AUSTRALIAN COMPETITION & CONSUMER COMMISSION

Button Battery Safety Issues Paper

August 2019

Contents

Acknowledgement:

This Issues Paper includes data collected by the ACCC and state and territory consumer protection and fair trading agencies during delivery of the National Strategy for improving the safety of button battery consumer products from 2016 to 2018. The ACCC acknowledges the assistance and cooperative effort contributed by officers within these agencies which has enabled a collaborative national response to this important safety issue.

Glossary

Term	Definition
ABRI	Australian Battery Recycling Initiative
ACCC	Australian Competition and Consumer Commission
ACL	Australian Consumer Law, Schedule 2 of the *Competition and Consumer Act 2010.*
ACL regulators	ACCC and state and territory product safety regulators that implement the ACL
AIHW	Australian Institute of Health and Welfare
ANSI	American National Standards Institute
APSU	Australian Paediatric Surveillance Unit
BIPBA	British and Irish Portable Battery Association
CAPT	Children's Accident Prevention Trust
CCA	*Competition and Consumer Act 2010* (Cwth)
Code	Industry Code for Consumer Goods that Contain Button Batteries
CPSC	Consumer Product Safety Commission (USA)
GSP	General Safety Provision
Horizontal Standard	In the case of consumer goods, a horizontal standard is a standard that would apply to all products, to address a specific hazard. (Whereas vertical standards address all hazards relating to consumer products of a specified kind.)
IEC	International Electrotechnical Commission
ISO	International Organisation for Standardisation
National Strategy	National strategy for improving the safety of button battery consumer products
NBIH	National Battery Ingestion Hotline (USA)
NCPC	National Capital Poison Center (USA)
NICNAS	National Industrial Chemicals Notification and Assessment Scheme
OBPR	Office of Best Practice Regulation
OECD	Organisation for Economic Co-operation and Development
QISU	Queensland Injury Surveillance Unit
RCH	Melbourne Royal Children's Hospital

RIS	Regulation Impact Statement
TGA	Therapeutic Goods Administration
VISU	Victorian Injury Surveillance Unit

Questions for response

1. What data or information can you provide on the size and value of the Australian market, or for a segment of the market, for button batteries or for products that contain button batteries?
2. What data or information can you provide on the prevalence of and costings of injuries and fatalities caused by button batteries?
3. What information can you provide on the range of products that you supply that contain button batteries?
4. Do you think the recommended safety actions in the *Industry Code for Consumer Goods that Contain Button Batteries* (Code) for products that contain button batteries are adequate to reduce the risk of children accessing button batteries? Please provide the reasons for your response.
5. Do you think the recommended safety actions in the Code should be made mandatory? What impact would mandating these requirements have on Australian suppliers?
6. If you are a supplier, do you supply products that comply with the Code? If no, please explain why. If yes, what actions do you have in place to reflect the Code?
7. What other research and development activities are you aware of that are directed toward:

   (a) improving button battery safety

   (b) improving the safety of consumer goods containing button batteries

   (c) improving the medical approach to button battery ingestion or injury?
8. Would a mandated safety standard for the security of battery compartments of products containing button batteries be likely to reduce the number of injuries and fatalities caused by button batteries in Australia? Please provide the reasons for your response.
9. Would a mandated safety standard and/or an information standard for child resistant packaging and labelling be likely to reduce the number of injuries and fatalities caused by button batteries in Australia? Should any such standard require provision of Australian Poisons Information Centre details? Please provide the reasons for your response.
10. If it is your view that child resistant packaging and labelling requirements should be mandated, do you think this should apply to all button batteries regardless of size or chemistry? Please provide the reasons for your response.
11. In your view, should any consumer products containing button batteries be banned from supply in Australia? If yes, please provide details and reasons.
12. If any of these requirements were mandated in Australia, what additional cost would be imposed on Australian suppliers or a relevant supplier segment?
13. If you are a supplier, what information can you provide on the actual or likely cost of implementing the safety standard and information standard outlined in section 19.2 for button batteries and for products that you sell?
14. Are there any button battery products that you think should be exempted from any mandatory safety or information standards? Please provide reasons why.
15. Please provide any other information you consider may be relevant to the ACCC's consideration of these issues.

1. Executive Summary

Button batteries are flat, round, single cell batteries with diameters up to 32 mm and heights ranging from 1–11 mm. Button batteries are available both individually and as components of a huge range of other consumer products and household products. These products include toys, TV remote controls, cameras, watches, calculators, greeting cards, scales, torches, digital thermometers, novelty items and LED lights. Over 58 million button batteries are sold in the Australian market every year.[1]

Button batteries can cause very serious injury and even death if ingested, particularly in children under the age of six. When lodged in the body and in contact with bodily fluid, button batteries create corrosive substances that can burn through tissue. Serious injury can occur in as little as two hours. There is a growing record of these injuries and deaths all over the world, including Australia. Globally, at least 64 children have died and thousands have been injured from ingesting button batteries. In Australia, two children, Summer Alice Steer and Isabella Estelle Rees, have died from injuries sustained after ingesting a button battery. Since 1999, hundreds of Australian children have presented at hospital emergency departments after ingesting or inserting button batteries, with some of them sustaining serious injuries.[2]

In 2018 and 2019 the Australian Competition and Consumer Commission (ACCC) identified button battery hazards as a product safety priority. This followed two years of concerted effort undertaken by consumer affairs regulators nationally under the *National Strategy for improving the safety of button battery consumer products* (2016–2018). The strategy commenced alongside release of the voluntary *Industry Code for Consumer Goods that Contain Button Batteries* (Code), developed by Industry and published in 2016.[3] The ACCC, along with state and territory product safety regulators helped to promote the Code and encourage its adoption.

The ACCC supports efforts to improve the safety of consumer goods through self-regulation and the voluntary actions of suppliers. Development of the voluntary code by Industry in 2016 was a significant step, and the ACCC has since undertaken market surveillance to gauge its uptake by suppliers as part of the national strategy.[4] The ACCC has also examined trends in injury reporting to see if there are any indications that exposures and injuries associated with button batteries are decreasing.

The ACCC is aware of significant efforts made by some suppliers but overall has found a high level of unsafe button battery products remain available in the Australian market, and a meaningful decrease in the rate of button battery exposures or injuries is not yet apparent.

In March 2019, after issuing a Safety Warning Notice warning to the Australian public about the dangers of button batteries, the Hon. Stuart Robert, then Assistant Treasurer, asked the ACCC to expedite the regulatory impact assessment process for developing regulation to address button battery safety.[5]

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1 K O'Farrell, R Veit, D A'Vard, *Study into market share and stocks and flows of handheld batteries in Australia*, ABRI, Australia, 2014, http://www.batteryrecycling.org.au/wp-content/uploads/2014/07/Stocks-and-flows-of-handheld-batteries-report-final.pdf, viewed 1 August 2019.

2 QISU*, QISU Report on Button Battery-related injury January 1999—December 2017,* 2018, report provided to ACCC.

3 *Industry Code for Consumer Goods that Contain Button Batteries*, ACCC, Canberra, 2016, https://www.productsafety.gov.au/publication/industry-code-for-consumer-goods-that-contain-button-batteries, viewed 1 August 2019.

4 ACCC, *National strategy for improving the safety of button battery consumer products*, ACCC, Canberra, 2016, https://www.productsafety.gov.au/publication/national-strategy-for-improving-the-safety-of-button-battery-consumer-products, viewed 1 August 2019.

5 ACCC, *Safety warning notice (button batteries)*, ACCC, Canberra, 2019, https://www.productsafety.gov.au/publication/safety-warning-notice-button-batteries, viewed 1 August 2019.

The ACCC's preliminary view is that there is a market failure with regard to the safety of button battery products and that government needs to consider available remedies, including whether regulation should be considered to address the button battery hazard.

The ACCC has identified a range of key safety measures that could improve safety of consumer products containing button batteries (including batteries themselves at first supply). These include:

- secure battery compartments so that children cannot access button batteries from these products
- child-resistant packaging to prevent children from accessing button batteries
- specific warnings and information alerting consumers to the dangers of button batteries and guidance on what to do in the event of a button battery ingestion, on products and at point of sale
- means of safe disposal of used batteries in households
- improved design and technology of battery manufacture to eliminate the hazard.

Some of these measures could be subject to safety regulation, however, others such as battery disposal and improved battery design are outside the remit of consumer law, or simply not available.

The Australian Consumer law enables development of regulation to address the safety of consumer goods, including through application of mandatory safety standards, mandatory information standards, interim and permanent bans.

The use of button batteries in so many and diverse consumer goods indicates that any regulation, such as a standard, would need to be one that could be applied horizontally. Only a horizontal standard could efficiently address a common hazard across multiple product types. Currently, Australian standards generally focus 'vertically'—addressing multiple hazards in particular goods, such as children's toys. For example, the mandatory safety standard for toys for children up to and including 36 months of age includes a requirement to have secure battery compartments. Some Australian electrical safety regulations also include requirements for secure battery compartments in products that contain button batteries. However, there is currently no mandatory safety standard in Australia or internationally that horizontally addresses the hazard of button batteries across all consumer goods.

Although the disposal of used button batteries is also an important safety issue, a safety standard (or other regulation) under the ACL could not impose requirements for disposal of end of life button batteries. Similarly the ACCC could not require manufacturers and suppliers to improve button battery technology until such time as the technology was available. The ACCC will engage with relevant stakeholders to further consider options available to address these issues.

