It is important to note, however, that impulse, not continuous noises are at issue here. These results show a leveling off of TTS after a maximum of 40 minutes of exposure to impulse noise in the 102–120 dB LpA range.

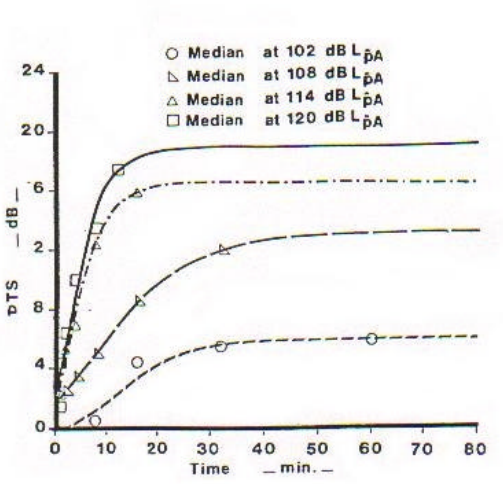


Figure 1: TTS as a function of exposure time (from (9))

A more recent study found similar results following exposure to natural stimuli. Loth (13) reported TTS of 8 dB following exposure to 100 minutes of noise, 5 dB following exposure to 60 minutes of music in the 89–94 dB range, 15 dB for exposure to 120 minutes of noise at 100 dBA, and 30–50 dB at 100–120 dBA (rock concert) for 4 hours.

More recent literature on the subject highlights the surprising fact that sound "quality" (for equal "dose") can effect TTS magnitude. Exposure to undesired noise provokes greater hearing loss than exposure to desired noise (10).

It is also important to note that objectively measured sound levels and subjective perceptions of same generally coincide, but the frequency content may alter this coincidence. A noise rich in low frequencies will be subjectively perceived as louder than that which is objectively measurable, while a high-frequency-rich noise may be perceived as softer than it objectively is.

Though there are unresolved issues around temporary hearing loss, new evidence suggests that it can cause functional hearing loss and thereby influence communication skills. In addition, the magnitude and frequency of the resting period between each episode of temporary hearing loss is directly correlated with the appearance of permanent hearing loss.

Daycare noise levels reported in the recent literature (11) are entirely sufficient to cause a temporary hearing loss whose magnitude has never been scientifically studied.

1.2.2 PERMANENT HEARING LOSS

According to a WHO document (12), exposure to the equivalent of 75 dBA for 8 consecutive hours is not hazardous to the human hearing system. However, sudden hearing loss may occur

when an individual is exposed to noise levels exceeding 120–130 dBA over a very short period (7).

Between these extremes, there is intermediate level noise (75–130 dBA). Since the 1950s, many researchers have conducted studies on permanent hearing loss (technically known as permanent threshold shift or PTS) following exposure to this noise level. The results of these studies vary considerably, as witness a 1994 meta-analysis of 160 studies published between 1966 and 1993 (13; see Table 1).

Maximum recommended level	**Remarks**	**Researcher**
85 dB	Non-hazardous level	Schneider
85 dB	Maximum level for portable music devices	Tsumura
85-90 dB	Maximum level for portable music devices (5 hrs/day)	Pialoux
85 dBA	Swedish standard	Axelsson
90 dBA	Maximum level, undesirable	Sudgen
90 dBA	Pop concert limit	Pontaut
90 dBA	Risk criterion for continuous noise	Vood
90 dBA	Would eliminate 90% of deficits	Fearn
90 dBA	8 hrs/day, 5 days/week	ISO (industry)
95 dBA	Acceptable compromise for pop music	Axelsson
100 dBA	Acceptable limit for discos	Dey and Rupp
100 dBA	Risk of permanent loss	Axelsson
‹ 100 dBA	No deficit	Schwetz
Leq(A) 100 dBA	Safe limit 4 hrs/week	Martin
105 dBA	Unacceptable exposure	Axelsson
110 dBA	Would eliminate half the problems	Fearn

Table 1: Sample recommendations issued between 1996 and 1993 for “safe” exposure to noise/sound, taken from (13)

The ISO standard 1999 (14) is claimed to predict the percentage of the affected population and the degree of hearing damage for a group of individuals as a function of length and level of exposure. For example, it predicts that after an exposure of 10–15 years to levels equivalent to 85 dBA at eight hours per day, more than 20% of adults will exhibit significant hearing loss.

In Québec, section 131 of the *Regulation Respecting Occupational Health and Safety* contains a table specifying the maximum occupational noise exposure levels as a function of continuous exposure duration. The regulated levels range from 85 to 115 dBA; higher levels are prohibited. The limit for an 8-hour day is 90 dBA. As to the WHO, it has conducted various studies (12) indicating a risk of permanent hearing loss when levels exceed the equivalent of 75 dBA during 8 hours of exposure. Using the most scientifically valid bisection value of 3 dB (the number of additional decibels necessary to double the source energy at equivalent dose), this limit enables us to estimate safe exposure duration according to the WHO standards. Table 2 presents these values, calculated according to the WHO criteria and also using the criterion of 85 dBA per 8 hours recommended by various authors cited in (13) and by various workplace noise provisions.

Maximum safe exposure duration	WHO acceptable noise level (12)	"Non-hazardous" noise level (13)
8 hours	75 dBA	85 dBA
4 hours	78 dBA	88 dBA
2 hours	81 dBA	91 dBA
1 hour	84 dBA	94 dBA
0.5 hour	87 dBA	97 dBA

Table 2: Noise levels for maximum safe exposure duration according to the WHO (12) and various sources cited in (13)

1.3 NOISE AND CHILDREN

Knowledge of the connection between noise and children's health is insufficient. The majority of studies have been done on adults, yet as we stressed in section 1.1, the auditory system completes its maturation around ages 10–12. Young children's reaction to significant or chronic exposure to noise remains poorly known today. Some researchers assert that young children's peripheral auditory system is more sensitive and vulnerable than that of adults (16). Furthermore, recent epidemiological studies suggest that young children's auditory acuity is declining and is in fact equivalent to that of a young adult (17), i.e., it degrades much earlier than several years ago. According to Niskar et al., this pattern is due to the fact that young children are exposed earlier to different sources of noise. Other studies have shown the devastating effect of early noise exposure on young children's hearing.

2. NOISE AND CHILDREN'S TOYS

The first mention in the literature of the possible hazardousness of toys was published in the 1960s (18). In the following 20–30 years, researchers focused on "toys" that may cause instantaneous hearing loss (e.g., firecrackers (19), horns (20), toy guns (21)). Even today, there is little systematic information on the effect of other noisy toys. Mirbod et al. (23) studied arcade games and found that arcade noise caused TTS varying from 4–8 dB for one hour of exposure, while the staff exposed to these noise levels had an equivalent dose of 87.5 dBA. More recently, Yaremchuk et al. (24) measured the sonic intensity of 45 toys with noise levels varying from 81–126 dB(A) or 80–115 dBA when measured respectively at 2.5 cm or 25 cm from the source.

In Québec, scientific interest in this subject dates back to the 1980s. For her master's thesis, France Lacombe (25) measured the noise levels of 200 toys using the WHO criteria (75 dBA per 8 hours or 87 dBA per 30 minutes), assuming that the toy would be used for more than 30 minutes. She wrote that "85% [of the toys] are unsafe because they emit noise levels in excess of the limits recommended by the World Health Organization (1980) and the ISO."

Several years later, Leroux and Laroche (16) proposed regulations limiting continuous noise levels to 75 dBA and peak impulse noise levels to 95 dB where the levels are measured at a distance representative of the toy's use. These authors also proposed a specific and detailed measurement methodology.

3. EXPERIMENTAL DESIGN

We began by measuring the noise levels of 40 sound-producing toys currently on the market. These toys are targeted exclusively at children ages 0–3. Some of these toys were then lent to private daycare centres in the Québec city area. The purpose of this phase was to measure the impact of these toys on the sound environment of the daycares and interview the centre workers for their comments.

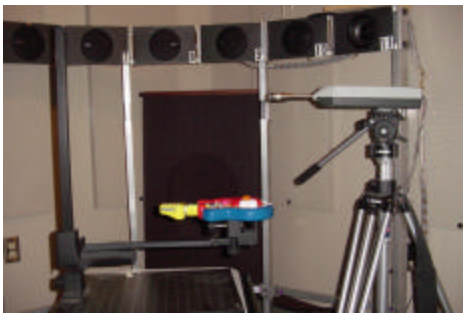
4. METHODOLOGY

4.1 NOISE MEASUREMENTS FOR SELECTED TOYS

For this part of the study, we used Health Canada's methodology titled *Test Method to Determine the Noise Level of Toys* (26; see Appendix A of this report). It stipulates that measurements must be made with a type 1 sound level meter, that 5 5-second measurements must be taken for each noise emitted, and that readings must be taken in fast response time to measure the maximum RMS (root mean square) level (MAXL) in dBA. The standard also stipulates the distance of the sound source from the sound level meter microphone as the distance at which the child would "ordinarily" use the toy. Table 3 summarizes the specifications concerning the distance of the toy from the microphone. We followed these measurement instructions, using a Larson-Davis 800-B sound level meter.

In addition to these specifications, we took the measurements in a soundproof booth (that of the Acoustics Group at the Université de Montréal's School of Speech Language Pathology and Audiology) meeting the standards for clinical audiology examinations. The dimensions of this booth were 2.32 m long by 2.32 m wide by 2.13 m high, for a total volume slightly less than 11.5 m^3. Figures 2 and 3 show the soundproof booth and the setup used to test the 40 toys. In these photos, a toy of the type "toy placed on a desktop" (Appendix B–4 in the Health Canada

protocol) was tested. It was positioned at 0 cm on the x-axis, 0 cm on the y-axis, and -30 cm (300 mm) on the z-axis, hence exactly 30 cm below the sound level meter microphone.



Figures 2 and 3: Figure 2 (left) shows the soundproof booth, Figure 3 (right) the measurement setup, in this case as per Appendix B-4 in (26).

Appendix in Health Canada standard	Toy type	Distance x (0 degrees from microphone/sound level meter) (mm)	Distance "y" (90 degrees from microphone/sound level meter) (mm)	Distance "z" (above microphone/sound level meter) (mm)
B-1	Squeeze toys, rattles	150	0	0
B-2	Wind instruments	75	100	45
B-3	Toys held to the ear (e.g., telephone, headphones)	10	0	0
B-4	Toys on a desk	0	0	300
B-5	Long-barrelled guns	50	0	0
B-6	Pistols	0	400	0
B-7	Push/pull toys	60	500	800
B-8	Tape recorders	0	0	300

Table 3: Measurement coordinates for groups of toys taken from Health Canada standard (26)

4.2 NOISE IMPACT OF SELECTED TOYS IN DAYCARES

The management of two daycare centres agreed to participate in this part of the study, involving ambient noise readings before the introduction of toys and while they were being used. In addition, the daycare workers had to complete a checklist commenting on the individual use of each toy (Appendix B). Both daycare centres hosted children ages 0–3. There were 4 to 10 children in each group. Each daycare received 10 noisy toys (see list in Appendix C) and was to circulate them as widely as possible before and during the noise measurements. Each toy was distributed with consideration to the targeted age group. The average targeted age for the toys in daycare #1 was 1.30 and for daycare #2 it was 1.52 (not statistically significant). The average noise levels of the toys loaned to daycares 1 and 2 were 77.59 dBA and 83.24 dBA, respectively. This difference is primarily due to the presence of one particularly noisy toy, Baby's Cell Phone (JS-01), with an average level of 104 dBA. The workers at this daycare centre were instructed to supervise children carefully while using this toy, since it is potentially hazardous if held directly against the ear for a prolonged period.

Ambient noise measurements before and after the introduction of the toys were taken at the same time of day at an interval of 24 hours. The operators of the sound level meter waited 10 minutes before taking readings to give the children time to get used to their presence. Five noise samples were taken under each set of conditions.

Each reading lasted at least 1 minute. The maximum noise level in dBA – fast response to measure MAXL[1] was recorded for each measurement (eliminating peaks[2] caused by impulse noise such as a door slamming or a toy falling on the floor).

5. RESULTS

5.1 NOISE LEVEL MEASUREMENTS FOR SELECTED TOYS

Table 4 and Figures 4 and 5 present the noise levels of the 40 toys chosen by Option consommateurs, measured according to the Health Canada laboratory protocol. Their characteristics are as follows:

- average noise level of 82 dBA;
- average of about 2.5 sound functions on each toy, the softest one emitting an average of 78 dBA and the loudest one an average of 82 dBA;
- the standard deviation of the noise measurements is 1,58 dBA, an acceptable value for the suggested protocol, the instrument used (type 1 sound level meter, which should have a maximum error of 1 dBA with a constant stimulus) and especially given the unstable nature of the different stimuli measured (songs, animal sounds, music).

[1] The maximum observed during 5 seconds of sampling.
[2] The peak is the maximum sound level of an impulse noise.

Consult Table 4 (in French)

Tableau 4 : Synthèse des caractéristiques et des mesures de niveaux sonores effectués au groupe de jouets sonores sélectionnés par Option Consommateurs selon le protocole recommandé par Santé Canada

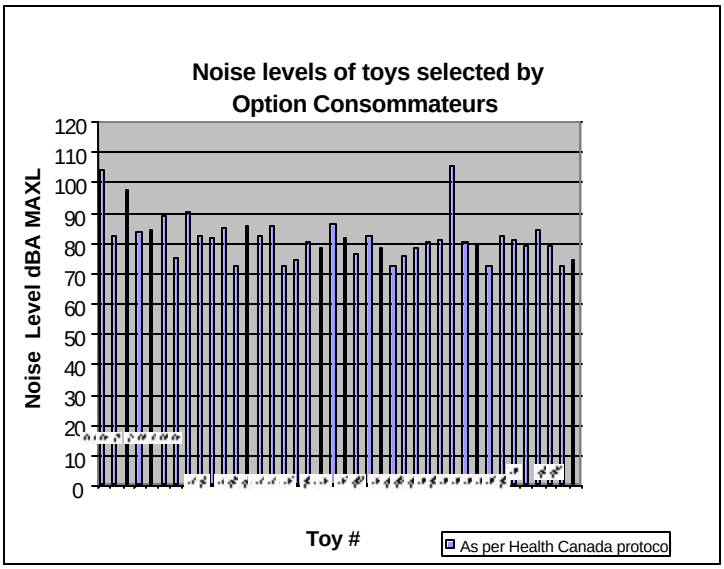


Figure 4: Sampling results for 40 noisy toys tested in the laboratory

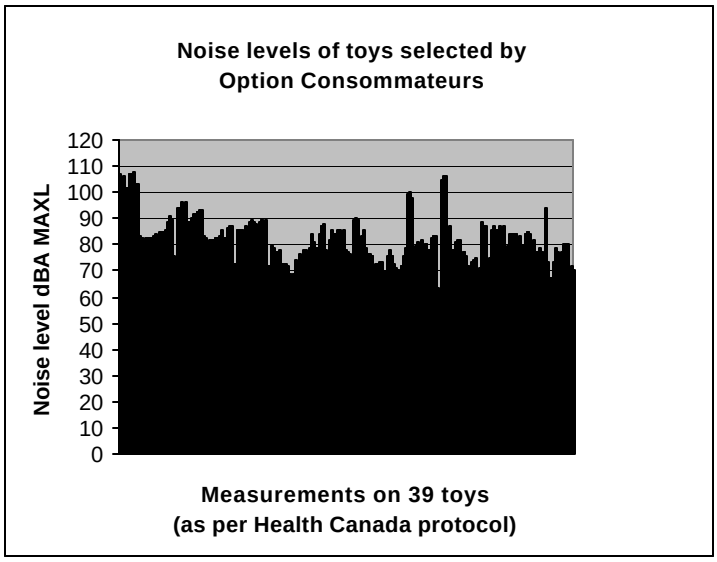


Figure 5: Average noise levels of 40 laboratory-tested toys

Figure 4 illustrates these same results for each of the sample sets, while Figure 5 shows the averages for each toy. Using the Health Canada protocol, we found that nearly all the toys tested conform to the applicable Canadian regulation. Only two toys (5% of the sample) exceed the 100 dBA limit: "Baby's Cell Phone" (JS-01) and "Sesame Street/Mini Violin" (JS-31). Two toys (5% of the sample) emitted 90–99.9 dBA, these being "SpongeBob" (JS-08) and "Road Rippers/PT Cruiser" (JS-03), 20 toys (50%) emitted 80–89.9 dBA, and 16 (40%) emitted 70–79.9 dBA.