The ACCC is now seeking to confirm the degree of regulatory failure regarding button battery safety in consumer goods and determine how government should respond. The ACCC has prepared this Issues Paper to seek community views on button battery safety and the regulatory options available to address this issue. The Issues Paper contains a broad discussion on button batteries including what they are, the dangers they pose, the current efforts to manage button battery safety and potential approaches to deal with the hazard. The ACCC will consider submissions on this Issues Paper before making any recommendation about development of new regulation. If the ACCC concludes that regulation is needed, the ACCC will proceed to undertake further regulatory impact assessment, including consultation with stakeholders.

2. Introduction

Button batteries are flat, round, single cell batteries with diameters up to 32 mm and heights ranging from 1–11 mm. These batteries are referred to as button or coin batteries. Their small size, while suited to many uses, makes it easy for children to ingest them. Button batteries are used in a broad range of consumer and household products including toys, TV remote controls, cameras, watches, calculators, greeting cards, scales, torches, digital thermometers, novelty items and LED lights.

Button batteries can cause very serious injury and even death if ingested, particularly in children under the age of six. Serious injury can occur in as little as two hours. There is a growing record of these injuries and deaths all over the world, including Australia. In Australia, two children, Summer Alice Steer and Isabella Estelle Rees, have died from button battery injuries.

From 2016 to 2018, the ACCC led delivery of the *National strategy for improving the safety of button battery consumer products.* The strategy focused on developing evidence to inform regulatory and other approaches to improve button battery safety with the overarching aim of preventing child exposure to uncontained button batteries through voluntary safety improvements. In 2019, the ACCC evaluated the impact of the National Strategy on button battery safety, as demonstrated by goods available in the market place and trends in injury and exposure data. The ACCC concluded that there was evidence of market failure in the safety of button battery consumer goods. This Issues Paper discusses the information and evidence collected throughout the National Strategy and opens discussion on ways to address the issue.

The ACCC is now consulting with the community about the need for regulatory or other options to address the issue of button battery safety. The aim of this consultation is to gather stakeholder input to inform any recommendation to government. Options include continuing with the status quo of voluntary self-regulation or developing regulations available in the Australian Consumer Law, such as, safety standards, information standards and bans (interim and permanent). For instance, a safety standard could:

- mandate requirements for the design and construction of battery compartments on products powered by button batteries
- require button batteries to be supplied in child resistant packaging
- prescribe the form and content of any warnings, graphics or information that needs to be provided on the packaging of button batteries and products that contain button batteries.

An information standard could mandate the nature and form of information that may or may not be provided about or with specified goods. Bans could be imposed to prevent supply of goods that will or may cause injury to any person.

This Issues Paper also explores:

- the frequency and impact of button battery injuries
- the current regulatory environment
- industry and government initiatives
- international approaches to button battery regulation
- regulatory options available to the ACCC under the ACL that could improve button battery safety.

This Issues Paper does not consider, or seek response regarding, goods that are subject to regulatory control by specialist regulators such as electrical safety regulators, the

Therapeutic Goods Administration (TGA) or the National Industrial Chemicals Notification and Assessment Scheme (NICNAS) who regulate products including medical devices and devices for industrial or scientific use. The ACCC will continue to liaise with these and other specialist safety regulators, such as the TGA, about the safety of button battery products more broadly.

Submissions to this Issues Paper will assist the government to decide whether, and in what form, regulation is needed. If it is concluded that regulatory options should be pursued, submissions will help the ACCC to illustrate what any such regulation should look like. Following consultation on the Issues Paper and analysis of responses the ACCC will prepare:

- a Draft Recommendation (in the form of a Regulatory Impact Statement if regulation is recommended) planned for release in the last quarter of 2019 for public consultation
- a Final Recommendation, which will be provided to the Hon. Michael Sukkar, Assistant Treasurer and Minister for Small Business in 2020.

3. Have your say

The ACCC invites interested parties to provide information and comment on this Issues Paper.

Submissions must be provided on or before **30 September 2019**.

Submissions can be lodged

Online	ACCC consultation hub at consultation.accc.gov.au/
By email or post:	Director, Button Battery Taskforce Consumer Product Safety Branch Australian Competition & Consumer Commission GPO Box 3131 CANBERRA ACT 2601 nationalprojects@accc.gov.au
Project officer:	Cindy Meadley Consumer Product Safety Branch Australian Competition & Consumer Commission GPO Box 3131 CANBERRA ACT 2601 Phone +61 2 6243 1143 Email: nationalprojects@accc.gov.au
Website:	https://www.productsafety.gov.au/

All submissions (including name and address details) will be treated as public documents and published on the ACCC website, productsafety.gov.au, unless otherwise requested. Parties wishing to submit confidential information are requested to:

- clearly identify the information that is the subject of the confidentiality claim and the reasons for this claim—the identified information must be genuinely of a confidential nature and not otherwise publicly available
- provide a non-confidential version of the submission in a form suitable for publication—this public version should identify where confidential information has been redacted.

The ACCC will not disclose the confidential information to third parties, other than advisors or consultants engaged directly by the ACCC, except where permitted or required by law. For more information, see the *ACCC & AER information policy: collection and disclosure of information* publication available at https://www.accc.gov.au/publications/accc-aer-information-policy-collection-and-disclosure-of-information.

4. Background

4.1. The Button Battery Hazard

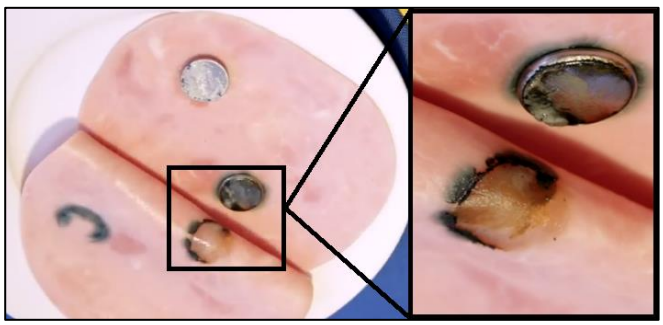
In Australia two children have died and many others have been seriously injured after ingesting button batteries. Hundreds of Australian children have presented to emergency departments nationally after ingesting or inserting button batteries.

Button batteries are commonly found in a broad range of household products including:

- remote controls for appliances and electronics
- computers
- calculators
- glucometers
- watches
- garage door openers
- flameless candles
- toys and games
- cameras
- torches
- book lights
- kitchen scales
- musical greeting cards
- clothing and accessories
- key fobs and
- children's jewellery.

Button batteries are hazardous because of their size, shape, design and electrical charge. When ingested or inserted, these batteries can get stuck or lodged in the body. When lodged in the body and in contact with bodily fluid, the energy contained within the battery can generate a chemical reaction called electrolysis. An electrical potential of as little as 1.229 volts is sufficient to cause the reaction.[6] At the negative terminal of the battery, hydroxide ions and hydrogen gas will be produced. The hydroxide ions act like caustic soda, chemically burning tissues and causing liquefactive necrosis.[7] Figure 1 below shows an example of how a button battery can burn organic tissue.[8] The terminals of a button battery collectively cover almost the entire battery surface area and are often separated by less than a millimetre. This greatly increases the chances of bodily fluids completing a circuit between the terminals and releasing the energy in the battery to create the corrosive hydroxide ions. Other types of batteries that can be ingested (like AAA batteries) have comparatively smaller terminals separated by a greater distance, which decreases the chances of a circuit being completed between the terminals.

Figure 1: Corrosive burns on ham caused by a button battery



6 M Chaplin 2019, London South Bank University, London, http://www1.lsbu.ac.uk/water/electrolysis.html, viewed 1 August 2019.

7 T Litovitz 2019, NCPC, Washington DC, https://www.poison.org/battery/mechanism-of-injury, viewed 1 August 2019.

8 ACCC, *Button battery safety in the home*, ACCC, Canberra, 2016, https://www.youtube.com/watch?v=iuWnIplKGcQ, viewed 1 August 2019.

Following ingestion, the caustic burn can go through the oesophageal wall in as little as two hours, causing severe and life threatening injuries, which may cause death. Death is typically by excessive blood loss and cardiac arrest.[9]

Children are at the greatest risk of injury due to their narrower oesophagus and tendency to place small objects into their mouths, ears and noses. Button batteries with diameters in the range of 16–23 mm can be ingested by a small child and are large enough to get stuck in their oesophagus. Many button battery ingestions go unwitnessed by parents and carers, and children are generally non-verbal or do not say that they ingested a battery. Symptoms of a button battery ingestion may include:

- gagging or choking
- drooling
- chest pain (this may present as grunting)
- coughing or noisy breathing
- unexplained vomiting or food refusal
- bleeding from the gut: black or red vomits or bowel motions
- nose bleeds—sometimes this can be blood vomited from the nose
- unexplained fever.

However, these symptoms are similar to many other conditions and may not appear for some time, so it may not be suspected that the child has ingested a battery and there can be delays in diagnosis and removal of the battery. Since serious injury can occur in as little as two hours, a delayed presentation or diagnosis can result in serious injury or death.

Children often have easy access to button batteries in a variety of ways:

- Household or other products which use button batteries do not have secure or 'child resistant' battery compartments.
- Products are supplied with button batteries that still need to be installed in packaging that is not child resistant.
- New or replacement button batteries are purchased separately in packaging that is not child resistant.
- Old or spent button batteries have been removed from a product but have not been properly disposed of.

When it is suspected that a child has ingested a battery, an x-ray needs to be conducted as soon as possible to confirm the location of the battery and determine if it has lodged in the oesophagus. Many regional hospitals throughout Australia have limited or no x-ray facilities on site.[10] This can lead to delays in diagnosis and removal of the battery.

Battery removal is also technically challenging with children due to their small size and the potential complications of operating on the gastrointestinal tract.[11] Removal can only be performed in specialist centres in urban areas in Australia. This presents challenges in getting children in country areas to hospital in time to reduce the extent of the injury and save lives.

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9 NCPC 2019, Washington DC, https://www.poison.org/battery/fatalcases, viewed 1 August 2019.

10 R Cairns, JA Brown, K Lachireddy, C Wylie, J Robinson, AH Dawson and NA Buckley, 'Button battery exposures in Australian children: a prospective observational study highlighting the role of poisons information centres', *Clinical Toxicology*, vol. 57, no. 6, 2019, pp. 404–410.

11 Gastrointestinal tract includes the mouth, oesophagus, stomach, small intestine and large intestine.

Toy standards around the world, including Australia, typically include provisions to ensure children's toys do not include small parts that present a choking hazard to children.[12] [13] [14] [15] Choking is the partial or complete obstruction of the airway which can be due to a foreign body. The size of small items or parts is assessed using a small parts cylinder, which is the size of an old film canister.[16] Toys or parts of toys that will fit within the cylinder are considered too small and are prohibited from toys for children younger than 36 months or toys that are likely to be accessed by these children. Button batteries and AAA batteries fit within the standard small parts cylinder and are considered a choking hazard to children.

4.2. Button Batteries

For the purposes of this paper, button batteries include all flat, disc-shaped cells or batteries regardless of their size or chemistry. 'Coin', 'disc' and 'button' cells or batteries are taken to be the same article. Button batteries generally operate using four chemistries: alkaline, lithium, silver oxide and zinc-air. Figure 2 shows the components of an alkaline button battery.[17]

It is the combination of battery diameter size, mode of exposure (ingestion vs insertion) and voltage (including propensity to retain residual voltage) that is critical for safety. Button batteries of all sizes, voltages and chemistries can cause caustic burns in contact with tissue. However, it is the combination of larger battery diameter, higher (and residual) voltage and exposure via swallowing that results in the most catastrophic injuries and death. This is because the larger batteries may lodge in a child's oesophagus, will have residual electrical charge and if burns ensue, they are in proximity to major blood supply. While lithium and alkaline chemistry battery types are known to have caused more major injuries and fatalities, all button batteries present a risk when ingested or inserted.[18]

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12 Government of Canada, 2019, Canada, https://www.canada.ca/en/health-canada/services/consumer-product-safety/reports-publications/industry-professionals/industry-guide-safety-requirements-children-toys-related-products-summary/guidance-document.html#a3241, viewed 1 August 2019.

13 Hong Kong Standards and Testing Centre, *Choking/Suffocation/Hazardous Shape Requirements of Different Countries for Toys Testing*, Hong Kong, 2019, http://stc.dev1.ysdhk.com/getfile/index/action/images/name/566a2a7f73bdf.pdf, viewed 1 August 2019.

14 Public.Resource.Org, 2014, California USA, https://law.resource.org/pub/eu/toys/en.71.1.2014.html#s8.2, viewed 1 August 2019.

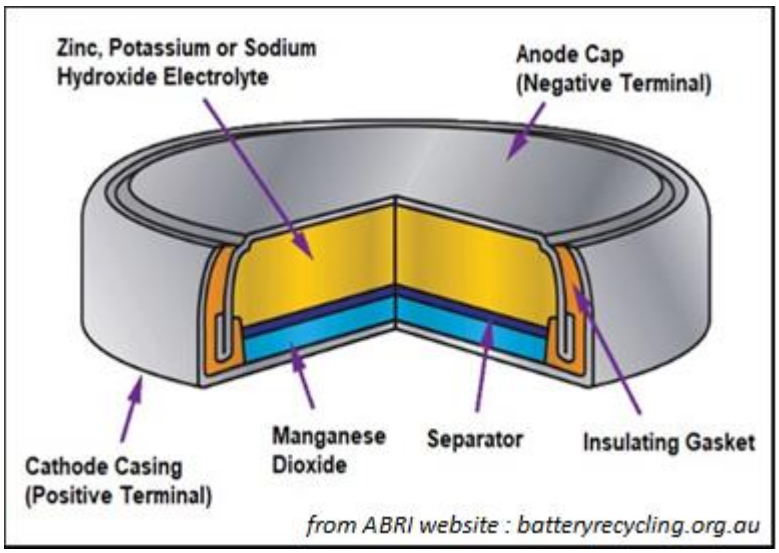
15 Federal Register of Legislation 2005, Australian Government, Canberra, https://www.legislation.gov.au/Details/F2008C00607, viewed 1 August 2019.

16 CPSC, 2019, Bethesda, Maryland USA, https://www.cpsc.gov/Business--Manufacturing/Business-Education/Business-Guidance/Small-Parts-for-Toys-and-Childrens-Products, viewed 1 August 2019.

17 ABRI 2019, Australia, https://batteryrecycling.org.au/battery-types/button-cell-batteries/, viewed 1 August 2019.

18 NCPC 2019, Washington DC, https://www.poison.org/battery/fatalcases, viewed 1 August 2019.

Figure 2: Typical components and structure of an alkaline button battery



Button batteries having lithium chemistry have a 3 volt electrical output. As noted above, these roughly coin-sized lithium batteries (16–25 mm diameter) pose the highest risk. Their larger size means that they are more likely to become stuck in a child's oesophagus and their higher voltage means they can injure more quickly and for longer. Ingested lithium button batteries lead to the most serious internal burns which can result in chronic health problems or death unless medical attention is quickly sought.

Button batteries with alkaline or other non-lithium chemistries have an electrical output of 1.5 volts or less and are generally less than 16 mm in diameter. Ingested alkaline button batteries are more likely to pass the oesophagus and travel through the gastrointestinal tract without causing significant problems. However, if an ingested alkaline button battery does stick and remains undetected in the oesophagus for some time, it can produce damage comparable to a larger diameter lithium button battery, particularly if it is relatively new.[19] The smaller alkaline button batteries can also be inserted in body orifices such as ears and noses, damaging delicate tissues and causing serious injuries if undetected for some time (see section 5).

Batteries perceived to be 'flat' because they will no longer operate a device can still generate enough current to cause serious tissue damage if lodged in the oesophagus. A flat lithium battery can still deliver 1.3–1.5 volts, well above the 1.229 volts required to generate a chemical reaction.[20] Table 1 below provides on overview of the characteristics of the common button battery chemistries.[21]

Silver oxide batteries are generally smaller, being in the range from 4.8 mm x 1.6 mm to 11.6 mm x 5.4 mm. While they supply sufficient voltage to cause injury, available records have not indicated them becoming lodged in a child's oesophagus. These batteries are commonly used in watches. Similarly, Zinc-air batteries are quite small, ranging between 5.8 mm x 3.6 mm to 11.6 mm x 5.4 mm. These batteries require access to air (oxygen) to produce a current and so, when ingested, they do not establish an electric current as other batteries may. Zinc-air batteries are most commonly used in hearing aids and while they are represented in paediatric exposures, they are not implicated in significant injuries.

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19 ibid.

20 M Chaplin loc cit.

21 Batteries.com 2019, Georgia USA, https://www.batteries.com/pages/coin-cell-button-cell-battery-guide, viewed 1 August 2019.

Table 1: Characteristics of the common button battery chemistries

Chemistry Type	Code	Positive Electrode	Negative Electrode	Electrolyte	Nominal Voltage (Volts)	End-Point Voltage (Volts)
Alkaline	L	Manganese dioxide	Zinc	Alkali	1.5	1
Silver	S	Silver oxide	Zinc	Alkali	1.55	1.2
Zinc-air	P	Oxygen	Zinc	Alkali	1.4	1.2
Lithium	C	Manganese dioxide	Lithium	Organic	3	2
Lithium	B	Carbon mono fluoride	Lithium	Organic	3	2
Lithium	G	Copper oxide	Lithium	Organic	1.5	1.2
Mercury[22]	M or N	Mercuric oxide	Zinc	Alkaline	1.35/1.40	1.1

Lithium primary (single use) batteries have a different chemistry to rechargeable lithium-ion batteries. However, there are some rechargeable lithium-ion button batteries available and all present the same hazard to children if ingested or inserted. Lithium–ion chemistry is favoured for rechargeable tools, phones and similar devices and by some electric vehicle manufacturers.

4.3. Battery Naming Standards

All batteries have standardised codified names. These are most commonly drawn from the International Electrotechnical Commission (IEC) standard. There are other sets of battery naming standards used around the world such as American National Standards Institute (ANSI) standard.

An example is the CR2032 cell shown in Figure 3 below. The first letter, C, denotes that the battery chemistry is Lithium. The R denotes that the battery is round. Batteries can also be Flat (F), Square (S), or Not Round (P). The three or four digit reference numbers indicate the size of the battery. In the battery pictured below, 2032 indicates that the battery is nominally 20 mm in diameter and 3.2 mm thick.[23]

[22] Mercury batteries are no longer produced but were once common in cameras.

[23] ibid.

Figure 3: A CR2032 Lithium Button Battery (3V = 3 volts)

4.4. Button Battery Market

Button batteries are a product in their own right, as well as being a component of a huge range of other consumer products (figure 4). This makes it difficult to quantify the scale of their retail market. For the purposes of this Issues Paper, button battery products include consumer products containing (powered by) button batteries and button batteries themselves, at first supply.