5.2 NOISE IMPACT OF SELECTED TOYS IN DAYCARES

The table below presents ambient noise measurements before the introduction of 10 sound-producing toys and during their use (24 hours later).

Daycare	Age of children	Number of children	Average noise measurement – BEFORE (dBA)	Average noise measurement – AFTER (dBA)
#1	0-1.5	5	84	86
#1	1.5-2	6	81	81
#1	2-3	5-6	83	Not available
#2	0–3	+/-10	87	88

Table 5: Characteristics of daycare groups using noisy toys and noise levels before and after introduction of the 10 toys listed in Appendix C.

Tables 6 and 7 summarize the daycare workers' comments on the use of the toys.

In general, the daycare centres chosen were excessively noisy even before the introduction of the toys. This explains why their introduction had a negligible impact on the sound environment.

As regards the workers' comments, they found the noise levels of 72% (13/18) of the toys adequate, 22% (4/18) were considered loud and only 5% (1/18) were considered unacceptable. Two of the toys at daycare #2 were not evaluated since one of them broke and the other did not attract the children's interest. In addition, 24% (4/17)[3] (JS-5-32-34 and 41) were used very close to the child's ear. None of these had been measured with this in mind since their "ordinary" use is different (JS-5, JS-32 and JS-41 were measured at 30 cm and JS-34 at 15 cm). We should note that the distance at which children actually used toys may differ from the one used for laboratory measurements. In this case, 24% (4/17) of the toys were used at an equivalent distance, 24% (4/17) at a greater distance, and 53% (9/17) at a lesser distance than in the laboratory.

[3] For one toy we have no average distance of use data.

Consult Table 6 (in French)

Tableau 6: Commentaires des éducateurs de la garderie #1 concernant l'utilisation des jouets sonores pendant 24 heures

Consult Table 7 (in French)

Tableau 7: Commentaires des éducateurs de la garderie #2 concernant l'utilisation des jouets sonores pendant 24 heures

6. DISCUSSION

At first sight, the above data analysis seems encouraging. After all, 95% of the 40 toys tested in the laboratory conform to the Canadian regulations, while the worst of the two nonconforming toys exceeded them by only 6 dBA. Comparing these results with those of Lacombe (25), who tested toys emitting nearly 119 dBA, or the work of Yaremchuk et al. (24) who measured toy noise levels up to 126 dBA, one might reasonably assume that toy manufacturers and distributors are doing their best to comply with Canadian law. It should be noted, though, that neither of these studies considered the noise produced by firecrackers or guns.

But in light of the latest knowledge about noise hazards and our tests in the daycares, the acoustic safety of young children handling noisy toys still raises doubts.

6.1 STATUS OF KNOWLEDGE ON HAZARDOUS NOISE

In our view, the current Canadian standard limiting toy noise levels to 100 dBA is arbitrary to say the least. It protects against excessive noise that may cause very short term injuries, such as that produced by firecrackers, but the scientific basis for the 1970 act is now outdated, as we shall explain.

First, we do not know how the auditory system of children, especially those aged 0–3, reacts to chronic noise exposure. The reason is that models predicting the onset of hearing loss (temporary or permanent) were developed with adult subjects. It seems quite clear that children's auditory system is much more fragile than that of adults. This is why we consider action based on the precautionary principle to be imperative.

Second, there are lingering debates over the reasonable quantification of safe exposure. There are two scientifically defensible positions on this issue. The WHO considers exposure to levels under 75 dBA for up to 8 hours to be safe. Other experts believe that exposure to levels under 85 dBA (see Table 1, section 1.2.1) for up to 8 hours is just as safe. This latter position is a compromise designed to limit, insofar as possible, hearing loss caused by chronic occupational exposure to workplace noise.

For the purposes of our demonstration, we shall term the WHO recommendations (75 dBA/8heures) the "safe scenario" and the various recommendations suggesting an exposure of up to 85 dBA the "compromise scenario." If we adopt what we view as a conservative hypothesis that a child will play with noisy toys 30 minutes a day on average, the limits would be 87 dBA for the safe scenario and 97 dBA for the compromise scenario (see Table 2, section 1.2.2).

Figure 6 schematically illustrates the application of these two scenarios to the noise samples taken in accordance with Health Canada's protocol (26) using a daily exposure (use) duration of 30 minutes.

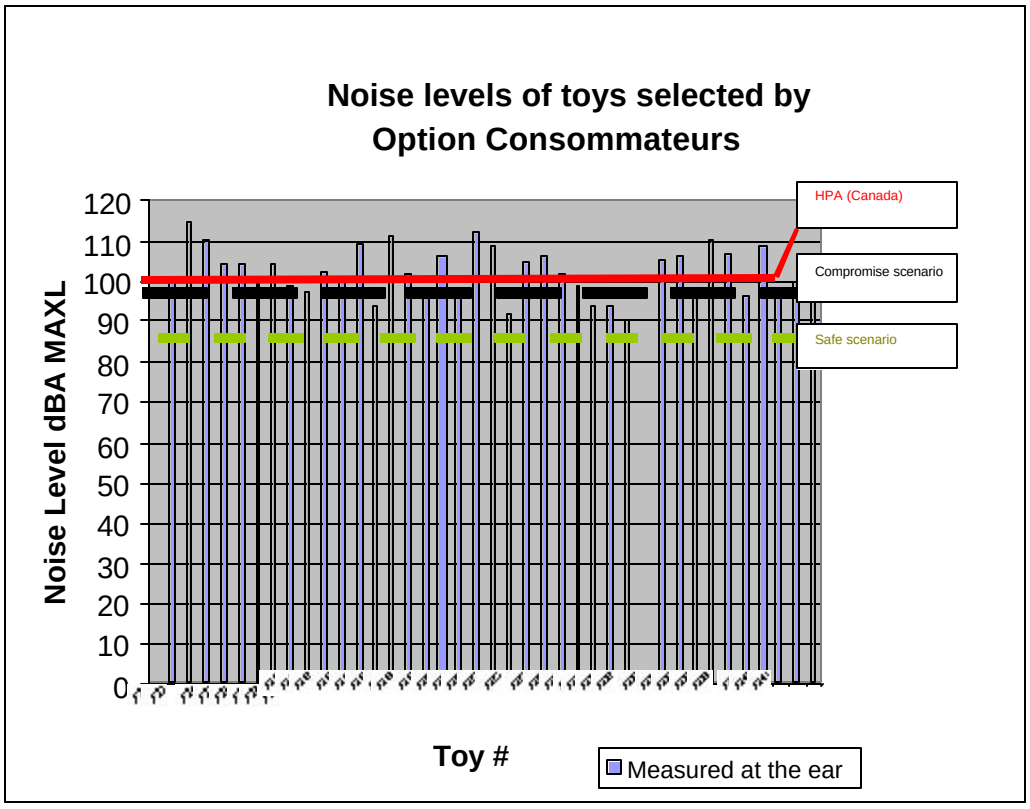


Figure 6: Average noise levels of 40 sound-producing toys tested in the laboratory as per Health Canada protocol (26). The horizontal lines indicate the current 100 dBA limit under Canadian law (solid red line), the limit under the "compromise" scenario (broken black line) and the limit under the "safe" scénario (broken green line) for average daily exposure (use) of 30 minutes per day.

As Figure 6 shows, using the compromise scenario does not greatly change the interpretation of our lab data concerning the safety of these toys. However, using the safe scenario as the cutoff point, 5 toys (13%) in the sample could be hazardous to children's hearing.

6.2 NOISE LEVEL MEASUREMENT METHOD

The Health Canada protocol precisely dictates the distances at which toy noise levels must be measured in the laboratory (see Table 3, section 5.1). This measurement method does not account for how children actually use toys. Children ages 0–3 frequently used toys in unpredictable ways, bringing them close to their mouth and ears. In fact, the two field trials showed that 22% of the toys were brought to the ear and that 56% of the toys were used unpredictably and at much closer distances than those used for the lab measurements. Elementary acoustic physics tells us that the distance between the transmitter and the receiver is what matters in this regard. Figure 7 and Table 8 present the noise levels measured “at the ear” following Health Canada protocol B-3 (26). These noise measurements were done under the same conditions as the initial ones.

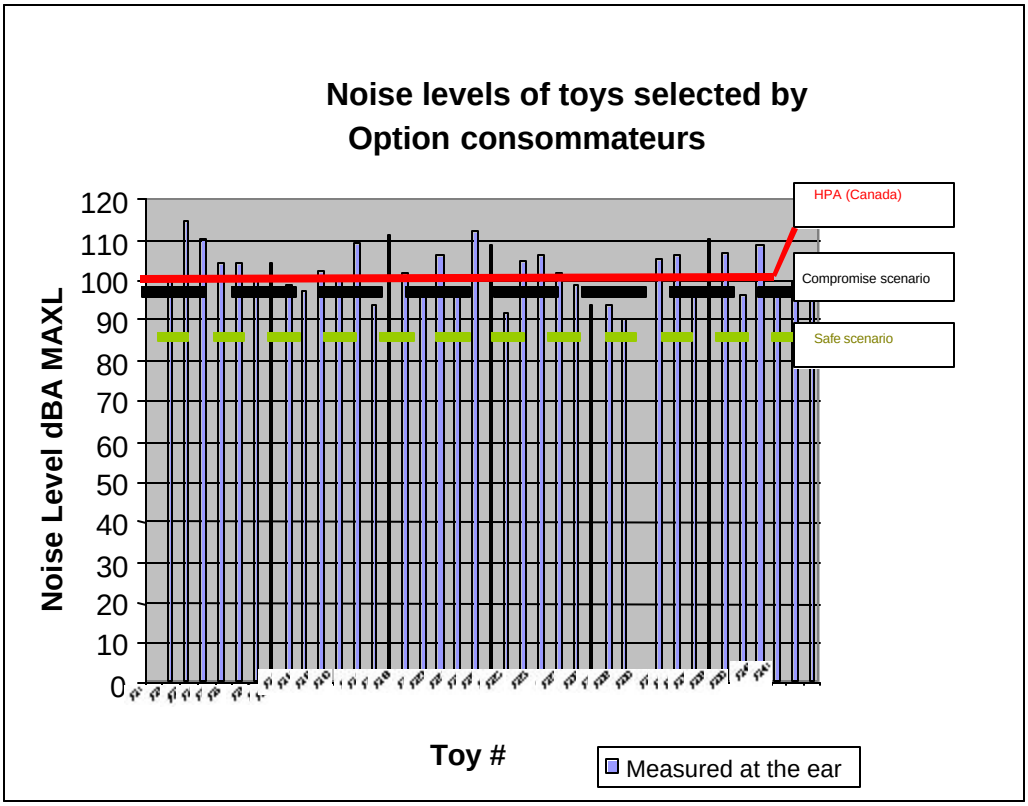


Figure 7: Average noise levels of 40 toys tested in the laboratory using Health Canada protocol B-3 (26), i.e., 1 cm from the microphone or "at the ear." The horizontal lines show the 100 dBA limit prescribed by the existing Canadian law (27) (solid red line), the compromise scenario (broken black line) and the safe scenario (broken green line) for average daily exposure (use) of 30 minutes per day.

Consult Table 8 (in French)

Tableau 8 : Synthèse et comparaison des caractéristiques et des mesures de niveaux sonores effectués au groupe de jouets sonores sélectionnés par Option Consommateurs selon le protocole recommandé par Santé Canada et selon le protocole B-3 du même protocole

As Figure 7 shows, toy noise levels measured at the ear are strikingly different from those measured with the Health Canada protocol: 63% of the sample (25 of 40 toys) exceed the 100 dBA limit, 83% (33) exceed the compromise scenario and all exceed the safe scenario by a wide margin!

Table 9 shows that even if the toys sampled were rarely brought to the ear (B–3 in (26)), a very large majority would greatly exceed the limits theoretically set by the two scenarios, even for extremely short exposure (except for the compromise scenario at exposures of 3.75–7.5 minutes).

	Maximum safe exposure for the safe scenario (12)	Percentage of toys exceeding this value	Maximum safe exposure for the compromise scenario (13)	Percentage of toys exceeding this value
30 minutes	87 dBA	100%	97 dBA	83%
15 minutes	90 dBA	100%	100 dBA	63%
7.5 minutes	93 dBA	98%	103 dBA	50%
3.75 minutes	96 dBA	88%	106 dBA	25%

Table 9: Noise levels as compared with maximum exposure under WHO standard (12), the "safe" scenario, and various sources cited in (13), the "compromise" scenario, and percentage of toys whose noise level measured at the ear (as per protocol B-3 in (26)) exceeds these limits for different exposure durations

Let us state this plainly: when these toys were measured under conditions that appear to reflect the ways in which children ages 0–3 actually use them, almost all the toys considerably exceeded the WHO 7.5-minutes safe exposure limit (12) and half exceeded the 7.5-minutes "compromise" limit (13). The majority of the levels studied also exceeded the 100 dBA limit prescribed by Canadian law since 1970.