Button batteries themselves are sold extensively on both wholesale and retail markets. In retail markets, they are replacements for flat batteries and sold through numerous supermarkets, department and discount stores, specialist repairers and retailers and spare parts businesses. In wholesale markets, they are supplied to the retail industry as branded private label products (rebranded for sale by specific retailers) and to the very large number of manufacturers who make products powered by button batteries across a wide range of market segments. Both button batteries and goods containing them are sold by internet based retailers and wholesalers. Many items can also be purchased online from overseas markets.

Figure 4: Button battery related products

Consumer products containing button batteries are widely available and can come from a range of sources including car dealers, newsagents, discount stores, department stores, whitegoods retailers, games stores, electronics stores, camping and hiking equipment stores, country markets, and carnivals, sporting events or agricultural shows. Used items

containing button batteries are also likely to be available at opportunity shops and second-hand stores.

In market studies, button batteries are included within classes of portable or handheld batteries or batteries weighing less than 5 kg. There is very little market information specifically identifying button batteries.

According to a report to the National Environment Protection Council Service Corporation[24], about 58 million button batteries (around 90 tonnes) were sold in Australia in 2012–13. This represented about 14.5 per cent of the total sales of handheld batteries in that year. The report also stated that total handheld battery sales were forecast to grow strongly with button batteries to maintain their market share. The highest market growth was forecast for rechargeable lithium-ion batteries as they are used extensively in phones, tablets and power tools. However, there are very few rechargeable lithium-ion batteries made in button battery sizes. Most lithium button batteries are lithium primary batteries with a chemistry different to the rechargeable lithium-ion battery.

The report also stated that there are no button battery manufacturers in Australia, with all batteries imported from overseas. At the time of reporting, Energizer and Duracell held the majority of the market share. The Australian market also contains numerous other brands such as Gold Peak, Varta, Renata, Panasonic, Sony, Maxell (Hitachi), Toshiba and a number of private label brands.

Questions

1. What data or information can you provide on the size and value of the Australian market, or for a segment of the market, for button batteries or for products that contain button batteries?

4.5. Packaging

Child resistant packaging

Child resistant packaging is used to create a physical barrier between a child and a potentially hazardous product. It is generally required to be designed in a way that limits the ability for a child to access the product from the packaging.

The safety risk to children from button batteries arises when they can gain access to the batteries. Recent Australian exposure data indicates that where known, button batteries were removed from the original battery packaging by the child in around 20 per cent of cases (see section 5.2).

Button batteries are sold individually or in multipacks. They can also be supplied loose or in packaging with consumer products.

There are no mandatory standards in relation to battery packaging in Australia. However, there is a voluntary standard for non-resealable child proof packaging in Australia as well as many other countries (see section 10). Recently developed international standards, such as *IEC 60086-4:2019* for lithium batteries, are also providing tests for child resistant button battery packaging (see section 12).

In 2015, following the investigation into the death of Summer Steer, Coroner John Hutton recommended that the ACCC should develop regulation mandating the Australian standard for child resistant packaging of non-pharmaceutical products to apply to all battery packaging, including button batteries. The ACCC and state and territory product safety

[24] K O'Farrell et al., loc. cit.

regulators (ACL regulators) met to discuss the recommendations and subsequently implemented the National Strategy to collect evidence to inform regulatory and other approaches to improve button battery safety

In 2019, the Hon. Stuart Robert, then Assistant Treasurer, issued a Safety Warning Notice warning the Australian public on the dangers of button batteries. The notice included advice recommending that consumers only purchase button batteries that are supplied in child resistant packaging and for suppliers to ensure that any button batteries supplied are in child resistant packaging.

The use of child resistant packaging is proven as an effective measure for preventing accidental poisoning from medication.[25] It is also used to prevent access to chemicals and other consumer products that pose a high risk to children. It is likely that child resistant packaging would be equally effective in preventing children from accessing button batteries directly from packaging. However, it is only one layer of a multifaceted approach needed to reduce the risk of children accessing the batteries.

Warnings and labelling

A foundation of consumer protection is that products are suitably labelled to warn consumers of any hazard the product may encompass, include appropriate instructions for use and carry consumer guarantees as to their safety. Coroner John Hutton also made a recommendation on warning labels in his report into the death of Summer Steer. Coroner Hutton recommended that all manufacturers, distributors and retailers of products containing button batteries provide adequate warnings that identify the presence of a button battery and that the battery is a health hazard if ingested or inserted. Coroner Hutton recommended that these warnings be placed on packaging, on the products themselves, and within user manuals supplied with products.

There is no mandatory standard requiring warnings about button battery hazards labelling in Australia. However, the voluntary Code specifies that information should be available at point of sale indicating that the product requires a button battery, and that these are hazardous to young children. The Code also recommends that packaging for products containing button batteries should include a ‘Keep out of reach of children’ warning, advice to contact the Australian Poisons Information Centre (PIC) hotline for suspected button battery ingestions and advice to dispose of used batteries immediately and safely. There are numerous voluntary international standards which include requirements for warnings on packaging of button batteries and products that contain them (see section 12).

Appropriate warning labels on products, at point of sale and within product instructions, are essential to inform consumers of the presence of button batteries and of the danger of those batteries to young children. Warning signs and information available at the point of sale, both in store and online, would provide further opportunity to inform consumers of the risks presented by button batteries.

Industry engagement

In 2013, the ACCC hosted a meeting with industry stakeholders, including major battery manufacturers, distributors, importers and retailers, to discuss safety measures aimed at minimising the safety risks of button batteries and products that contain them. At the meeting, the industry participants agreed to voluntarily implement measures to improve the safety of button batteries.

[25] GB Rodgers ‘The safety effects of child-resistant packaging for oral prescription drugs—Two decades of experience’, *JAMA*, vol. 275, no .21, 1996, pp. 1661–5.

Manufacturers and importers

Manufacturers and importers of button batteries agreed to the following measures:

- Implement, as quickly as possible, improved warnings on button battery packaging focusing on the use of an icon on the front of a pack and a written warning on the back of a pack.
- Cease to produce batteries that are packaged:
    - with perforations allowing batteries to be easily released from packaging
    - in such a way that multiple batteries are released at the same time.
- Encourage product manufacturers to incorporate mechanisms that securely hold batteries in devices into products that require lithium coin cell batteries.

Following the meeting, the ACCC wrote to known battery suppliers to confirm their commitment to comply with child resistant packaging standards and warnings as agreed at the meeting and to do so as soon as practicable. Responses indicated that major battery suppliers were voluntarily meeting the specified packaging and labelling requirements from early 2014. Despite these actions there are still other manufacturers and importers of batteries who have not voluntarily introduced these safety measures.

Retailers

Retailers of button battery powered consumer goods and batteries in packaging agreed to:

- Implement buying strategies that require devices using button cell batteries to:
    - securely hold batteries in the device and to make the batteries inaccessible to young children
    - have warnings on the product and it's packaging
    - securely package any uninstalled lithium coin cell batteries that are supplied with the product
    - sell replacement batteries in childproof packaging with warnings.
- Incorporate point of sale signage on a voluntary basis.
- Not place lithium coin cell batteries within easy reach of children in retail stores, where possible.

These measures subsequently informed the development of the requirements and recommendations included in the Code, which was developed by volunteers from industry and published in 2016.

Despite industry support and commitment and the Code, market surveillance conducted by the ACCC indicates that there are still significant inconsistencies in the packaging and labelling of button batteries and products that contain them (see section 13.1).

5. Deaths and injuries

5.1. Deaths in Australia

In Australia, two children, Summer Steer and Isabella Rees, have died from injuries caused by ingesting a button battery. State and territory coroners have jurisdiction to investigate sudden and unexpected deaths, such as deaths from button battery ingestions. Coronial inquests have been conducted into both deaths.

Summer Steer

Coroner John Hutton conducted an inquest into the death of Summer Steer in July 2015 and delivered his findings on 3 November 2015.[26] Summer was four years old when she died on 30 June 2013 after ingesting a 20 mm lithium button battery. Summer had presented to both her local general practitioner and her local hospital emergency department many times in the days prior to her death. The battery ingestion was not witnessed and the source of the battery remains unknown. The button battery lodged in Summer's throat burned a hole in her oesophagus and created an aorto-oesophageal fistula.[27] This fistula led to profuse bleeding and eventually to her death.

As noted above, following the investigation, Coroner John Hutton made a range of recommendations including that the ACCC develop regulation to mandate:

- secure battery compartments for all products containing button batteries
- a current child resistant packaging standard for button batteries.

Coroner Hutton also outlined issues in the health system, including lack of clear treatment protocols, and lack of public and clinician awareness of the button battery hazard. Coroner Hutton recommended that Poison Information Centres serve as first point of contact for potential battery exposures.

Isabella Rees

Isabella Rees was 14 months old when she died on 4 February 2015 after ingesting a button battery. The Victorian Coroner Caitlin English investigated her death in November 2018.[28] Isabella also died of profuse bleeding from an aorto-oesophageal fistula caused by a 3 volt lithium button battery that had burned a hole in her oesophagus. The ingestion of the battery was not witnessed and the source of the battery is not known.

The ACCC provided a submission to the inquest. Coroner Caitlin English was of the view that all devices requiring button batteries should have battery enclosures secured (fastened) with a screw. Coroner English also recommended that a state wide clinical practice guideline should be developed for the management of potential button battery ingestions. Coroner English suggested that the guideline should align with the existing Melbourne Royal Children's Hospital (RCH) guideline for foreign body ingestion and should promote the Victorian Poisons Information Centre as the first point of information.[29] Coroner English also supported the ACCC's position in recommending the introduction of a General Safety Provision (GSP) (see section 19.1).

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[26] Office of the State Coroner 2015, Queensland Courts, Brisbane, https://www.courts.qld.gov.au/__data/assets/pdf_file/0004/444289/cif-steer-sa-20151103.pdf, viewed 1 August 2019.

[27] Aorto-oesophageal fistula is an abnormal connection or passageway between the aorta (which is the major artery carrying blood from the heart) and oesophagus (which is the muscular tube that connects the mouth to the stomach).

[28] Coroners Court of Victoria at Melbourne 2019, Coroners Court of Victoria at Melbourne, Melbourne, https://www.coronerscourt.vic.gov.au/sites/default/files/2019-04/IsabellaEstelleRees_059215.pdf, viewed 1 August 2019.

[29] RCH, 2017, Melbourne, https://www.rch.org.au/clinicalguide/guideline_index/Foreign_body_ingestion/, viewed 1 August 2019.

5.2. Button battery exposures and injuries in Australia

Button battery exposures

There is no national database for consumer product-related injuries or attendances at emergency departments in Australia. Consequently, there is no single point of reference for nationwide data on button battery exposures (ingestions or insertions) in Australia. Data included in this Issues Paper has been drawn from multiple sources.

Button battery exposure data includes all situations where an individual has been exposed to a button battery through ingestion or insertion, irrespective of whether the battery has actually caused an injury. Different organisations have been tracking button battery exposures for different periods of time and are continuing to track button battery exposures. The ACCC has obtained available exposure data from these organisations (see table 2).

Table 2: Data obtained from organisations tracking button battery exposures and injuries in Australia

Organisation	Time period the data covers	Coverage
Victorian Injury Surveillance Unit (VISU)	1999 to 2011 2013 to 2018	Victoria
Queensland Injury Surveillance Unit (QISU)	1999 to 2017	Queensland
Princess Margaret Hospital for Children emergency department—Childhood Injury Surveillance	2011 to 2018	Western Australia
Poison Information Centres	2015 to 2018	National
Centre for Epidemiology and Evidence, NSW Ministry of Health	2014 to 2018	New South Wales

These organisations collect data from hospital emergency departments or calls to Poison Information Centres. As there is no standardised dataset for button battery injuries, these organisations have collected different types and ranges of data. However, the data they have collected reveals some common patterns and trends.

Button battery exposures occur all over Australia

Poisons Information Centre data indicates that button battery exposures occur all over Australia. The greatest numbers of exposures were in New South Wales and Victoria, with the greatest rate of exposures (i.e. per 100 000 people) in South Australia and the Australian Capital Territory (table 3).

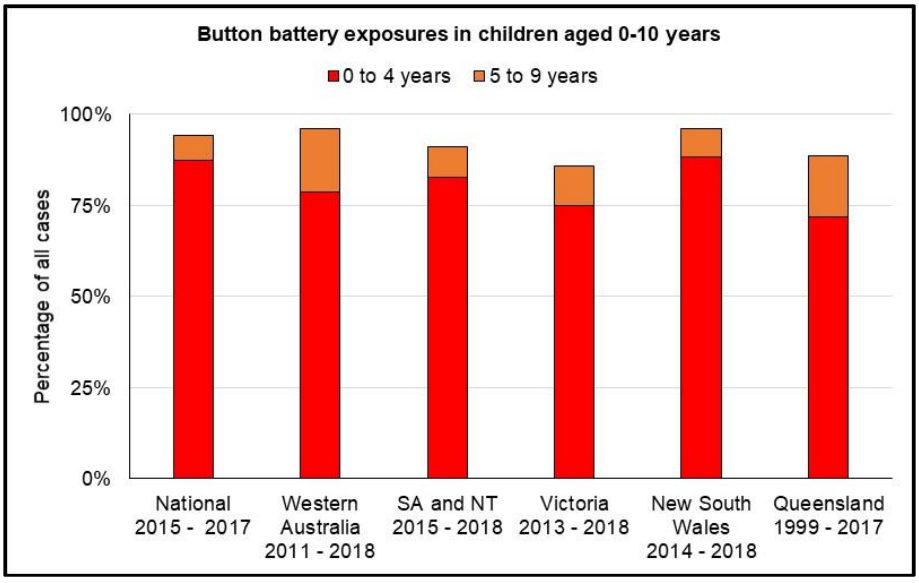
Table 3: Reported button battery exposures across Australia from 2015 to 2018

State	No. of paediatric cases	Paediatric cases/100 000 people /year
New South Wales	284	4.88
Victoria	229	4.96
Queensland	180	4.7
Western Australia	87	4.42
South Australia	85	6.92
Australian Capital Territory	18	5.83
Tasmania	16	4.26
Northern Territory	6	2.9

Button batteries exposures occur mostly in children under five years of age

Data from all of the organisations in table 2 indicate that young children under five years of age are most prone to button battery exposures. As figure 5 below shows, this pattern is consistent across all time periods measured and all of Australia.

Figure 5: Reported button battery exposures in children aged 0–10 years across Australia from 1999 to 2018



While most button battery exposures occur in children, adult exposures occur as well. Poisons Information Centre data indicates that that from 2015 to 2017, there were 72 accidental adult exposures to button batteries. Where known (53 cases), hearing aids or cochlear implants were by far the most common products involved in adult exposures (89 per cent of cases). During this period, Poisons Information Centres also recorded 12 cases of intentional adult ingestion of button batteries attributed to self-harm.[30]

[30] Cairns et al., loc. cit.

The numbers of reported button battery exposures are increasing

Long term data from Victoria (collected by the Victorian Injury Surveillance Unit) (figure 6) and Queensland (collected by the Queensland Injury Surveillance Unit) (figure 7) indicates that the numbers of reported button battery exposures in children under the age of five have been increasing.[31] However, as the awareness of the button battery hazard has grown, there has also been improvement in the capture of data on button battery related exposures and injuries during this period.

Figure 6: Reported button battery exposures per year from 1999 to 2018 in Victorian children under five years of age (VISU)

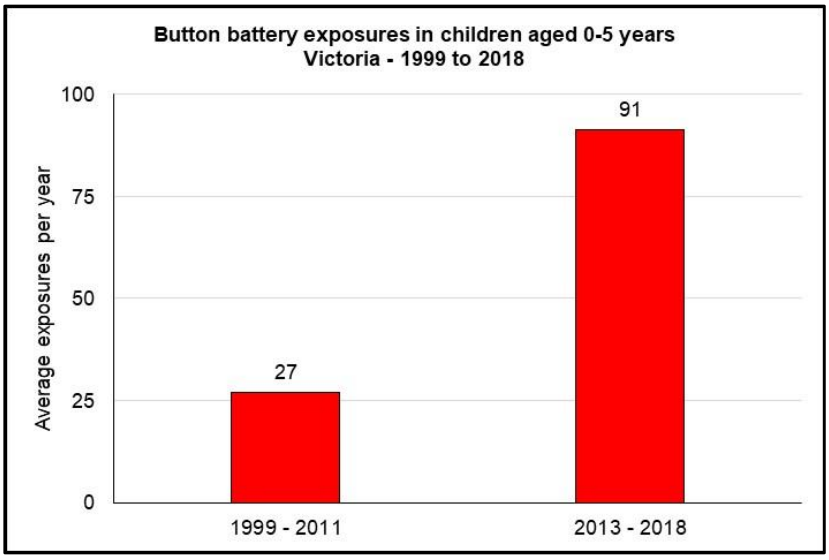
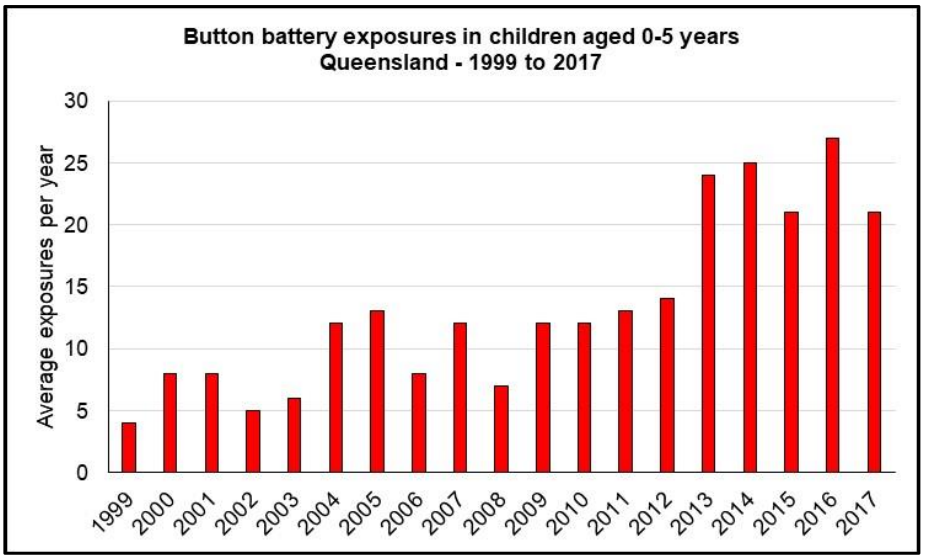