In short, the weaknesses in the regulation may well be creating a serious public health problem. To avoid this, governments, the toy industry, and the competent public health authorities must act without delay.

7. RECOMMENDATIONS

In view of:

the importance for children to possess and maintain optimal hearing in an overall developmental context that includes language learning, among other skills;

the importance, given this same context, of living in an acoustic environment in which it is physically possible to assimilate the necessary information;

the precautionary principle that should guide our actions to prevent temporary and permanent hearing loss as well as the lack of reliable experimental data in this field;

the discrepant scientific data relating to the prevention of temporary and permanent hearing loss in adults;

the acoustic and behavioural data gathered in this study,

We recommend that:

1. Noise levels of toys designed for children ages 0–3 not exceed 87 dBA, where these levels are measured under conditions simulating significant proximity between the toy and the ear (if possible, measured at 1 cm from the sound level meter microphone or through an ear coupler).

2. A multidisciplinary committee of experts in the fields of audiology, acoustics, and ergonomics be formed to make recommendations for the revision of the legislative framework covering the sale, distribution, and advertising of toys designed for children, particularly those aged 0–3.

3. The committee of experts take a position on a suitable acoustic measurement methodology that is sensitive to the proposed legislative framework, the nature of the industry, and the ergonomic constraints inherent in each age group targeted by toy products.

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APPENDIX A: TOY NOISE ANALYSIS METHOD

Consult this file

APPENDIX B: EVALUATION FORM FOR DAYCARE TESTING OF NOISY TOYS

DESCRIPTION OF TOY	LIST OF PARTICIPANTS	LES AMIS DU LAC DAYCARE CENTRE
No:	**Name Age**	
Nom:	_____	
Test period: **From: To:**	_____ _____ _____	

A- LOUDNESS

☺ Reasonable 😐 Loud ☹ Unbearable

LOUDNESS OF SOUNDS PRODUCED	☺	😐	☹	COMMENTS
Level 1				
Level 2 (if applicable)				
Level 3 (if applicable)				

B- CHILDREN'S REACTION *Children's hearing is fragile. If you find that the toy is too loud, you are not required to let the child use it.*

1- What was the overall reaction the first time the children heard the toy?
_____

2- Subsequently, to what extent did the toy retain the children's interest?
⑨ abandoned the toy ⑨ occasionally played with it ⑨ often played with it

3- Approximately how far did the children keep the toy from themselves?

_____

4- Did the children:

- press their ear against the toy? yes ⑨ no ⑨
- hold down the buttons for long periods of time? yes ⑨ no ⑨

OTHER COMMENTS:

_____
_____

APPENDIX C: TOYS LOANED TO DAYCARES

Toys loaned to daycare #1

Toy name	Company	Target age (years)	Number of sound effects	Average noise level (dBA)
JS-07 Sesame Street/Tableau rigolo	Fisher-Price	1	1	74.76
JS-11 Playskool/Luminou/P'tit lumi -copain	Hasbro	0	1	85.48
JS-24 Monster Chainsaw with Goggles	Kid Connection	3	2	82.54
JS-26 Baby Playzone/Ball	Fisher-Price	1	1	72.98
JS-29 Little People/Flash the Fire Truck	Fisher-Price	1.5	2	80.49
JS-30 Hug & Learn Baby Tad	Leapfrog	0.5	1	62.62
JS-32 Blue's Clues/Sing With Blue Microphone	Fisher-Price	2	1	80.72
JS-34 Magic Remote Control	Chicco	0.25	4	72.42
JS-35 Le livre des Ani'Maths	Leapfrog	0.75	5	82.57
JS-36 Public Telephone in French	Soon Cheng Toys	3	3	81.29
	Overall average	**1.30**	**2.10**	**77.59**

Toys loaned to daycare #2

Toy name	Company	Target age (years)	Number of sound effects	Average noise level (dBA)
JS-01 Baby's Cell Phone	Tiny Love	0	4	104.20
JS-02 Tonka 3430	Funrise	3	4	82.52
JS-05 Sound/Light Turtle	Geoffrey	0.9	1	84.78
JS-10 Sesame Street/Mini Saxophone	Fisher-Price	1	4	81.98
JS-15 Sesame Street/le touche-à-tout	Fisher-Price	0.25	1	82.78
JS-16 Learning Drum	Leapfrog	0.5	4	86.09
JS-20 Disney Pop Dreamers/Ariel Interactive Doll	Thinkway	3	1	79.00
JS-23 Caillou Danse & Chante	Danaware	3	1	76.98
JS-33 Fun Years/Talk'n learn Alphabet	Unknown, imported by Toys R Us	2	2	79.68
JS-41 Sesame Street/ Elmo's Rock & Roll Guitar	Fisher-Price	1.5	4	74.37
	Overall average	**1.52**	**2.60**	**83.24**

PART TWO

Researched and written by Option Consommateurs

option consommateurs
l'association des consommateurs du québec

INTRODUCTION

We began by inventorying various regulations governing noisy toys internationally. We then examined the packaging of 350 toys in stores, noting the information provided to consumers (label, existence or absence of off or volume button, etc.). Finally, we purchased 40 of these toys and lent them to families in order to find out their opinions.

1- NOISY TOY REGULATIONS

We researched domestic and foreign law to determine the existence of noisy toy standards. We wanted to know the maximum decibel levels allowed in these standards. We also wanted to know if the standards are mandatory, that is, if manufacturers are required to comply with them.

1.1-INTERNATIONAL ORGANIZATION FOR STANDARDIZATION (ISO)

Founded in 1946 and based in Switzerland, the ISO is a nongovernmental organization devoted to international standardization. ISO represents more than 140 countries and issues thousands of standards that "provide a reference framework, or a common technological language, between suppliers and their customers - which facilitates trade and the transfer of technology."[4]

All toys are covered by *ISO 8124-1:2000 Safety of Toys-Part 1: Safety Aspects Related to Mechanical and Physical Properties* unless specifically excluded. This standard covers various aspects of safety, such as the possibility of ingesting small parts and the quality of the plastic. The section concerning noisy toys is found in Appendix F. This is a **voluntary informational standard**. It applies to toys used near the ear, on a table, on the floor, or held in the hand, as well as those that have to be shaken or pressed in order to emit a sound. Radio/cassette players and CD players as well as mouth-blown or muscle-activated musical instruments (xylophone, flute, trumpet, bell, etc.) are not covered by the standard. All other noisy toys must meet the following requirements:

[4] See online at http://www.iso.ch/iso/en/aboutiso/introduction/index.html.

Group	Noise limit in decibels
Toys used near the ear	80 for free-field measurement[5] 90 when measured with ear coupler[6] (LpA)
Squeeze toys and rattles	85 (LpA) 110 (maximum peak) (LpCpeak)
Toys using percussion caps	125 (maximum peak) (LpCpeak)
All toys except those using percussion caps	115 (maximum peak) (LpCpeak)

Table 1: Toy noise limits (ISO)

As Table 1 shows, the directives are accompanied by a test procedure. According to this procedure, the decibel levels are measured with reference to the intended use; the distance at which volume is measured is not the same for a telephone, say, as for a car. The standard also specifies the type of laboratory in which the tests must be performed. These laboratory requirements increases the costs of production. Finally, the standard notes that if the sound pressure (LpCpeak) produced by a toy exceeds 110 decibels (dB), a warning about the potential hearing hazard it represents must be displayed.

Still, ISO 8124-1:2000 is a voluntary standard (it has no associated logo) and not all countries adhere to it. A manufacturer wishing to sell its products in a given country must make sure that it meets the safety standards of the country in question.

In its bulletin of March 2000,[7] ISO stressed that research on the impact of noisy toys on children's hearing is insufficient, and it tasked the ISO/TC 181 technical committee with conducting that research. In June 2003, the committee reached the conclusion that toy noise levels must be reduced in order to protect children's, and especially infants', hearing.[8] According to Annelise

[5] Free field: Listening or audiometric examination situation in which the sound stimulus travels through the space between the source (or a loudspeaker) and the person's ear, obeying the laws of acoustics as a function of distance and ambient noise but without reverberation effect.
[6] An ear coupler is a device that simulates the inner ear.
[7] ISO Bulletin, March 2000.
[8] ISO Bulletin, June 2003.

Wedebye, an employee of the ISO/TC 181 secretariat, a committee called ISO/TC 181/Wg3 is now studying new rules and test methods.

1.2-AUSTRALIA, NEW ZEALAND, AND BRAZIL

For several years now, toy safety has been undergoing a degree of standardization. Largely for the purpose of facilitating free trade, an increasing number of countries are harmonizing with ISO 8124–1:2000. This is the case for Australia and New Zealand where, since 2002, toys must meet standard AS/NZ 8124-1:2002, identical in every respect to ISO 8124-1:2000 concerning the mechanical and physical properties of toys.

This is also the case for Brazil, where toys must meet Brazilian standard NBR 11786:1998. This standard was revised and renamed NBR 11786:2003 and is now identical to the current ISO 8124-1:2000. It sets safety requirements for toys manufactured and sold domestically. It aims to prevent risks unknown to the public that may arise during the normal use of toys. According to Mariano Bacellar Netto, Technical Director of the Instituto Brasileiro de Qualificação e Certificação (IQB),[9] toys manufactured or imported into Brazil are strictly monitored. Importers and manufacturers must test their products before marketing them, except in the case of wind and percussion instruments and radios without headphones. Manufacturers whose products meet the requirements may display the INMETRO logo (see logo in Appendix B) on their packaging.

1.3-EUROPEAN UNION

1.3.1-THE EN-71 STANDARD AND THE EC BRAND

Noisy toys are covered by European standard EN 71-1, *Safety of Toys – Part 1: Mechanical and Physical Properties*. The purpose of this standard is to prevent risks of which the public is unaware, particularly hearing alterations. It is identical to the ISO standard in every respect. However, in September 2002 an amendment (A2) involving additional acoustical requirements

[9] Since 1993, the IQB is accredited by INMETRO (Instituto Nacional de Metrologia, a government agency under the Ministry of Industrial and Trade Development) for certification of toy imports and domestic production.

was added. The maximum loudness was reduced from 125 to 115 dB for all toys except cap toys (e.g., children's pistols).

Toy manufacturers must ensure that their products meet the standard. They are allowed to conduct their own in-house testing or use a certified laboratory. Once this stage is completed, the manufacturer can display the "CE" (Europe compliant) logo (see logo in Appendix B). Since 1989, the European Union has required that all toys (or their packaging) manufactured, distributed or imported into the EU bear this logo, but the appearance of the logo on the toy does not mean that the safety tests were in fact performed. The manufacturer is not held to account unless a complaint is filed against a toy. The EU then orders the manufacturer to prove that its toys are compliant or withdraw them from the market.

1.3.2-THE LION MARK

In the United Kingdom in the late 1980s, the British Association of Toy Retailers (BTHA) developed an exclusive logo depicting a lion inside a triangle (see logo in Appendix B). The purpose of the "Lion Mark" is to help consumers identify safe, high-quality toys manufactured according to standard BS5665:1989 1 (mechanical and physical properties), which is identical to European standard EN-71. Manufacturers wishing to display the Lion Mark on their products must certify that their products meet high safety standards by signing a code of practice.

As well, some retailers use the lion logo to indicate to consumers that all toys they sell meet this standard of quality and safety.

1.4-UNITED STATES AND JAPAN

1.4.1-UNITED STATES

In the United States, toys are covered by voluntary safety standard ASTM F963 (see logo in Appendix B) developed by an NGO called the American Society for Testing and Materials (ASTM International). Updated in 1986, this standard establishes that a brief noise from a toy measured at 25 cm from its surface must not exceed 138 dB — louder than a jackhammer! Like the ISO standard, though, and as Table 2 indicates, the acceptable loudness differs according to the type of toy tested.

TOY TYPE	Maximum acceptable noise level (dB)	Measurement distance
Handheld toy, used on floor or bed	90 (continuous noise)	25 cm
Toy used near the ear	70 (continuous noise)	25 cm
All toys emitting brief sounds	120 (peak[10])	25 cm
All toys except cap guns with explosive and brief sounds	138 (peak)	25 cm

Table 2: Noise limits for different types of toys (ASTM, United States)

In 2002, a committee composed of manufacturers, consumers, government officials, and other stakeholders proposed a new acoustic standard (ASTM F963–03) setting the limit at 90 dB for most handheld toys. This standard was approved and published by ASTM International in 2003.[11]

1.4.2- JAPAN

The new Japanese toy standard was published 1 September 2002 by the Japan Toy Association (JTA) and took effect in April 2003. Noisy toys must now conform to section 4.2.2.18, "Noise Level of Sound-Producing Toys," which is identical to US standard ASTM 963 and reads as follows:

> Toys shall not produce impulse noises with an instantaneous sound pressure level exceeding 138 dB when measured at any position 25 cm from the surface of the toy. Toys shall be tested in accordance with the test method specified in 5.21.

Section 5.21 makes the following clarifications about the test method:

> Test for sound producing toys (see clause 4.2.2.18): when determining sound levels, both the toy and the test equipment shall be at least 1 metre from any wall, ceiling, or other large obstruction. The sound level shall not exceed 138 dB.

[10] The peak is the maximum sound level of an impulse noise.
[11] www.toy-tma.org.

1.5- CANADA

Contrary to other countries, in Canada toys sold, advertised, or imported are not governed by a standard but by legislation; namely, the *Hazardous Products Act* (HPA) and the *Hazardous Products (Toys) Regulation*. The provisions concerning noisy toys are contained in Schedule I, Part I, section 10(a), which prohibits the sale, importation, or advertising of toys whose noise level exceeds 100 dB.[12] Schedule IV, section 27 of the Regulation deals with the test procedure for electric batteries, which is outside the scope of our study.

Like the standards we have examined, the Canadian law prescribes noise measurement according to the type of toy in question.

GROUP	DISTANCE
Tape recorders	300 mm
Squeeze toys, rattles, and similar toys	150 mm
Telephones, headphones, and similar toys	10 mm
Toys placed on a desk in front of a child	300 mm

Table 3: Sample toy types and measurement distances (Canada)

Valentino Tramonti, a Health Canada inspector, reports that manufacturers, importers, and distributors are not required to display a seal on the package attesting to the safety of a toy. However, they must ensure that their products meet Canadian safety requirements.

Toys against which complaints are filed are tested by Health Canada inspectors, whose offices are located in Ottawa. The tests are performed in the Product Safety Laboratory, accredited for toy evaluation under standard ISO/IEC 17025, *General Requirements for the Competence of Calibration and Testing Laboratories*. However, according to Yves Fortin, Director of Health Canada's Consumer Product Safety Bureau, Mechanical and Electrical Hazards Section, toys are

[12] "Toys producing explosive noise, such as firecrackers or toys imitating firearms, are exempt from the *Hazardous Products Act*. The Explosives Division of Energy, Mines and Resources Canada regulates the safety of these toys." See online at http://www.chs.ca/info/noise/book3.html.

allowed to be tested elsewhere using a sound level meter[13] in an ordinary room. When testing indicates that a toy is noncompliant, Health Canada requires it to be withdrawn from the market.

1.6-CONCLUSION

Depending on their economic interests, the countries studied have adopted either the ISO or the ASTM standards (see Table 4). Canada is the only country to have legislated requirements for noisy toys.

<table>
<tr><th></th><th>ISO</th><th>CANADA</th><th>UNITED STATES (ASTM 963)</th><th>EUROPE (EN_71)</th><th>BRAZIL (INMETRO)</th><th>JAPAN</th><th>AUSTRALIA/ NEW ZEALAND</th></tr>
<tr><td>Noise limit (except guns and impulse noises)</td><td>125 dB</td><td>100 dB</td><td>138 dB</td><td>115 dB</td><td rowspan="7">Same as ISO</td><td rowspan="7">Same as ASTM</td><td rowspan="7">Same as ISO</td></tr>
<tr><td>Toy held near the ear</td><td>80 dB (free field) 90 dB (ear coupler)</td><td>100 dB (1 cm)</td><td>70 dB</td><td rowspan="5">Same as ISO</td></tr>
<tr><td>Rattles, etc.</td><td>85 dB or 110 dB (peak)</td><td>100 dB (15 cm)</td><td rowspan="2">90 dB (continuous sound)</td></tr>
<tr><td>Toy placed on a desk, bed, etc.</td><td></td><td>100 dB (30 cm)</td></tr>
<tr><td>Impulse noise</td><td>125 (peak)</td><td>100 dB</td><td>120 (peak)</td></tr>
<tr><td>Distance</td><td>Varies according to toy type</td><td>Varies according to toy type</td><td>25 cm regardless of toy type</td></tr>
</table>

Table 4: Summary of international standards examined

It is clear from this survey that noisy toy regulations are considerably deficient in all the countries studied. In the first place, the standards are voluntary, so their application depends on the manufacturer's good will. Second, the manufacturer is not required to use an independently accredited lab to certify its products' compliance. Finally, most authorities inspect toys only if a complaint is filed, which rarely happens because consumers are unaware of the hazards that noise may represent.

[13] A device that measures sound pressure levels, weighted or not, in the range of audible frequencies according to certain specifications.

We acknowledge that efforts have been made to keep abreast of the problem of noise, but there is still room for improvement. Recently, the EU and the US updated their standards but they made only minor changes. Currently, only ISO acknowledges the insufficiency of noisy toy impact studies and appears to be considering an overhaul of its noise standard (Appendix F, *ISO 8124-1:2000 Safety of Toys-Part 1: Safety Aspects Related to Mechanical and Physical Properties).* The results are to be made public next June. As for Canada, it has not taken any steps to reassess the situation, yet its noisy toy legislation has not been amended for 34 years.

As a further point, it is unfortunate to note that toy noise limits and calculation methods for them vary from one country to another. Due to this lack of uniformity, it is impossible to indicate on the packaging the maximum number of decibels emitted by the toy, which would enable consumers to properly evaluate the product.

Furthermore, the applicable toy testing procedures are out of touch with reality. The procedure depends on the type of toy, not the way the children actually use it. For example, it may be claimed that children "ordinarily" hold a toy at arm's length when in reality they bring it close to the ear. Yet Health Canada acknowledges that "the way some toys are used may expose children to hazards" and that "loud toys can damage a child's sensitive hearing."[14]

Therefore, Option consommateurs puts forward the following recommendation:

Option consommateurs recommends that the Government of Canada revise the noise limit for battery-operated toys and the applicable calculation procedures with reference to the unintended use that children may make of such toys.

[14] See online at http://www.hc-sc.gc.ca/english/iyh/products/toys.html .

2- IN-STORE SURVEY

In the course of our testing for the *Guide Jouets*, published in collaboration with *Protégez-Vous* magazine, we noted an increase in the number of battery-operated toys. We noticed the same trend when searching the Internet sites of major toy manufacturers such as Fisher-Price and Little Tikes. By our count, 64% of Fisher-Price toys designed for children ages 0–3 contained batteries and 75% of these were designed for infants under one year of age.[15] At Little Tikes, the percentage of sound-producing toys designed for the 0–3 age group was 54%. There are also some companies that only manufacture battery-operated toys, such as Vtech and Leapfrog, which produce electronic educational toys.

This situation led us to wonder whether consumers are well-informed about the noise generated by sound-producing toys. We conducted an in-store survey to verify the quality of information displayed on the packaging of 350 noisy toys designed for children ages 0–3 (see list of toys in Appendix C).

2.1- METHODOLOGY

Our first step was to prepare a checklist to assist in cataloging the information displayed on packages, such as logos, warnings, and existence of volume and/or off buttons. We also noted the names of the toy and manufacturer and included a photo if available (see Appendix D).

Then, in November and December, we visited 11 toy retailers on the Island of Montreal and in Ottawa. This time of year seemed particularly appropriate for such a survey. While the stores are bustling, manufacturers take advantage of the crowds to offer numerous noisy toys, noise being a good way to attract consumers' attention. In some cases, we visited several stores of the same chain (see list in Appendix E).

2.2- RESULTS

We found four different logos on packages: ASTM (United States), CE (Europe), the Lion Mark (United Kingdom), and INMETRO (Brazil), as well as a notice indicating that “this product meets the safety requirements of the *Canadian Hazardous Products (Toys) Regulation*” (see

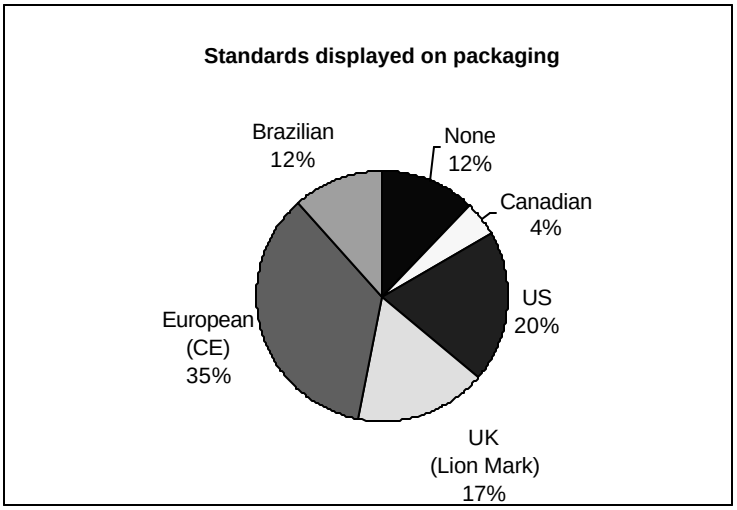
Appendix B). As we mentioned in chapter 1, the main function of these logos is to allow for free circulation of products in this country. These logos are poorly known to the general public, as evidenced by a survey we conducted of 24 families. None of the respondents was able to tell us what the Lion Mark, INMETRO and the Canadian compliance notice meant, while 89% did not know what the ASTM logo meant. The few who did have some idea said it was either a US standard or a Canadian standard. Moreover, 79% of the respondents did not know the meaning and origin of the CE logo; the others thought it had something to do with electrical standards, European standards, or safety in general.

In short, the presence or absence of these logos on toy packages is clearly of little or no use to consumers. The Canadian compliance notice is at least more explicit in that it mentions the word "safety," but we found this notice on only 4% of the packages examined. Also, not one package had any information on the number of decibels generated by the toy, or any noise warning.

Furthermore, we noticed that half the logos on the packages are of European origin (the most common being the CE logo). This, however, is a mandatory logo for manufacturers wishing to sell their products in Europe.[16] It does not necessarily imply that the toys meet the standards in force.

[15] This count took place in November 2003.
[16] See 1.3.1- Standard EN-71 and CE logo (p. 3).

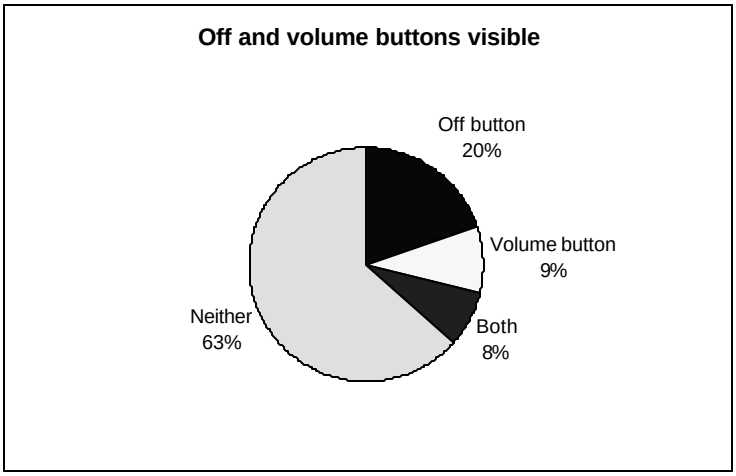
FIGURE 1: STANDARDS DISPLAYED ON PACKAGING



*Each package may display several different logos.

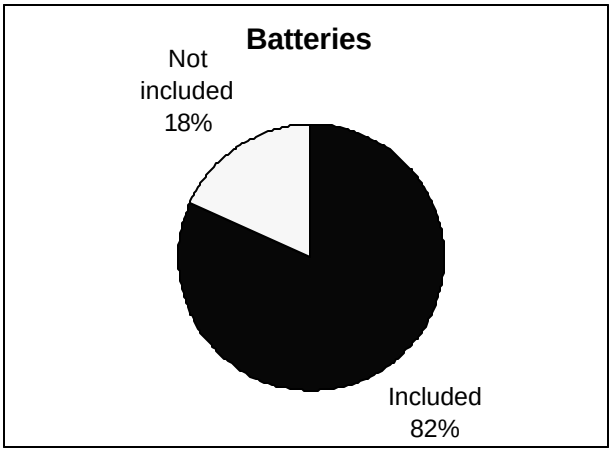
A further observation is that in a large majority (63%) of cases we were unable to determine by examining the packaging whether or not the toy had an off or volume button.

FIGURE 2: OFF AND VOLUME BUTTONS VISIBLE ON PACKAGING



Finally, 82% of the demonstrator models we examined contained batteries. Consumers can listen to them on site and attempt to judge the quality and loudness of the toy. This test is far from foolproof, since in such a busy shopping environment the toy may have been tried many times, the batteries may have run down, and the volume may be lower than normal.

FIGURE 3: PRESENCE OF BATTERIES



2.3-CONCLUSION AND RECOMMENDATIONS

Our careful examination of toy packaging reveals that the noise information displayed is highly insufficient. None of the manufacturers indicates the number of decibels emitted by the toy, and rare are the products that indicate the presence of an off or volume button. In the majority of cases, consumers can attempt to get an idea of the toy's loudness by pressing the buttons, but various factors (low batteries, store background noise, sound deadening acoustics) may mislead them into thinking the volume level is acceptable. Other toys, such as certain baby toys, are sold with batteries not included, so buyers cannot assess the product’s loudness.

Therefore, Option consommateurs puts forward the following recommendations:

Option consommateurs recommends that manufacturers systematically indicate on toy packaging the inclusion of an off and/or volume button, as applicable.

Option consommateurs recommends that manufacturers equip all their sound-producing toys with an off button and a volume button.

3- FAMILY EVALUATION OF TOYS

The 40 toys tested scientifically in the laboratory and in daycare centres (see Part One) were also evaluated by families at home (see list in Appendix F).

3.1-METHODOLOGY

Twenty-four families (40 children) tested the toys for 15 days. The parents were not required to let their children play with the toys if they found them too loud. At the end of the test, the parents completed an evaluation form (see Appendix G).

Last summer we also sent parents who test toys for the *Guide Jouets* a questionnaire on noisy toys that was completed by 52 families (see Appendix H).

3.2 -RESULTS

3.2.1-TEST RESULTS

In general, parents deplore their lack of control over noisy toys. The majority of parents suggested adding a volume button to toys not equipped with one (30 of 40). They did note that when such a button exists its presence is mentioned on the packaging or it is visible on the toy inside the packaging.

Parents also suggested that all toys be equipped with an off button (this was the case for 20 of 40 toys). They mentioned that there was no notice on the packaging of four of the toys indicating the presence of such a button and that for these toys the button was not visible inside the packaging.

The parents also stated that they were misled by the buttons on four toys. Two of these had a “fake” on/off button. When the child presses the button, the sounds stop only to resume when the child presses any other button. One of these toys was a cloth frog. A child might be tempted to sleep with it and be woken up by noise in the middle of the night. The other two toys had a button that changes the rhythm of the sounds. Some parents confused this button with a volume button. They would also have appreciated if the volume button were not operable by children, who tended to turn it to maximum when playing alone.

Furthermore, the parents' responses confirmed our doubts about the current scientific/regulatory approach to measuring toy loudness. The distance from the ear during ordinary play does not always correspond to the measurement distance prescribed by Canadian law, among other provisions. Marianne (2½ years), Amélie (11 months) and Amélie (2½ years) brought the Blue's Clues microphone (toy #27) to their ear as if it were a telephone, instead of holding it in their hands as per manufacturer's suggested use.

Finally, parents' responses revealed that noise tolerance varies from one individual to another. Their opinions were unanimous on only 8 of the 40 toys evaluated (see Appendix I). For the remaining toys, some families found the volume reasonable, others found it noisy or even unbearable. In fact, some parents even found the noise generated by Baby's Cell Phone by Tiny Love (104.8 dB average) to be reasonable, yet this toy is not even legally compliant (exceeding 100 dB) and may pose a hazard to babies' hearing. If parents like these are unable to identify an unacceptably loud toy by listening to it, then one doubts the value of "commonsense" Health Canada criteria as guides to toy selection (e.g., "a toy that is loud for an adult is likely too loud for a child"[17]).

Not only is noise a subjective criterion, but some parents are unconcerned about it. They remove the batteries because the noise bothers them, not because they think it poses a hazard to their children. The parents of Jade-Émilie (4 years) stated that when a noisy toy starts to annoy them, they simply leave the room and let her play with it!

3.2.2-SURVEY RESULTS

When making purchases, 90% of the parents surveyed tested toy sound effects and claimed to be influenced by them. Some check loudness; others want to know if the toy has a volume and/or an off button. Still others check the sound quality (for example, to see if a cow's mooing is realistic). Moreover, 65% of parents find that their children's toys are noisy. (This figure may seem paradoxical but, of course, parents are not the only family members who buy toys for their children.) To dampen the noise, 41% of the respondents stated that they had taped over a toy's

loud speaker because they found it too loud, while 59% of the parents stated that they had removed the batteries.