Figure 7: Reported button battery exposures per year from 1999 to 2016 in Queensland children under five years of age (QISU)

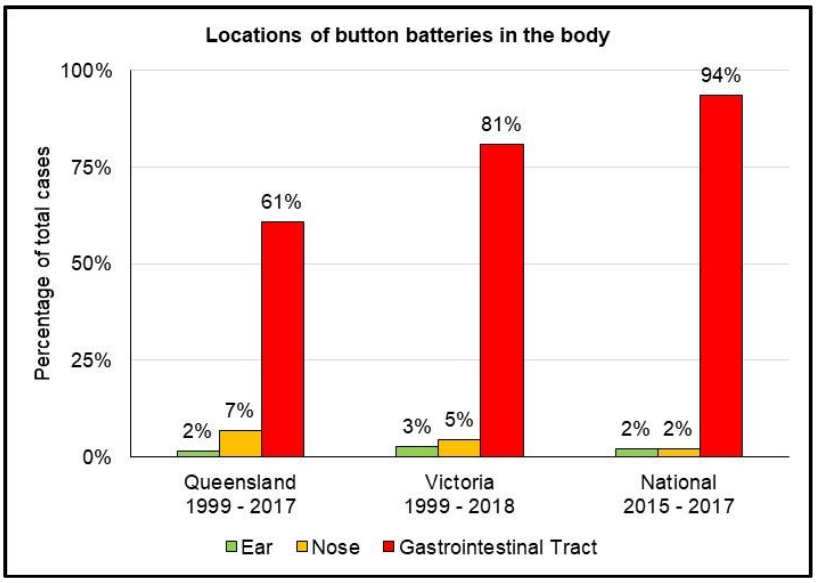


[31] VISU data 1999–2011 and 2013–2018 were extracted from the Victorian Emergency Minimum Dataset which comprises de-identified demographic, administrative and clinical data detailing presentations at Victorian public hospitals with designated emergency departments. Both data sets are from similar numbers of hospitals.

Button batteries are more likely to be ingested than inserted

Data from Victoria (collected by the Victorian Injury Surveillance Unit) and Queensland (collected by the Queensland Injury Surveillance Unit) and from across Australia (collected by Poisons Information Centres) indicate (figure 8) that children ingest button batteries much more often (more than 81 per cent of cases) than inserting them into their ears or noses or other orifices (less than 15 per cent of cases). Most of these batteries end up in the gastrointestinal tract. However, in most cases, the location of the battery was not documented.

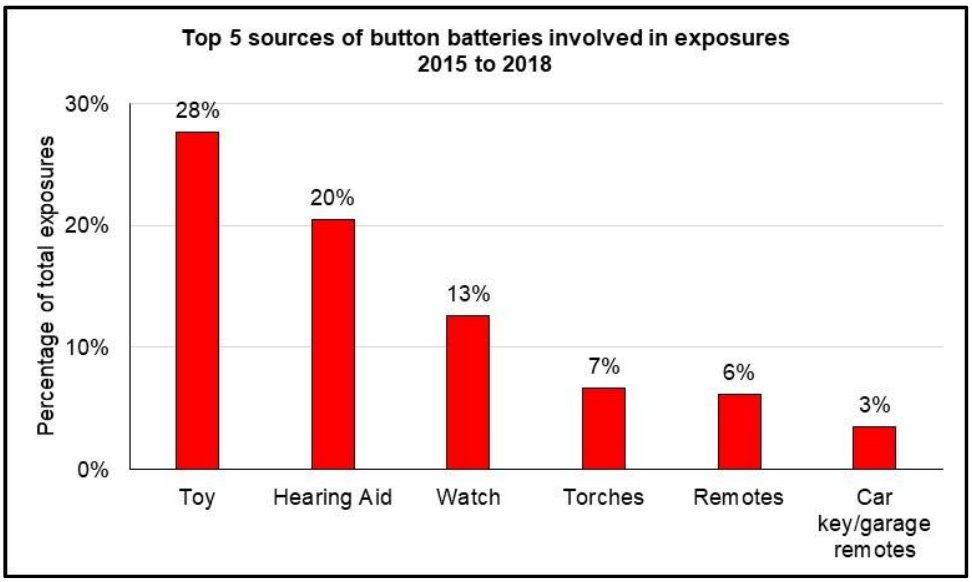
Figure 8: Locations in the body where button batteries are found most often after investigation



The most common sources of button batteries involved in exposures are watches, toys and hearing aids

Long term data from Victoria (collected by the Victorian Injury Surveillance Unit) and Queensland (collected by the Queensland Injury Surveillance Unit) and recent data from across Australia (collected by Poison Information Centres) indicate that, where known, watches, toys and hearing aids, torches and remote controls are the most common sources of the button batteries that are ingested or inserted. The long term data indicates that watches were the most common source of button batteries whereas more recent exposure data from Australian Poison Information Centres (figure 9), toys are the most common source. However, in the majority of cases the source of the battery is not known.

Figure 9: Most common sources of button batteries involved in reported exposures in the short term (2015 to 2018)



Poison Information Centres data also indicates how the children gained access to the button batteries that caused injury. Of the 99 cases where the source of the battery was known, the child most often gained access to the battery directly from the product compartment (31 per cent). The next most frequent method of access was the child removing the button battery directly from the packaging (21 per cent).

Button battery injuries

Where known, most button battery exposures do not result in immediate injury requiring further treatment and admission to hospital. Long term and recent exposure data indicate that in about 80 per cent of the cases, the visit to the emergency department does not result in immediate admission to hospital and further treatment. This could be because the battery is either removed from an orifice without the need for admission or has passed through the body without immediate incident.

However, the damage caused by button battery exposure can manifest well after the event, even if there is no immediate effect. The available exposure data only includes the first visit to emergency departments or first calls to Poison Information Centres. The exposure data also does not account for near misses where the child has been prevented from ingesting the battery or where the battery has passed through the child without incident. Also, given that the symptoms of injury due to button batteries are not unique and can be confused with other conditions, it is highly likely that the frequency of injury from button batteries has been underestimated.

The Australian Paediatric Surveillance Unit (APSU) is conducting a study into severe injury related to button batteries.[32] The purpose of the study is to collect information about injuries resulting from ingested or inserted button batteries as well as information about the battery operated products associated with the injuries. The study commenced in December 2017.

Between December 2017 and 22 February 2019, the study identified 14 individual cases of serious injury following exposure to a button battery. It is likely that this is an under representation of the number of cases nationally as the study relies on doctors and individuals reporting serious incidents.

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[32] APSU 2017, Sydney, http://www.apsu.org.au/assets/new-studies/SIRDB-APSU-Protocol-FINAL-V5.1.pdf, viewed 1 August 2019.

The average age of the injured children was 3.5 years. In most cases (12), the button battery was located in the oesophagus. The button battery was found in the ear in one case and the location was not specified in the other case. In ten cases, surgical intervention was required to remove the battery. The batteries remained inside the children for at least two hours before surgical removal. In most cases (13), the presence of the battery resulted in burns and dead tissue.

The data also included an estimate of the size of the button battery involved. Large batteries (diameter greater than 20 mm) and medium batteries (diameter between 10 mm and 19 mm) accounted for almost all the severe injuries requiring surgical intervention. The one case without serious injuries involved a small battery less than 10 mm in diameter.

Where known (10 cases), the battery was accessed most often (seven cases) from the product battery compartment. The products were torches, tea light candles, toys, glucometers and electronic remote controls. In two cases, the batteries were loose or kept in an accessible container and in one case the child accessed the battery directly from product packaging.

While the data above provides a general overview of button battery injury statistics in Australia, they do not demonstrate the extent of the injuries button batteries have caused or can cause. Appendix A contains further examples of individual reports of button battery injuries from across Australia. These examples provide a clear picture of the severe injuries and damage that button batteries can cause when ingested.

Question

2. What data or information can you provide on the prevalence of and costings of injuries and fatalities caused by button batteries?