Our survey also reveals the children play in places where other noise is present, from the TV, the radio, and/or household appliances. The three most common playrooms are the living room, the bedroom, and the basement. A parent of Florent (8 months) stated that "there were other sounds in the room where Florent was playing but the toy drowned them out."

This factor may partially explain the differing opinions on toy loudness. If a child plays in a noisy environment, the noise from the toy will seem softer than in a quiet environment.

4-RECOMMENDATIONS

In the view of Option consommateurs, whereas:

1- The information appearing on noisy toy packaging is insufficient.
2- Few toys have volume and off buttons.
3- Parents' opinions of toy loudness vary from one individual to another.
4- Parents are generally unaware of the hazard to their children's hearing that some toys represent.
5- Many children use their toys in ways that were not intended.

Option consommateurs recommends:

- **That the Government of Canada revise the noise limit for battery-operated toys and the applicable calculation procedures with reference to the unintended use that children may make of them.**

[17] See online at http://www.hc-sc.gc.ca/english/iyh/products/toys.html .

- **That the Government of Canada conduct a public information campaign on noisy toys.**
- **That manufacturers systematically indicate on toy packaging the inclusion of an off and/or volume button, as applicable.**
- **That manufacturers equip all their sound-producing toys with an off button and a volume button.**

Finally, Option consommateurs supports the recommendations of Richard Larocque, audiologist with the firm Audio Conseil, which we reiterate below.

According to Audio Conseil, in view of:

1) the importance for children to possess and maintain optimal hearing in an overall developmental context that includes language learning, among other skills;

2) the importance, given this same context, of living in an acoustic environment in which it is physically possible to assimilate the necessary information;

3) the precautionary principle that should guide actions intended to prevent temporary and permanent deafness, as well as the lack of reliable experimental data in this field;

4) the discrepant scientific data relating to the prevention of temporary and permanent deafness in adults;

5) the acoustic and behavioural data gathered in this study, Audio Conseil recommends that:

- **Noise levels of toys designed for children ages 0–3 not exceed 87 dBA, where these levels are measured under conditions simulating significant proximity between the toy and the ear (if possible, measured at 1 cm from the sound level meter microphone or through an ear coupler).**
- **A multidisciplinary committee of experts in the fields of audiology, acoustics, and ergonomics be formed to make recommendations for the revision of the legislative framework covering the sale, distribution, and advertising of toys designed for children, particularly those aged 0–3.**

- **The committee of experts take a position on a suitable acoustic measurement methodology that is sensitive to the proposed legislative framework, the nature of the industry, and the ergonomic constraints inherent in each age group targeted by toy products.**

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Canada: http://www.hc-sc.gc.ca/hecs-sesc/cps/publications/toy/testing.htm

http://laws.justice.gc.ca/en/H-3/index.html

Europe: www.industrie.gouv.fr/eic/dossier/doc/cec.htm

www.afnor.fr

www.btha.co.uk/publications/ntc/toysafety.html

www.btha.co.uk/codeofconduct.html

United States: www.astm.org (ASTM International)

www.toy-tia.org (Toy Industry Association)

Japan: www.toys.or.jp/index.html

New Zealand: www.standards.co.nz

International Organization for Standardization (ISO): www.iso.ch

International Standards for Toys & Children's Products:

www.toy-icti.org/publications/safetystandards.htm

APPENDIX A: LETTER FROM HEALTH CANADA CONCERNING TOY NOISE TESTING

APPENDIX B: INTERNATIONAL LOGOS SEEN ON PACKAGING

Brazil

United States

United Kingdom

European Union

CE

Canadian note (manufacturer's initiative)

APPENDIX C: TOYS INSPECTED IN STORES

Name	Manufacturer	Age
1. Brillant Basics/Portique tonique	Fisher Price	0 yr
2. Aquarium	Fisher-Price	0 yr
3. Baby PlayZone/Mon premier flipper	Fisher-Price	0 yr
4. Classical Chorus/Portique	Fisher-Price	0 yr
5. Classical Chorus/Tambour	Fisher-Price	0 yr
6. Learning Patterns/Balle singe musical	Fisher-Price	0 yr
7. Learning Patterns/Chaton Calin	Fisher-Price	0 yr
8. Learning Patterns/Mon petit tableau de bord Car Seat Dashboard with Remote Control 71924	Fisher-Price	0 yr
9. Learning patterns/Zèbre joueur	Fisher-Price	0 yr
10. Maison-Gym	Fisher-Price	0 yr
11. Rigolotronique!/Tableau d'activités Baby Smartronics™	Fisher-Price	0 yr
12. Rigolotronique/Piano apprenti 71681	Fisher-Price	0 yr
13. Sesame Street/Baby Discoveries/L'activitron 3 en 1	Fisher-Price	0 yr
14. Trotteur musical premières découvertes	Fisher-Price	0 yr
15. Playskool/Berceuse lumineuse	Hasbro	0 yr
16. Playskool/Carroussel Bébé bedon 6584	Hasbro	0 yr
17. Playskool/Gym Bébé bedon 2 en 1	Hasbro	0 yr
18. Playskool/Luminou Douceur du dodo	Hasbro	0 yr
19. Playskool/Luminou/P'tit Lumi-copain	Hasbro	0 yr
20. Playskool/Punch-reveil Acti-Multi	Hasbro	0 yr
21. Lumières et sons Barre de jouet pour porte-bébé	Kids II	0 yr
22. Bright Friends/Pupsqueak	Lamaze	0 yr
23. Dreamscapes	Leapfrog	0 yr
24. Roll & Rhytme Melody Block	Leapfrog	0 yr

25. Musical Motion Ocean/Portique Gym 1558	Little Tikes	0 yr
26. Gym pour bébé son et lumière	Shelcore Toys	0 yr
27. Puppy Play Activity Bar	Star H.K Electronic	0 yr
28. Babiee Discoveriee/Babiee Readee	Tinco	0 yr
29. 1-2-3 Musical Mirror	Tiny Love	0 yr
30. 3D Activity Gym	Tiny Love	0 yr
31. Baby's Cell Phone	Tiny Love	0 yr
32. Symphony-in-motion/Mobile	Tiny Love	0 yr
33. Taylor The Hug-Me-Turtle	Tiny Love	0 yr
34. Bébé s'éveille/Lumi'douceur	Vtech	0 yr
35. Smart Sensations/La chenille Toudoux	Vtech	0 yr
36. Smart Sensations/Tableau d'éveil Toudoux	Vtech	0 yr
37. Alarme de voiture	Winkz (imported by Zellers)	0 yr
38. Baby baby/Baby gadget light'n sound	aucun	03 mth
39. PhotoMagic'Rainbow Mini Camera	Chicco	03 mth
40. Télécommande Magique	Chicco	03 mth
41. Learning Patterns/Grenouille Surprise	Fisher-price	03 mth
42. Learning patterns/L'éléphant musical	Fisher-Price	03 mth
43. Learning Patterns/La chenille Flip Flap	Fisher-Price	03 mth
44. Ocean Wonders Aquarium Bouncer	Fisher-Price	03 mth
45. Sesame Street/Le touche-à-tout	Fisher-Price	03 mth
46. Sound & Light Elephant	Learning Road	03 mth
47. Make Fun With The Phone	SB Toys	03 mth
48. Light N'Sound Train	Shelcore Toys	03 mth
49. Wacky sounds Teething Key	Shelcore Toys	03 mth
50. Developlay Activity Centre	Tiny Love	03 mth
51. LozyPals Hippo (ou lion)	Tiny love	03 mth

52. Hochet Canard	Vtech	03 mth
53. Hochet escargot/Hochet lune	Vtech	03 mth
54. Le lion Toudoux	Vtech	03 mth
55. P'tite Fleur	Vtech	03 mth
56. Smart Sensations/Le Caméléon Toutdoux	Vtech	03 mth
57. Smart Sensations/Mon ourson Toudoux	Vtech	03 mth
58. L'arbre ventouse musical	Chicco	06 mth
59. Téléphone magique	chicco	06 mth
60. Baby Kitty Wrap Around on Baby Bunny	Child Guidance	06 mth
61. Auto Tape et roule	Fisher Price	06 mth
62. Classical chorus/Pyramide Maestro	Fisher Price	06 mth
63. Baby Play Zone/Établi de sol	Fisher-Price	06 mth
64. Baby Play Zone/Mon premier volant 74086	Fisher-Price	06 mth
65. Baby Smartronics!/Rigolotronique/Dino Roulanimo	Fisher-Price	06 mth
66. Baby Smartronics Rigolotronique/Monsieur téléphone	Fisher-Price	06 mth
67. Baby Smartronics!/Rigolotronique/Tortue Roulanimo	Fisher-Price	06 mth
68. Baby Smartronics/High Flyin Language Learner	Fisher-Price	06 mth
69. Baby Smartronics/Nursery Rhymes Bus	Fisher-Price	06 mth
70. Classical Chorus/Trieur de formes (B0644)	Fisher-Price	06 mth
71. Disney/Arbre d'activités Winnie 1,2,3 Exploring Tree™	Fisher-Price	06 mth
72. Disney/Hochet magique Winnie l'ourson	Fisher-Price	06 mth
73. Escargot Musical Animablocs	Fisher-Price	06 mth
74. La ronde des animaux	Fisher-Price	06 mth
75. Learning Patterns/Doux serpent	Fisher-Price	06 mth
76. Learning Patterns/La pieuvre à malices	Fisher-Price	06 mth
77. Learning Smart Screen Intelli-Table	Fisher-Price	06 mth

78. Ocean Wonders/Bocal à poissons 73299	Fisher-Price	06 mth
79. Peek a Bloks/2-in-1 Activity Chariot Cub'Chariot	Fisher-Price	06 mth
80. Peek a Bloks/Cub'Girafe	Fisher-price	06 mth
81. Photo Fun Learning/Smart screen intelli-table	Fisher-Price	06 mth
82. Rigolotronique/Mr Cookie Baby Smartronics	Fisher-Price	06 mth
83. Sesame Street/L'activatome Activity Atom	Fisher-Price	06 mth
84. Sesame Street/La molécule magique Magic Sounds Molecule 90734	Fisher-Price	06 mth
85. Winnie berceuse magique	Fisher-price	06 mth
86. Winnie the Pooh/Balade musicale	Fisher-Price	06 mth
87. Winnie The Pooh/Musical Take Along	Fisher-Price	06 mth
88. Anneaux empilés avec musique et lumières	Geoffrey (imported by Toys R Us)	06 mth
89. Playskool/Go & Grow Crawl'n Flutter Bee	Hasbro	06 mth
90. Playskool/Twinckle'n Twirl Cd Player	Hasbro	06 mth
91. Hug & Learn Baby Tad	Leapfrog	06 mth
92. LeapStart Learning Table	Leapfrog	06 mth
93. Learning Drum	Leapfrog	06 mth
94. DiscoverSounds/Boîte à outil Tool Box 1609	Little Tikes	06 mth
95. DiscoverSounds/Casseroles empilables Stackin' Pans 1607	Little Tikes	06 mth
96. DiscoverSounds/Fer	Little Tikes	06 mth
97. DiscoverSounds/Marteau Hammer	Little Tikes	06 mth
98. DiscoverSounds/Roller	Little Tikes	06 mth
99. DiscoverSounds/Théière musicale	Little Tikes	06 mth
100. DiscoverSounds/Waver	Little Tikes	06 mth
101. Goofy Giggle Remote Control/Télécommandé	Little Tikes	06 mth
102. Le copain d'apprentissage	Little Tikes	06 mth
103. Scie	Little Tikes	06 mth

104.	Tunes & Tales Learning bus	Little Tikes	06 mth
105.	Tunes & Tales/Hochet	Little Tikes	06 mth
106.	Radio Bébé	Playskool	06 mth
107.	Golf avec des lumières et des sons	Shelcore Toys	06 mth
108.	Ligh'N Sound Busy Ball	Shelcore Toys	06 mth
109.	Light'N Sound Phone 03031	Shelcore Toys	06 mth
110.	Rouleau musical	Shelcore Toys	06 mth
111.	Parc d'activités	Toys R'Us	06 mth
112.	Fil'O Chat	Vtech	06 mth
113.	Rhyme & Discover Book	Vtech	06 mth
114.	Roul'Marguerite	Vtech	06 mth
115.	Smart Start/Pek-a-Boo Ball	Vtech	06 mth
116.	Arche enchantée	Chicco	09 mth
117.	Sesame Street/Le labo lumières et leviers	Fisher price	09 mth
118.	Baby Play Zone/Module Serpentin	Fisher-Price	09 mth
119.	Baby Play Zone/Mon 1er Basket	Fisher-Price	09 mth
120.	Baby Play Zone/Stand-Up Ball Blast	Fisher-Price	09 mth
121.	Baby Play Zone/Trotteur 2 en 1	Fisher-Price	09 mth
122.	Elmo's Stuiterbal	Fisher-Price	09 mth
123.	Winnie the Pooh/Abeilles voltigeuses	Fisher-Price	09 mth
124.	Playskool/Table Air-Activité	Hasbro	09 mth
125.	Le livre des Ani'Maths	Leapfrog	09 mth
126.	Château de jeu	Little Tikes	09 mth
127.	DiscoverSounds/Kitchen cuisine	Little Tikes	09 mth
128.	Smoby Baby/Sounds & Lights Book	Smoby	09 mth
129.	Les 3 petits cochons	Vtech	09 mth
130.	Mon livre enchanté	Vtech	09 mth

131. Electronic Light N Sound/Ensemble musical 10en 1	Blue Box plus	1 yr
132. Interactive farm Interactive	Blue Box plus	1½ yr
133. Château enchanté	Chicco	1½ yr
134. Escargot électronique	Chicco	1 yr
135. Magic tree house	Chicco	1 yr
136. Little People/Maison des découvertes	Fisher Price	1 yr
137. Baby Playzone/Balle à tirer	Fisher-Price	1 yr
138. Barney Chante sous la pluie	Fisher-Price	1½ yr
139. Barney Dino danseur	Fisher-Price	1½ yr
140. Barney's ordinateur portatif Apprendre en s'amusant	Fisher-Price	1½ yr
141. Barney/Batterie gonflable	Fisher-Price	1½ yr
142. Barney/Camions empilables 4 en 1	Fisher-Price	1½ yr
143. Barney/Clean-up Shapes Trucks	Fisher-Price	1½ yr
144. Blue bavarde	Fisher-Price	1½ yr
145. Blue Clue/La radio de Blue	Fisher-Price	1½ yr
146. Blue Clues Freeze Dance Periwinkle	Fisher-Price	1½ yr
147. Cheval à bascule musical	Fisher-Price	1 yr
148. Elmo farceur	Fisher-price	1½ yr
149. Little People/Animaux et sons de la ferme	Fisher-Price	1 yr
150. Little People/Animaux parleurs du zoo et Bébés animaux du zoo	Fisher-Price	1 yr
151. Little People/Caserne de pompiers	Fisher-Price	1½ yr
152. Little People/Fête Forraine B6313	Fisher-Price	1½ yr
153. Little People/Flash the Fire truck	Fisher-Price	1½ yr
154. Little People/La grande roue	Fisher-Price	1½ yr
155. Little People/Super Garage	Fisher-Price	1 yr
156. Little People/Train musical des animaux	Fisher-Price	1 yr
157. Little People/Train sons amusants	Fisher-Price	1 yr

158. My first Princess/Cinderella'a 3-in-1 carriage	Fisher-Price	1½ yr
159. My first Princess/Dress'n Spin Cinderella	Fisher-price	1½ yr
160. Piano gonflable	Fisher-Price	1½ yr
161. Sesame Street/Bébé Macaron	Fisher-Price	1½ yr
162. Sesame Street/Cube musical Making Music™ Cube 90438	Fisher-price	1½ yr
163. Sesame Street/Elmo de la danse des canards	Fisher-Price	1½ yr
164. Sesame Street/Elmo's World /Téléphone cellulaire bavard	Fisher-Price	1½ yr
165. Sesame Street/Guitare Rock Elmo	Fisher-price	1½ yr
166. Sesame Street/Limbo Elmo	Fisher-Price	1½ yr
167. Sesame Street/Mini saxophone	Fisher-Price	1 yr
168. Sesame Street/Mini Violon	Fisher-Price	1 yr
169. Sesame Street/Tableau rigolo	Fisher-Price	1 yr
170. Snoopy junior musical Lil' Snoopy 72775	Fisher-Price	1 yr
171. Tigrou pense vite	Fisher-Price	1½ yr
172. Centre de conduite 80330	Fun Years (imported by Toys R Us)	1½ yr
173. Fun Years/Tableau de bord junior	Geoffrey (imported by Toy R Us)	1½ yr
174. Fun Years/Véhicule de secours avec sons et lumières (ambulance)	Geoffrey (imported by Toy R Us	1½ yr
175. Baguette musicale	Geoffrey (imported by Toys R Us)	1½ yr
176. Fun Years/Chiot chanteur	Geoffrey (imported by Toys R Us)	1 yr
177. Le pousseur d'activité électronique	Geoffrey (imported by Toys R'Us)	1 yr
178. Mon petit train amusant	Geoffrey (imported by Toys R'Us)	1 yr

179.	Table d'activité	Geoffrey (imported by Toys R'Us)	1½ yr
180.	Baby's First Giggles	Goldberger (Imported by Wal Mart)	1 yr
181.	Playskool/Fun Tunes Tracteur	Hasbro	1 yr
182.	Playskool/Musique et lumière siège toupie	Hasbro	1½ yr
183.	Tonka Junior/Boing et Vroum	Hasbro	1 yr
184.	Dancing Deedle Dudes	Imagiix	1½ yr
185.	Happy Land/Happy Hospital	International Playthings	1½ yr
186.	Happy Land/Rescue Station	International Playthings	1½ yr
187.	Musical pull phone	International Playthings	1 yr
188.	Playtime Station	International Playthings	1 yr
189.	Super Duper Keys	International Playthings	1½ yr
190.	Alphabet pal La chenille ABC	Leapfrog	1 yr
191.	Fun & Learn Phonics Bus Interactive Game	Leapfrog	1½ yr
192.	Chat'n Play/Téléphone 211	Little Tikes	1½ yr
193.	DiscoverSounds/Maison de jeux	Little Tikes	1½ yr
194.	Glitter Flitter/Papillon Butterfly 1612	Little Tikes	1 yr
195.	Véhicules d'urgence Tots	Little Tikes	1½ yr
196.	Activity Table	Mega Bloks	1½ yr
197.	Learning Station	Mega Bloks	1½ yr
198.	Mr Drum	Mega Bloks	1½ yr
199.	Mr Piano	Mega Bloks	1½ yr
200.	My musical farm	Mega Bloks	1 yr
201.	Transforming Timmy the Smart Trucks!	Mega Bloks	1½ yr
202.	Fun mobile Amusomobile	Navystar	1½ yr
203.	Teletubbies sons rigolos	PBS Kid, imported by Toys R Us	1½ yr

204.	Magic Screen Learning Desk	Playskool	1 yr
205.	Magic Screen palm learner	Playskool	1 yr
206.	John Deere/Animal Sounds Hay Ride	RC2 Ertl	1½ yr
207.	Ambulance Chunky camion de pompier 52598	Shelcore Toys	1 yr
208.	Auto de course qui marche	Shelcore Toys	1 yr
209.	Chemin de fer avec secouement	Shelcore Toys	1 yr
210.	Light'N Sound Chunky Rig	Shelcore Toys	1 yr
211.	Piano éclatant de son et lumière	Shelcore Toys	1½ yr
212.	Pull'N Glow Bug 82124	Shelcore Toys	1 yr
213.	Sans nom	Shelcore Toys	1 yr
214.	Shakin'Rescue Station	Shelcore Toys	1½ yr
215.	Tracteur qui se secoue	Shelcore Toys	1 yr
216.	Chatter animals	Silverlit Toddler	1 yr
217.	Giddy-Up! Pony	Tomy	1½ yr
218.	Baby Rallye	Vtech	1 yr
219.	Bébé découvre/Anneaux surprises	Vtech	1 yr
220.	Bébé découvre/Cot cot Family	Vtech	1 yr
221.	Bébé découvre/Magi'fusée	Vtech	1 yr
222.	Rigol'auto	Vtech	1 yr
223.	Rigolo'phone	Vtech	1 yr
224.	Lumière et balle à son musical	Wah Huing Toys	1 yr
225.	Gentil Lumignon	Winkz	1 yr
226.	Canard musical	Winkz (exclusivité Zellers)	1 yr
227.	Tortue Son et Lumière	Geoffrey (imported by Toys R Us)	10 mth
228.	Thomas & Friends/Pull along Thomas	Tomy	10 mth
229.	Roul'avion	Vtech	10 mth
230.	Roul'Train	Vtech	10 mth

231. Electronic Musical Shape Sorter House	Battat	2 yrs
232. Parle, chante et joue	By Lovee Doll	2 yrs
233. Anima Torche Animée	Fisher-Price	2 yrs
234. Blue's Clues/Microphone Chante avec Blue	Fisher-Price	2 yrs
235. Dora The Explorer/Dora la danseuse We Did It!™ Dancing Dora 90639	Fisher-Price	2 yrs
236. Dora The Explorer/Dora musicale	Fisher-Price	2 yrs
237. Dora The explorer/L'exploratrice/Boots le singe danseur	Fisher-Price	2 yrs
238. Geotrax/Circuit train	Fisher-price	2½ yrs
239. Fun Years/Jungle Phonic Teacher	Geoffrey (imported by Toy R Us)	2 yrs
240. The Home Depot/Desherbeuse de l'ouvrier	Geoffrey (imported by Toys R Us)	2 yrs
241. Playskool/Barney/Bongos magiques de chansons	Hasbro	2 yrs
242. Fridge phonics Magnetic Letter Set	Leapfrog	2 yrs
243. Pretend & Learn Shopping Cart	Leapfrog	2 yrs
244. Lego Explore 3362 Music tapper	Lego	2 yrs
245. Choo Choo Zoo/Train	Little Tikes	2 yrs
246. Coiffeuse parlante	Little Tikes	2 yrs
247. Music Bloks	Neurosmith	2 yrs
248. Téléphone animé électronique avec 4 messages et sonnerie de rappel	Playskool	2 yrs
249. Fun Years/Talk'n learn Alphabet	Sans Nom (importé Toys R Us)	2 yrs
250. Talk'N Learn/L'alphabet	Scientific Toys	2 yrs
251. The Wiggles/Anthony qui chante et qui parle	Spin Master	2 yrs
252. The Wingles Toot toot Musical big red car	Spin Master	2 yrs
253. Fun Street Rider	Steer me	2 yrs
254. Maggie	Zapf Creation	2 yrs

255. Jocund Dinosaur	Aucun	3 yrs
256. Electronic Alphabet Bus	Battat	3 yrs
257. Projection Game	Catle Classics	3 yrs
258. Caillou Danse & Chante	Danaware	3 yrs
259. Caisse électronique	Disney	3 yrs
260. Disney Princess Sleeping Beauty ensemble de jeu le château	Disney	3 yrs
261. Disney Princess/Ma beauté de sommeil de taille	Disney	3 yrs
262. Lilo & Stitch/Communicateur final de l'espace	Disney	3 yrs
263. Lilo & Stitch/Commutateur intergalactique de voix	Disney	3 yrs
264. Téléphone et répondeur automatique pour jouer	Disney	3 yrs
265. Toy story and Beyong!/Interstellar Buzz Ultimate Talking Action Figure	Disney Store	3 yrs
266. Toy story and Beyong!/Talking Buzz Lightyear Doll	Disney Store	3 yrs
267. Cours de dessin/Blue's Clues	Fisher-price	3 yrs
268. Disney/get Up'n Bounce Tiger	Fisher-Price	3 yrs
269. Fauteuil Génie Musical 39645	Fisher-Price	3 yrs
270. Kasey the Kinterbot	Fisher-price	3 yrs
271. Rescue Heroes/Camion de pompiers	Fisher-Price	3 yrs
272. Rescue heroes/Voiture de police	Fisher-Price	3 yrs
273. Screw y Looey	Fisher-Price	3 yrs
274. Smithsonian/Aventures fauniques tout-terrain	Fisher-Price	3 yrs
275. Tambour disco	Fun Years imported by Toys R Us	3 yrs
276. Tonka 3430	Funrise	3 yrs
277. Musical Train Station/Gare Musicale	FunYears (Importation)	3 yrs
278. Fun Year/Caisse enregistreuse	Geoffrey (imported by Toy R Us)	3 yrs

279. Fun Years/Air Drums Electroniques	Geoffrey (imported by Toy R Us)	3 yrs
280. Fun Years/Centre de soin pour animaux vet tec électronique et parlent	Geoffrey (imported by Toy R Us)	3 yrs
281. Fun Years/Cla vier électronique	Geoffrey (imported by Toy R Us)	3 yrs
282. Fun Years/Clavier portatif	Geoffrey (imported by Toy R Us)	3 yrs
283. Fun Years/Coffret grue géante avec outil électrique	Geoffrey (imported by Toy R Us	3 yrs
284. Fun Years/Ferme électronique	Geoffrey (imported by Toy R Us)	3 yrs
285. Fun Years/Gare musicale	Geoffrey (imported by Toy R Us)	3 yrs
286. Fun Years/Grand clavier avec microphone à entrée vocale	Geoffrey (imported by Toy R Us)	3 yrs
287. Fun years/Tambour Disco	Geoffrey (imported by Toy R Us)	3 yrs
288. Fun years/Téléphone cellullaire	Geoffrey (imported by Toy R Us)	3 yrs
289. Fun Years/Téléphone et téléavertisseur sonores factices	Geoffrey (imported by Toy R Us)	3 yrs
290. My Home/Aspirateur Balai 2 en 1	Geoffrey (imported by Toy R Us)	3 yrs
291. Gadget de bébé	Geoffrey (imported by Toys R Us)	3 yrs
292. The Home Depot/Grill de barbecue	Geoffrey (imported by Toys R Us)	3 yrs
293. The Home Depot/Jeu d'outils 16 pièces	Geoffrey (imported by Toys R	3 yrs

	Us)	
294. The Home Depot/Workman's power Tool Set	Geoffrey (imported by Toys R Us)	3 yrs
295. Animotrain	Happy Kid	3 yrs
296. Tonka/Rescue Ambulance	Hasbro	3 yrs
297. Happy Tails	Hasbro/Wow Wee	3 yrs
298. Active Ben/Chien dalmatien sauteur	Heng Hai (imported by SP Toys)	3 yrs
299. Disney/Musical marionettes Piglet	Hosung NY	3 yrs
300. Mon chien savant	IQ Builders	3 yrs
301. Traffic City Piano	JD ((imported by SP Toys)	3 yrs
302. Caisse enregistreuse de supermarché 30251	Kid Connection (Imported by Wal mart)	3 yrs
303. Mon distributeur automatique	Kid Connection (Imported by Wal Mart)	3 yrs
304. Tronçonneuse Monstre sur Piles avec Lunettes	Kid Connection (imported by Wal Mart)	3 yrs
305. Unité d'intervention de la police municipale	Kid Connection (Imported by Wal mart)	3 yrs
306. Voiture de police lampe de poche avec sons et lumières	Kid Connection (imported by Wal Mart)	3 yrs
307. Voiture téléguidée préscolaire	Kid Connection (Imported by Wal Mart)	3 yrs
308. Jouet médical parlant	Kiddieland	3 yrs
309. Guitare Rock Électronique	Kidz Focus imported by Wal-Mart	3 yrs
310. The Ultra Corps Ultra powersound/ATK Dirt Bike	Lanard	3 yrs
311. The Ultra Corps/Recoil Weapon rapid Fire	Lanard Toys	3 yrs

312. Imagination Desk/Système d'aprrentissage	Leapfrog	3 yrs
313. Leap's Phonics Library	Leapfrog	3 yrs
314. Mon premier leapad	Leapfrog	3 yrs
315. Little Chunky Radio	Listen Toys	3 yrs
316. Mon incroyable bébé	Lotus	3 yrs
317. Barbie/Paquebot de croisière	Mattel	3 yrs
318. Bob l'éponge/Les Frappés Rigolos-Bob l'éponge	Mattel	3 yrs
319. Hotwheels/Auto tech Service centre	Mattel	3 yrs
320. Hotwheels/Liquid Fusion racer	Mattel	3 yrs
321. HotWheels/Monster Jam Wolverine	Mattel	3 yrs
322. HotWheels/Scorchin Wheelie Vehicle	Mattel	3 yrs
323. My beautiful Mermaid	MGA Entertainment	3 yrs
324. Musical Noah's Ark	Navystar	3 yrs
325. Gun'em Racer's	New Bright Industrial Co	3 yrs
326. Funshine Bear Solours Calinours	Play Along	3 yrs
327. The Dog/Le chien	Play along	3 yrs
328. Caillou/Laugh and Learn Talking Plush	Sans nom (Imported by Danawares)	3 yrs
329. Play at home with lots of fun/Aspirateur	Sans nom (imported by Wal mart)	3 yrs
330. Mon copain Clifford 24219	Scholastic	3 yrs
331. Fun'n Learn Houses/Maison 3 jeux dans 1	Soon Cheng Toys (imported by SB TOys)	3 yrs
332. Telephone public en français	Soon Cheng Toys (imported by SB Toys)	3 yrs
333. Toy Story Beyong!/Woody parlant à ficelle	The Disney Store	3 yrs
334. Toy story and Beyong!/Disk Shooter	The Disney Store exclusive	3 yrs
335. Toy Story Beyong!/Ceinture de Buzz Lightyear	The Disney Store exclusive	3 yrs