5.3. International deaths and injuries

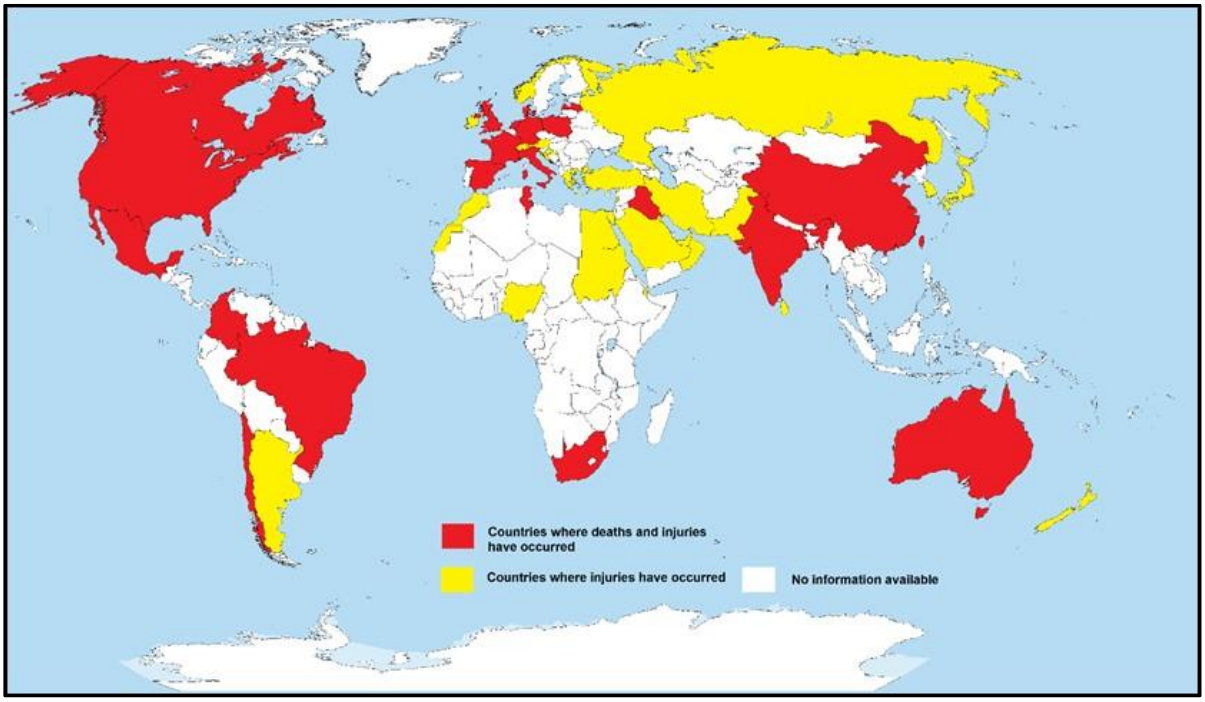
Button battery exposures, injuries and deaths are a global problem. Data from 49 countries indicates that there have been numerous deaths and thousands of exposures and injuries related to button batteries in every continent (figure 10). Sources of this data include peer reviewed button battery related medical literature on the PubMed database[33], records from the National Capital Poison Center (NCPC)[34] and a report from the Organisation for Economic Co-operation and Development (OECD) on button batteries.[35]

[33] National Center for Biotechnology Information 2019, US National Library of Science, Maryland, https://www.ncbi.nlm.nih.gov/pubmed/, viewed 1 August 2019.

[34] NCPC 2019, Washington DC, https://www.poison.org/battery/fatalcases, viewed 1 August 2019.

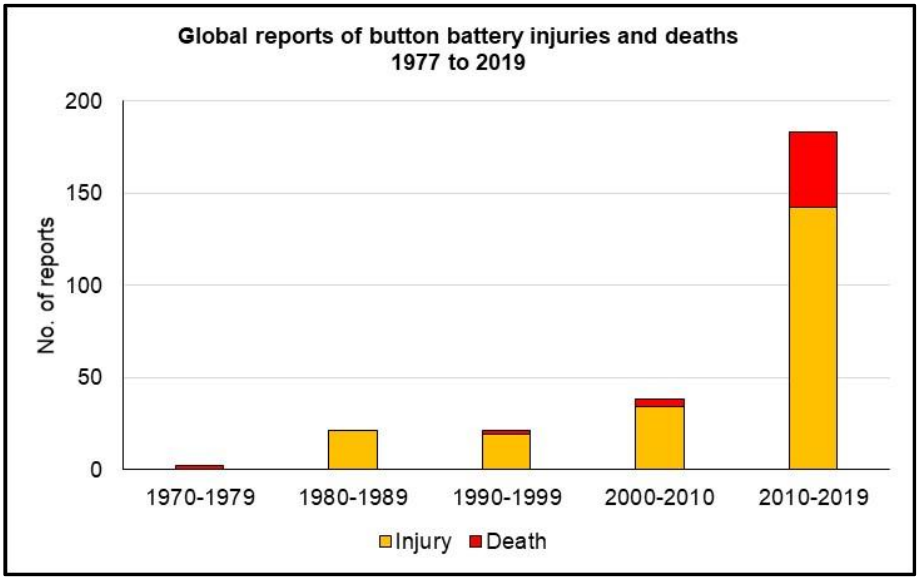
[35] Directorate for Science, Technology and Innovation 2014, OECD, Brussels, http://www.oecd.org/officialdocuments/publicdisplaydocumentpdf/?cote=DSTI/CP/CPS(2014)21/FINAL&docLanguage=En, viewed 1 August 2019.

Figure 10: Global button battery related injuries and deaths



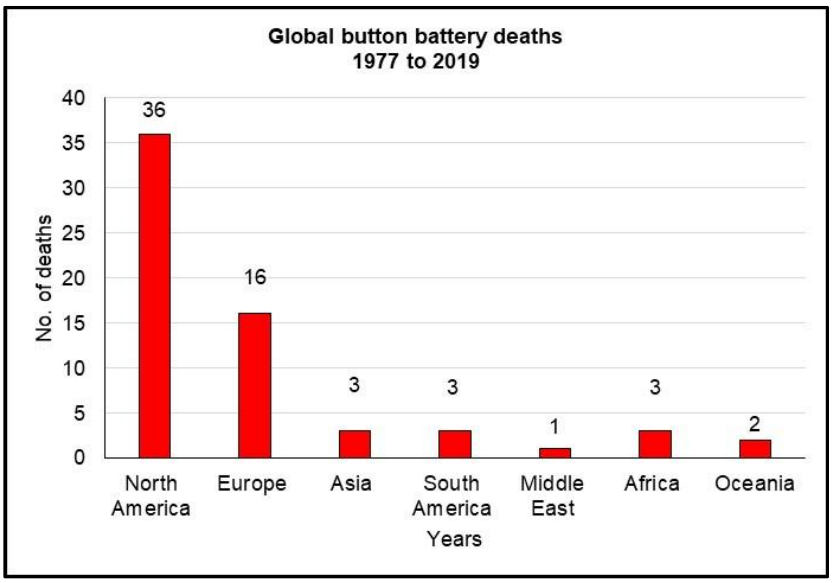
Reports of these exposures, injuries and deaths span almost five decades from 1977 to 2019 and have been increasing in number every decade (figure 11).

Figure 11: Global reports of button battery injuries and deaths from 1977 to 2019



There have been at least 64 confirmed child deaths from ingesting button batteries during this approximately forty year period (figure 12). The average age of these children was 1.9 years, and ages ranged from two months old to five years old. Where known (62 cases), the ingested button battery had become lodged in or affected the oesophagus in 98 per cent of the cases, where it caused severe damage and complications that led to death. There was only one case where the battery caused death by causing severe bleeding in the stomach. Where known (42 cases), the most common size of the button batteries ingested was about 20 mm and ranged from 10 mm to 23 mm. Where known (33 cases), lithium button batteries caused 91 per cent of the deaths. Of the remaining deaths, two involved manganese dioxide button batteries and one involved alkaline button batteries.

Figure 12: Global button battery deaths



There have also been thousands of recorded button battery exposures and injuries all over the world. Where known, lithium batteries ranging in size from 10 mm to 23 mm were most often involved in exposures and injuries. Most injuries occurred in the oesophagus. Injuries also occurred in the lower digestive tract, eyes, ears and noses. The severity of injuries ranged from mild burns and ulcers to severe perforations, trachea-oesophageal fistulas, aorto-oesophageal fistulas; corrosion, twisting or inflammation of the spine, heavy metal poisoning and vocal cord palsy.

The reports identifying these exposures, injuries and deaths are mostly from peer reviewed medical literature. Considering the global availability and use of button batteries, it is highly likely that more incidents such as these have occurred all over the world that have not been captured on any dataset.

The most comprehensive data on button battery exposures, injuries and deaths is available from the National Capital Poison Center, USA (NCPC)), which has also recorded the greatest numbers of such incidents. The NCPC estimates that from 1985 to 2017 in the USA there were an average of 9.8 button battery ingestions per million of population served by poison control centres. During this time, about 800 children in the USA under the age of six suffered moderate (617) and major life threatening or disabling (183) injuries.[36]

An analysis of the NCPC data has revealed patterns relating to button battery ingestions similar to Australia. The numbers of exposures, injuries and deaths in the USA have been increasing from 1985 to 2017. Most of these exposures, injuries and deaths have occurred in children below the age of six. From 2016 to 2018, the top five products in the USA related to button battery exposures were hearing aids (36.5 per cent), toys (22 per cent), lights (16.5 per cent), remotes (5.4 per cent) and watches (4.9 per cent).This is similar to the top sources of button batteries causing injuries in Australia (Figure 8). Also, as observed in Australia, the sources of the button batteries involved in the exposure was unknown in most cases.[37]

The USA data is relevant to Australia because of the similarities in lifestyles, the products available and the uses of these products. However, unlike the USA, Australia does not have a national database or system for collecting and analysing data on button battery ingestions.

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[36] NCPC 2019 Washington DC, https://www.poison.org/battery/stats, viewed 1 August 2019.

[37] ibid.