336. Toy Story Beyong!/Sableuse cosmique de l'espace	The Disney Store exclusive	3 yrs
337. Disney pop dreamers/Ari Poupée interactive Reconnaît vêtements et guitare!	Thinkway	3 yrs
338. Compagnon de jeu Battant des ailes	Toy Island	3 yrs
339. Snubbie/Soirée d'anniversaire avec Rosie	Toy Quest	3 yrs
340. Road Rippers/4x4	Toy State Industrial	3 yrs
341. Road Rippers/Muscle road	Toy State Industrial	3 yrs
342. Road Rippers/PT Cruiser	Toy State Industrial	3 yrs
343. Fun Years/Animal Alley maisonnette pour animaux	Toys R Us	3 yrs
344. Road Rippers/Lightning Blast: Silver Dodge Ram	ToyState	3 yrs
345. Alphabet Apple	Vtech	3 yrs
346. AlphaBit's Litters'N Lights	Vtech	3 yrs
347. La ferme des devinettes	Vtech	3 yrs
348. Le super Détective	Vtech	3 yrs
349. Learning adventures/Smarty's Toolbox	Vtech	3 yrs
350. Mon premier globe	Vtech	3 yrs

APPENDIX D: CHECKLIST FOR NOISY TOY PACKAGING

Checklist

CODE ____ ☐ Boutique ☒ Chain

Nom Choo Choo Zoo/Train **FABRICANT** Little Tikes **AGE** 2

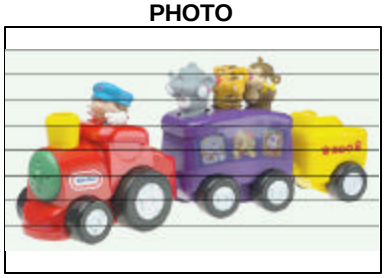
Name

PHYSICAL DETAILS OF TOY

STANDARD INFO ON PKG

☒ CE ☐ INMETRO NBR 111786 OCP 0006 CE-BRI/IQB 2719
☐ Lion Mark ☐ Canadian Hazardous Products (Toys)
☐ ASTM F963 ☐ None

PHOTO



NOISE INFO ON PKG ☐ On/off ☐ Noise levels ☒ None

OFF BUTTON **VISIBLE** ☐ Yes ☒ No

VOLUME BUTTON **VISIBLE** ☐ Yes ☒ No

BATT. INCLUDED ☒ Yes ☐ No

NOTES

APPENDIX E: STORE LIST

Montreal

1. Au Diabolo
2. Bobino, les jouets Morency
3. Canadian Tire
4. Costco
5. Educa-jeux
6. Kangourou
7. The Bay
8. Le Tambourin
9. Maxi & Cie
10. Sears
11. Tour de jeux (Galerie d'Anjou)
12. Toys-R-Us
13. Wal Mart
14. Winners
15. Zellers

Ottawa

1. Toy-R-Us
2. Sears
3. Mrs. Tiggy Winkle's
4. The Disney Store

APPENDIX F: LIST OF TOYS TESTED BY FAMILIES

NAME	Company	Age
1. BABY'S CELL PHONE	Tiny Love	0 year
2. PLAYSKOOL/GYM BÉBÉ BEDON 2 EN 1	Hasbro	0 year
3. PLAYSKOOL/LUMINOU/P'TIT LUMI-COPAIN	Hasbro	0 year
4. TÉLÉCOMMANDE MAGIQUE	Chicco	3 months
5. SESAME STREET/LE TOUCHE-À-TOUT	Fisher-Price	3 months
6. CLASSICAL CHORUS/TRIEUR DE FORMES (B0644)	Fisher-Price	6 months
7. DISCOVERSOUNDS/WAVER	Little Tikes	6 months
8. HUG & LEARN BABY TAD	Leapfrog	6 months
9. WINNIE THE POOH/BALADE MUSICALE	Fisher-Price	6 months
10. LEARNING DRUM	Leapfrog	6 months
11. BABY PLAYZONE/MODULE SERPENTIN	Fisher-Price	9 months
12. BABY PLAYZONE/STAND-UP BALL BLAST	Fisher-Price	9 months
13. LE LIVRE DES ANI'MATHS	Leapfrog	9 months
14. BABY PLAYZONE/BALL	Fisher-Price	1 year
15. MUSICAL DUCK	Winkz (Zellers exclusive)	1 year
16. MON PETIT TRAIN AMUSANT	Geoffrey (imported by Toys R'Us)	1 year
17. PULL'N GLOW BUG 82124	Shelcore Toys	1 year
18. SESAME STREET/MINI SAXOPHONE	Fisher-Price	1 year
19. SESAME STREET/MINI VIOLON	Fisher-Price	1 year
20. SESAME STREET/TABLEAU RIGOLO	Fisher-Price	1 year
21. TORTUE SON ET LUMIÈRE	Geoffrey (imported by Toys R Us)	10 months
22. BLUE CLUE/LA RADIO DE BLUE	Fisher-Price	1½ year
23. CENTRE DE CONDUITE 80330	Fun Years (imported by Toys R Us)	1½ year
24. LITTLE PEOPLE/FLASH THE FIRE TRUCK	Fisher-Price	1½ year
25. PIANO ÉCLATANT DE SON ET LUMIÈRE	Shelcore Toys	1½ year
26. SESAME STREET/GUITARE ROCK ELMO	Fisher-price	1½ year
27. BLUE'S CLUES/SING WITH BLUE MICROPHONE	Fisher-Price	2 years
28. FUN YEARS/TALK'N LEARN ALPHABET	No name (imported by Toys R Us)	2 years
29. SPONGEBOB	Mattel	3 years
30. CAILLOU DANSE & CHANTE	Danaware	3 years
31. DISNEY POP DREAMERS/ARIEL INTERACTIVE DOLL	Thinkway	3 years
32. FUN'N LEARN HOUSES	Soon Cheng Toys (imported by SB Toys)	3 years
33. ELECTRONIC ROCK GUITAR	Kidz Focus imported by Wal-Mart	3 years
34. HOTWHEELS/MONSTER JAM WOLVERINE	Mattel	3 years
35. MUSICAL TRAIN STATION/GARE MUSICALE	FunYears (import)	3 years
36. ROAD RIPPERS/PT CRUISER	Toy State Industrial	3 years
37. DISCO DRUM	Fun Years imported by Toys R Us	3 years
38. PUBLIC TELEPHONE IN FRENCH	Soon Cheng Toys (imported by SB Toys)	3 years
39. TONKA 3430	Funrise	3 years
40. MONSTER CHAINSAW WITH GOGGLES	Kid Connection (imported by Wal Mart)	3 years

APPENDIX G: EVALUATION FORM FOR FAMILIES

DESCRIPTION OF TOY	LIST OF PARTICIPANTS
No.:	**Name Age**
Name:	_____
Test period: **From: To:**	_____ _____ _____

A- PACKAGING

1- Was the noise information displayed on the packaging (off button, volume button, etc.) satisfactory?
Yes ⑨ No ⑨
2- Was the noise information indicated in the instructions (off button, volume button, etc.) satisfactory?
Yes ⑨ No ⑨

B- LOUDNESS

☺ Reasonable 😐 Loud ☹ Unbearable

TOY LOUDNESS	☺	😐	☹	COMMENTS
Level 1				
Level 2 (if applicable)				
Level 3 (if applicable)				

C- CHILDREN'S REACTION *Children's hearing is fragile. If you find that the toy is too loud, you are not required to let the child use it.*

1- What was the overall reaction the first time the children heard the toy?

2- Subsequently, to what extent did the toy retain the children's interest?

⑨ abandoned the toy ⑨ occasionally played with it ⑨ often played with it

3- Were there other sounds in the room while your child was playing with the toy? Yes ⑨ No ⑨

If yes, explain: (e.g., other toys, voices, TV, radio, washing machine, other appliances, etc.)
4- Approximately how far was your child from the toy?

5- Did your child:

- press their ear against the toy? Yes ⑨ No ⑨
- hold down the buttons for long periods of time? Yes ⑨ No ⑨

D- Improvements

What should the manufacturer do to improve the quality of the toy and the noise information indicated on the package?

E- Other comments:

APPENDIX H: NOISY TOY SURVEY

NUMBER OF CHILDREN? **AGES:**

1. **When making buying decisions, how are you influenced by the sound effects advertised on the package? (+/-)**

_____
_____

2. **Do you check the sound effects of toys you are considering purchasing?**

_____
_____
_____

3. **Have you noticed an increase in the number of battery-operated toys since the birth of your first child?**

_____
_____

4. **In what room of your home to your children play most often?**

their bedroom ☐ the kitchen ☐ the living room ☐ the game room ☐ the basement ☐ the family room or den ☐ other_____

5. **Do your children have toys that you find noisy?** Yes ☐ No ☐

If so, give examples (brand, name, date manufactured if available):
_____
_____
_____
_____

6. **Have you ever blocked the loudspeaker on a toy because it was too loud?** Yes ☐ No ☐ **Removed the batteries?** Yes ☐ No ☐

7. **How many battery-operated toys are there in your home (for children 0–5)?**
_____

8. **What is your opinion of sound-producing or noisy toys in general?**

APPENDIX I: PARENTS' OPINIONS OF TOY LOUDNESS

Toy	Manufacturer	Average sound level (Health Canada protocol)	Maximum sound level (Health Canada protocol)	Parents' opinion	Loudness
Musical Duck	Winkz (Zellers exclusive)	89.38	91.2	Divided	Reasonable Loud
Sesame Street/Tableau rigolo	Fisher-Price	74.76	79.8	Unanimous	Reasonable
Baby's Cell Phone	Tiny Love	104.20	108.1	Divided	Reasonable Loud Unbearable
Sound/Light Turtle	Geoffrey (imported by Toys R Us)	84.78	86.2	Divided	Reasonable Unbearable
Sesame Street/Le touche-à-tout	Fisher-Price	82.78	85.5	Unanimous	Loud
Sesame Street/Mini saxophone	Fisher-Price	81.98	85.6	Divided	Reasonable Loud
Sesame Street/Elmo’s Rock & Roll Guitar	Fisher-Price	74.37	80.6	Divided	Reasonable Loud Unbearable
SpongeBob	Mattel	90.71	96.6	Divided	Loud Unbearable
Musical Train Station	FunYears (import)	72.79	79.3	Divided	Reasonable Loud Unbearable
Playskool/Luminou/P'tit Lumi-copain	Hasbro	85.48	87.1	Divided	Loud Unbearable
Piano éclatant de son et lumière	Shelcore Toys	85.88	85.9	Divided	Unbearable Loud
Blue’s Clues/Blue’s Radio	Fisher-Price	72.48	74.8	Divided	Reasonable Loud
Mon petit train amusant	Geoffrey (imported by Toys R'Us)	83.68	84.6	Divided	Reasonable Loud

Road Rippers/PT Cruiser	Toy State Industrial				Loud Unbearable
Tonka 3430	Funrise	82.52	84.4	Unanimous	Loud
Learning Drum	Leapfrog	86.09	89.4	Divided	Reasonable Loud
Playskool/Gym Bébé bedon 2 en 1	Hasbro	74.46	77.8	Divided	Reasonable Loud
Baby Play Zone/Module Serpentin	Fisher-Price	80.42	84.1	Divided	Reasonable Loud
Le livre des Ani'Maths	Leapfrog	82.57	88.3	Divided	Reasonable Loud
Disney Pop Dreamers/Ariel Interactive Doll	Thinkway	79	80.1	Divided	Reasonable Loud
Pull'N Glow Bug 82124	Shelcore Toys	86.52	87.6	Divided	Loud Unbearable
Électronic Rock Guitar	Kidz Focus (imported by Wal-Mart)	81.98	85.9	Divided	Loud Unbearable
Little People/Flash the Fire Truck	Fisher-Price	80.49	83.5	Unanimous	Reasonable
Monster Chainsaw with Goggles	Kid Connection (imported by Wal Mart)	82.54	90.1	Divided	Loud Unbearable
Caillou Danse & Chante	Danaware	76.98	78.1	Divided	Reasonable Loud
Hug & Learn Baby Tad	Leapfrog	62.62	63	Divided	Reasonable Loud
Centre de conduite 80330	Fun Years (imported by Toys R Us)	75.85	100.2	Divided	Reasonable Loud Unbearable
Baby Playzone/Ball	Fisher-Price	72.98	78.9	Divided	Reasonable Loud
Disco Drum	Fun Years imported by Toys R Us	78.6	85.6	Unanimous	Reasonable
HotWheels/Monster Jam Wolverine	Mattel	84.28	84.9	Unanimous	Unbearable
Baby Play Zone/Stand-Up Ball Blast	Fisher-Price	79.5	82.1	Divided	Reasonable Unbearable
Sesame Street/Mini Violon	Fisher-Price	105.78	106.5	Unanimous	Loud
Magic Remote Control	Chicco	72.42	76.9	Divided	Reasonable Loud

DiscoverSounds/Waver	Little Tikes	79.26	80.1	Divided	Reasonable Loud Unbearable
Public Telephone in French	Soon Cheng Toys (imported by SB Toys)	81.29	84.3	Unanimous	Unbearable
Classical Chorus/Sorter Surprise (B0644)	Fisher-Price	78.42	81.8	Divided	Reasonable Loud
Winnie the Pooh/Musical Stroll	Fisher-Price	82.74	83.1	Divided	Loud Unbearable
Blue's Clues/Sing with Blue Microphone	Fisher-Price	80.72	86.8	Divided	Loud Reasonable
Fun Years/Talk'n Learn Alphabet	Sans Nom (importé Toys R Us)	79.68	81.6	Divided	Loud Unbearable
Fun'n Learn Houses	Soon Cheng Toys (imported by SB TOys)	72.72	76.9	Divided	Reasonable Loud

APPENDIX J: CURRICULUM VITAE OF RICHARD LAROCQUE

Name:	Richard Larocque, M.O.A.	
Institutional affiliation:	1999-…	Institut national de santé publique du Québec (public health)
	1996-…	Audio Conseil (private practice)
	1994-1996	Louis-Charles Simard research centre (cochlear implant research)
Education:	(M.O.A.) Audiology, Université de Montréal	
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Tableau 4 : Synthèse des caractéristiques et des mesures de niveaux sonores effectués au groupe de jouets sonores sélectionnés par Option Consommateurs selon le protocole recommandé par Santé Canada

Nom du jouet	Compagnie	Âge cible du jouet (ans)	Nbr d'effet(s) sonore(s)	Protocole de mesure, annexe « B »	Plus faible effet sonore mesuré (dB(A))	Plus fort effet sonore mesuré (dB(A))	Déviation standard moyennes des mesures (dB(A))	Niveau sonore moyens (dB(A))
JS-01 Baby's Cell Phone	Tiny Love	0	4	B-3	101.3	108.1	0.54	104.20
JS-02 Tonka 3430	Funrise	3	4	B-4	80.9	84.4	0.46	82.52
JS-03 Road Rippers/PT Cruiser	Toy state	3	6	B-4	97.7	99.1	0.57	98.16
JS-04 Mon petit train amusant	Geoffrey	1	1	B-4	82.4	84.6	1.17	83.68
JS-05 Tortue Son et Lumière	Geoffrey	0.9	1	B-4	83.9	86.2	0.98	84.78
JS-06 Canard musical	Winkz	1	1	B-7	88.4	91.2	1.15	89.38
JS-07 Sesame Street/Tableau rigolo	Fisher-Price	1	1	B-8	71.7	79.8	3.21	74.76
JS-08 Bob l'éponge/les Frappés Rigolos-Bob l'éponge	Mattel	3	5	B-1	84.4	96..6	2.32	90.71
JS-09 Winnie the Pooh/Balade musicale	Fisher-Price	0.5	3	B-1	81.6	83.1	0.74	82.74
JS-10 Sesame Street/mini Saxophone	Fisher-Price	1	4	B-1	80.3	85.6	0.88	81.98
JS-11 Plaskool/Luminou/P't it lumi-copain	Hasbro	0	1	B-1	82.0	87.1	2.11	85.48
JS-12 Blue Clue/La radio de Blue	Fisher-Price	1.5	1	B-8	69.4	74.8	1.95	72.48
JS-13 Piano éclatant son et lumière	Shelcore Toys	1.5	1	B-4	85.8	85.9	0.04	85.88
JS-15 Sesame Street/le touche-à-tout	Fisher-Price	0.25	1	B-1	84.4	85.5	1.70	82.78
JS-16 Learning Drum	Leapfrog	0.5	4	B-4	75.9	89.4	3.16	86.09
JS-17 Musical Train Station/Gare musical	FunYears	3	8	B-8	62.9	79.3	1.81	72.79
JS-18 Playskool/Gym bébé bedon 2 en 1	Hasbro	0	1	B-4	72.4	77.8	2.00	74.46
JS-19 Baby Play Zone/Module Serpentin	Fisher-Price	0.75	1	B-4	78.4	84.1	2.34	80.42
JS-20 Disney pop Dreamers/Ari poupée interactive	Thinkway	3	1	B-4	77.8	80.1	0.82	79.00
JS-21 Pull'N Glow Bug 82124	Shelcore Toys	1	1	B-7	84.4	87.6	1.29	86.52
JS-22 Guitare Rock Électronique	Kidz Focus	3	4	B-4	75.8	85.9	1.04	81.98
JS-23 Caillou Danse & Chante	Danaware	3	1	B-4	75.1	78.1	1.19	76.98
JS-24 Tronçonneuse Monstre sur piles avec lunettes	Kid Connection	3	2	B-4	72.7	90.1	0.84	82.54
JS-25 Tambour disco	Fun years	3	1	B-4	73.0	85.6	5.40	78.60
JS-26 Baby Playzone/Balle à tirer	Fisher-Price	1	1	B-7	72.9	78.9	3.86	72.98
JS-27 Centre de conduite 80330	Fun years	1.5	9	B-4	68.9	100.2	1.05	75.85
JS-28 Classical Chorus/Trieur de formes	Fisher-Price	0.5	3	B-4	71.9	81.8	2.35	78.42

JS-29 Little people/Flash the Fire truck	Fisher-Price	1.5	2	B-4	77.5	83.5	0.30	80.49
JS-30 Hug & Learn Baby Tad	Leapfrog	0.5	1	B-4	79.9	82.9	1.16	81.56
JS-31 Sesame Street/Mini violon	Fisher-Price	1	1	B-3	104.8	106.5	0.75	105.78
JS-32 Blue's Clues/Microphone Chante avec Blue	Fisher-Price	2	1	B-8	78.2	86.8	3.57	80.72
JS-33 Fun Years/Talk'n learn Alphabet	Sans nom importé Toys R	2	2	B-8	76.8	81.6	0.69	79.68
JS-34 Télécommande Magique	Chicco	0.25	4	B-1	68.1	76.9	1.40	72.42
JS-35 Le livre des Ani'Maths	Leapfrog	0.75	5	B-8	69.1	88.3	1.73	82.57
JS-36 Telephone public en français	Soon Cheng toys	3	3	B-4	73.4	84.3	1.25	81.29
JS-37 DiscoverSounds/Waver	Little Tikes	0.5	1	B-1	78.6	80.1	0.59	79.26
JS-38 HotWheels/Monster Jam Wolverine	Mattel	3	1	B-4	83.8	84.9	0.47	84.28
JS-39 Baby Play Zone/Tourboules	Fisher-Price	0.75	1	B-4	77.5	82.1	1.85	79.50
JS-40 Fun'n Learn houses/Maison 3 jeux en 1	Soon Cheng Toys	3	4	B-4	72.6	76.9	1.92	72.72
JS-41 Sesame Street/Guitare Rock Elmo	Fisher-Price	1.5	4	B-4	70.4	80.6	2.27	74.37
Moyennes globales			**2.44**		**78.68**	**85.66**	**1.58**	**82.02**

Tableau 4 : Synthèse des caractéristiques et des mesures de niveaux sonores effectués au groupe de jouets sonores sélectionnés par Option Consommateurs selon le protocole recommandé par Santé Canada

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Tableau 6: Commentaires des éducateurs de la garderie #1 concernant l'utilisation des jouets sonores pendant 24 heures

Nom du jouet	Âge cible du jouet (ans)	Nbr d'effet(s) sonore(s)	Niveau sonore moyens (dB(A))	Jugement de la force par les éducateurs			Distance de manipulation			Commentaires
				OK	Fort	Trop fort	Collé sur l'oreille ?		Distance	
							Oui	Non		
JS-07 Sesame Street/Tableau rigolo	1	1	74.76	X				X	?	Pas de commentaires
JS-11 Plaskool/Luminou/P'tit lumi-copain	0	1	85.48	X				X	10 cm	« Les enfants sont attirés par le bruit »
JS-24 Tronçonneuse Monstre sur piles avec lunettes	3	2	82.54			X		X	30 cm	« Il empêchait d'entendre les autres jouets »
JS-26 Baby Playzone/Balle à tirer	1	1	72.98	X				X	50 cm	Pas de commentaires
JS-29 Little people/Flash the Fire truck	1.5	2	80.49	X				X	40cm	Pas de commentaires
JS-30 Hug & Learn Baby Tad	0.5	1	62.62	X				X	30 cm	« Musique douce et voix douce non-agressante »
JS-32 Blue's Clues/Microphone Chante avec Blue	2	1	80.72		X		X		15 cm	"À côté de l'oreille, c'était très fort"
JS-34 Télécommande Magique	0.25	4	72.42	X			X		5 cm	« Les enfants le mettent à côté de leurs oreilles »
JS-35 Le livre des Ani'Maths	0.75	5	82.57	X				X	50 cm	« Très beau jouet pour tous les âges »
JS-36 Telephone public en français	3	3	81.29		X			X	15 cm	«À la longue c'est fort et tannant »

Tableau 6: Commentaires des éducateurs de la garderie #1 concernant l'utilisation des jouets sonores pendant 24 heures

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Tableau 7: Commentaires des éducateurs de la garderie #2 concernant l'utilisation des jouets sonores pendant 24 heures

Nom du jouet	Âge cible du jouet (ans)	Nbr d'effet(s) sonore(s)	Niveau sonore moyens (dB(A))	Jugement de la force par les éducateurs			Distance de manipulation			Commentaires
				OK	Fort	Trop fort	Collé sur l'oreille ?		Distance	
							Oui	Non		
JS-01 Baby's Cell Phone	0	4	104.20	Non-applicable						« Ne fonctionnait pas »
JS-02 Tonka 3430	3	4	82.52		X			X	30 cm	« Ils pèsent sans cesse sur les boutons »
JS-05 Tortue Son et Lumière	0.9	1	84.78	X			X		15 cm	« Les plus petits aiment l'effet de lumière »
JS-10 Sesame Street/mini Saxophone	1	4	81.98		X			X	30 cm	"Ils trouvaient amusant les sons »
JS-15 Sesame Street/le touche-à-tout	0.25	1	82.78	X				X	20 cm	Pas de commentaires
JS-16 Learning Drum	0.5	4	86.09	X				X	20 cm	« Ils ont de la difficulté à taper dessus »
JS-20 Disney pop Dreamers/Ari poupée interactive	3	1	79.00	Non-applicable						« Les enfants le lui ont pas touché »
JS-23 Caillou Danse & Chante	3	1	76.98	X				X	+100 cm	« Les enfants l'observait de loin »
JS-33 Fun Years/Talk'n learn Alphabet	2	2	79.68	X				X	30 cm	« Peu d'intérêt »
JS-41 Sesame Street/Guitare Rock Elmo	1.5	4	74.37	X			X		20 cm	« Les enfants avaient beaucoup de plaisir »

Tableau 7: Commentaires des éducateurs de la garderie #2 concernant l'utilisation des jouets sonores pendant 24 heures

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Tableau 8 : Synthèse et comparaison des caractéristiques et des mesures de niveaux sonores effectués au groupe de jouets sonores sélectionnés par Option Consommateurs selon le protocole recommandé par Santé Canada et selon le protocole B-3 du même protocole

Nom du jouet	Compagnie	Âge cible du jouet (ans)	Nbr d'effet(s) sonore(s)	Protocole de mesure, annexe « B »	Niveau sonore moyens (dB(A)) mesuré selon le protocole de « Santé Canada »	Niveau sonore moyens (dB(A)) mesuré « à l'oreille » selon le protocole B-3 de « Santé Canada »
JS-01 Baby's Cell Phone	Tiny Love	0	4	B-3	104.20	104.20
JS-02 Tonka 3430	Funrise	3	4	B-4	82.52	100.16
JS-03 Road Rippers/PT Cruiser	Toy state	3	6	B-4	98.16	114.96
JS-04 Mon petit train amusant	Geoffrey	1	1	B-4	83.68	111.18
JS-05 Tortue Son et Lumière	Geoffrey	0.9	1	B-4	84.78	104.80
JS-06 Canard musical	Winkz	1	1	B-7	89.38	104.46
JS-07 Sesame Street/Tableau rigolo	Fisher-Price	1	1	B-8	74.76	99.98
JS-08 Bob l'éponge/les Frappés Rigolos-Bob l'éponge	Mattel	3	5	B-1	90.71	104.44
JS-09 Winnie the Pooh/Balade musicale	Fisher-Price	0.5	3	B-1	82.74	99.70
JS-10 Sesame Street/mini Saxophone	Fisher-Price	1	4	B-1	81.98	96.98
JS-11 Plaskool/Luminou/P'tit lumi-copain	Hasbro	0	1	B-1	85.48	102.54
JS-12 Blue Clue/La radio de Blue	Fisher-Price	1.5	1	B-8	72.48	100.86
JS-13 Piano éclatant son et lumière	Shelcore Toys	1.5	1	B-4	85.88	109.34
JS-15 Sesame Street/le touche-à-tout	Fisher-Price	0.25	1	B-1	82.78	94.06
JS-16 Learning Drum	Leapfrog	0.5	4	B-4	86.09	111.34
JS-17 Musical Train Station/Gare musical	FunYears	3	8	B-8	72.79	101.60
JS-18 Playskool/Gym bébé bedon 2 en 1	Hasbro	0	1	B-4	74.46	98.15
JS-19 Baby Play Zone/Module Serpentin	Fisher-Price	0.75	1	B-4	80.42	106.72
JS-20 Disney pop Dreamers/Ari poupée interactive	Thinkway	3	1	B-4	79.00	98.54
JS-21 Pull'N Glow Bug 82124	Shelcore Toys	1	1	B-7	86.52	112.32
JS-22 Guitare Rock Électronique	Kidz Focus	3	4	B-4	81.98	109.10
JS-23 Caillou Danse & Chante	Danaware	3	1	B-4	76.98	92.22
JS-24 Tronçonneuse Monstre sur piles avec lunettes	Kid Connection	3	2	B-4	82.54	105.24
JS-25 Tambour disco	Fun years	3	1	B-4	78.60	105.92
JS-26 Baby Playzone/Balle à tirer	Fisher-Price	1	1	B-7	72.98	101.44
JS-27 Centre de conduite 80330	Fun years	1.5	9	B-4	75.85	99.53

JS-28 Classical Chorus/Trieur de formes	Fisher-Price	0.5	3	B-4	78.42	94.30
JS-29 Little people/Flash the Fire truck	Fisher-Price	1.5	2	B-4	80.49	94.30
JS-30 Hug & Learn Baby Tad	Leapfrog	0.5	1	B-4	81.56	90.50
JS-31 Sesame Street/Mini violon	Fisher-Price	1	1	B-3	105.78	105.78
JS-32 Blue's Clues/Microphone Chante avec Blue	Fisher-Price	2	1	B-8	80.72	105.78
JS-33 Fun Years/Talk'n learn Alphabet	Sans nom importé Toys R	2	2	B-8	79.68	106.57
JS-34 Télécommande Magique	Chicco	0.25	4	B-1	72.42	97.94
JS-35 Le livre des Ani'Maths	Leapfrog	0.75	5	B-8	82.57	110.66
JS-36 Telephone public en français	Soon Cheng toys	3	3	B-4	81.29	107.13
JS-37 DiscoverSounds/Waver	Little Tikes	0.5	1	B-1	79.26	96.52
JS-38 HotWheels/Monster Jam Wolverine	Mattel	3	1	B-4	84.28	108.62
JS-39 Baby Play Zone/Tourboules	Fisher-Price	0.75	1	B-4	79.50	98.78
JS-40 Fun'n Learn houses/Maison 3 jeux en 1	Soon Cheng Toys	3	4	B-4	72.72	100.09
JS-41 Sesame Street/Guitare Rock Elmo	Fisher-Price	1.5	4	B-4	74.37	98.15
Moyennes globales			**2,44**		**82.02**	**102,62**

Tableau 8 : Synthèse et comparaison des caractéristiques et des mesures de niveaux sonores effectués au groupe de jouets sonores sélectionnés par Option Consommateurs selon le protocole recommandé par Santé Canada et selon le protocole B-3 du même protocole

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