6. Mandatory injury reports

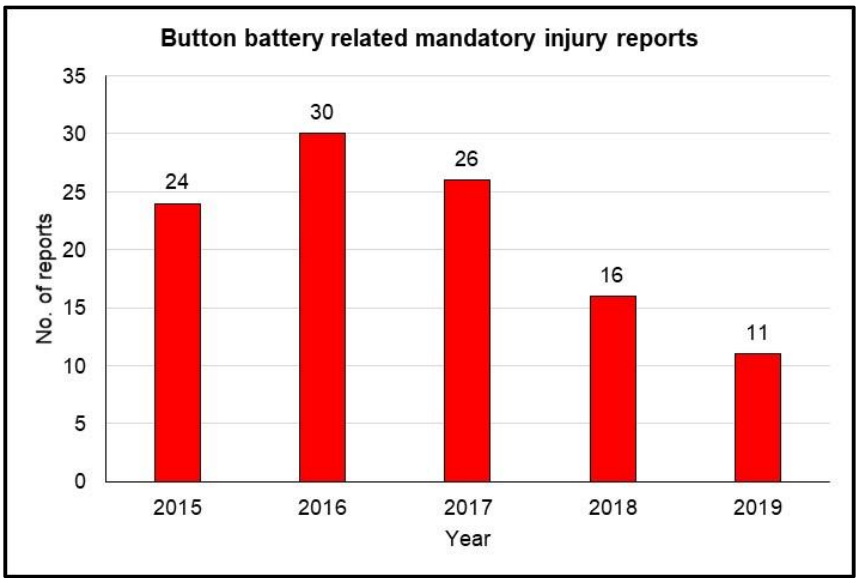
Section 131 of the ACL requires suppliers of consumer goods and related services to report deaths, serious injuries or illnesses associated with consumer goods. These reports are called mandatory injury reports.

All participants in the supply chain of a consumer good are required to comply with the reporting requirement if they become aware of a death, serious injury or illness caused by a consumer good. This includes a retailer, dealer, hirer, distributor, installer, repairer, importer, manufacturer and/or exporter of the consumer goods in question.

Similarly, all participants in the supply chain for product related services linked to the goods associated with the death, injury or illness are required to report the incident if they become aware of it. This could include installers and service technicians.

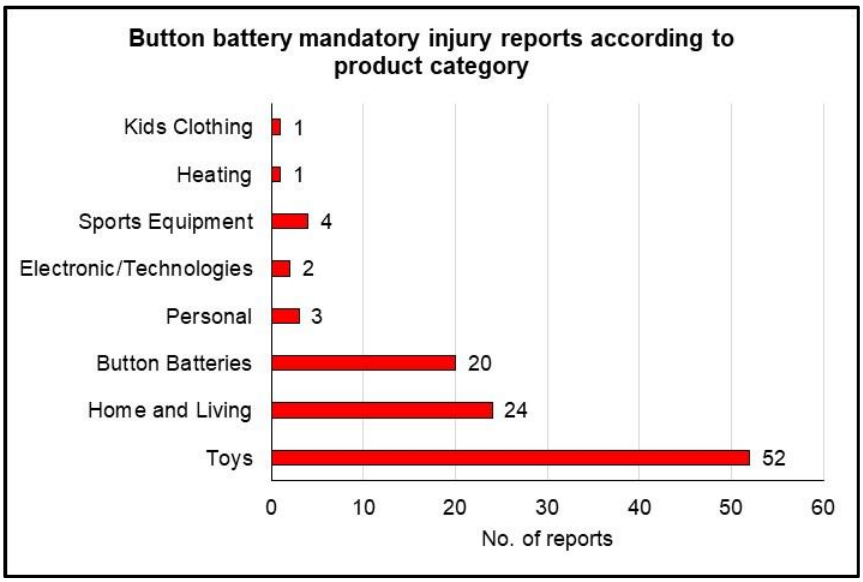
A supplier is required to submit a report to the ACCC within two days of becoming aware of a reportable incident. From 1 January 2015 to 30 June 2019, the ACCC received 107 mandatory reports regarding button battery products. Due to confidentiality provisions in the ACL, the ACCC is unable to provide further detail relating to any specific report. These mandatory injury reports do not constitute all of the injuries that have occurred relating to button batteries. Incidents where the source of the battery is unknown for example would not be reported or captured in this dataset.

Figure 13: Button battery related mandatory injury reports received by the ACCC from 1 January 2015 to 30 June 2019 (note that 2019 figures are January to June only)



Of the 107 mandatory injury reports received concerning button battery products, the main product categories were toys, button batteries and home and living products (figure 14). Note that the type ‘Button Batteries’ does not duplicate but may include other product types. Given the Poisons Information Centre injury and exposure data above, the ACCC considers there may be under reporting in this area.

Figure 14: Product categories related to button battery mandatory injury reports received by the ACCC from 1 January 2015 to 30 June 2019

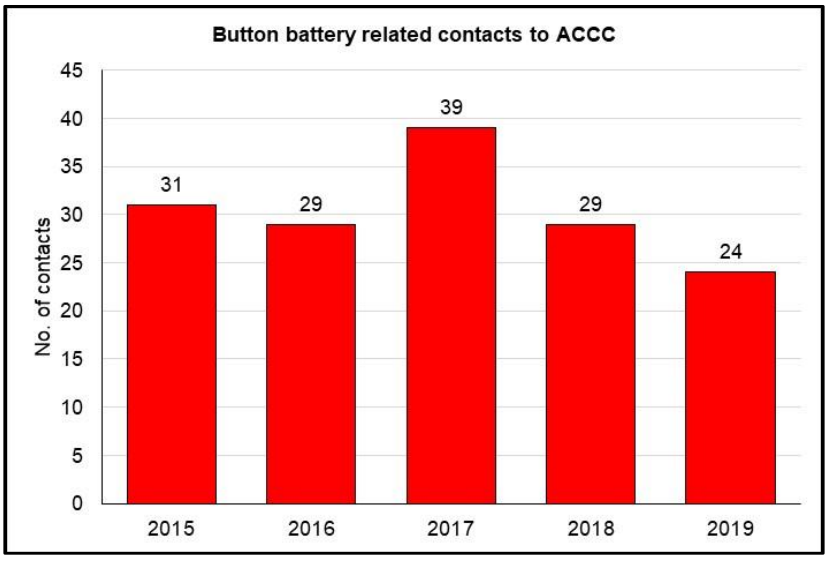


Analysis of ACCC data on mandatory injury reports also shows that the likelihood of a button battery related injury to be very severe or fatal, is similar and second only to the injuries caused by quad bikes.

7. Consumer contacts and complaints

The Infocentre is the ACCC's initial response centre for all telephone and written enquiries and reports from consumers and businesses about competition and consumer issues in Australia. The Infocentre has received 152 reports relating to button batteries from 1 January 2015 to 30 June 2019. The number of reports received per year has remained reasonably consistent (figure 15).

Figure 15: Button battery related contacts to the ACCC from 1 January 2015 to 30 June 2019 (Note that 2019 figures are from January to June only)



NSW Fair Trading reported two consumer contacts; the WA Department of Mines, Industry Regulation and Safety reported 12 consumer contacts, and Queensland Office of Fair Trading reported 28 consumer contacts between 1 January 2015 and 28 February 2019.

8. Voluntary recalls

Voluntary safety recalls of consumer goods may be initiated by suppliers in a number of circumstances such as where:

- the goods will or may cause injury
- a reasonably foreseeable use (including a misuse) of the goods will or may cause injury
- the goods do not comply with a relevant safety standard
- the goods are subject to an interim or permanent ban.

Since 1 January 2015, suppliers have notified 47 voluntary recalls for consumer products containing button batteries and of these, 32 voluntary recalls have occurred since the commencement of the National Strategy in 2016. This increase may be in part due to the coordinated surveillance activities undertaken as part of the National Strategy (see section 13), and the increased focus of the ACCC and ACL regulators on the safety hazard. Appendix B contains a list of voluntary recalls notified since 1 January 2015.

Some of the defects described for the voluntary recall of button battery consumer products include:

- the battery compartment was not adequately secured with a screw or mechanism, and the button batteries inside may be easily accessible
- the button batteries could be released if the product was dropped on a hard surface
- the battery compartment cover could be opened easily, exposing the button batteries inside
- the button batteries could be dislodged if the product is continuously bent or twisted
- small parts may be released from the product.

The product hazards described include internal burn injuries, which may result in serious illness and death, and in some cases, choking hazards.

9. Australia's current legislative framework

9.1. Australian Consumer Law

The Australian consumer product safety framework is underpinned by the ACL. The ACL is set out in Schedule 2 to the *Competition and Consumer Act 2010* (CCA).[38] The ACL is applied as a law of the Commonwealth (CCA Part XI) and as a law of the states and territories (through the enactment of legislation in each state or territory that applies the ACL as a law of its jurisdiction).

Australian consumers have high expectations of product stewardship. They expect that there are processes to ensure that consumer goods available in the market are safe to use.

[38] Federal Register of Legislation 2005, Australian Government, Canberra, https://www.legislation.gov.au/Details/C2019C00149, viewed 1 August 2019.

Consumers also expect compensation for faulty or defective goods, and that dangerous goods will be removed from sale.[39]

The ACL provides consumer guarantees that apply each time goods or services are supplied to consumers. If a good or service doesn't meet the statutory guarantee, consumers have rights to remedies from the suppliers. A statutory guarantee is that goods will be of acceptable quality, defined in the ACL as being safe, fit for purpose and free from defects, as a reasonable consumer can expect given their knowledge of the goods.

In circumstances where safety related market failure is evident, there are specific provisions of the ACL whereby the Commonwealth Minister, or state and territory Ministers, can intervene and introduce regulation to consumer goods and product-related services by:

- making or declaring or developing mandatory safety standards, imposing permanent national bans or making information standards (only in relation to the Commonwealth Minister)
- banning consumer goods on an interim basis
- issuing a compulsory recall notice to suppliers (in relation to consumer goods only).

These regulatory interventions are available to address safety-related market failure, such as where unsafe goods of a particular kind are supplied into the Australian market place and consumers are injured. The provisions apply only to 'consumer goods' (and product-related services in certain cases). Section 2 of the ACL defines 'consumer goods' as 'goods that are intended to be used, or are of a kind likely to be used, for personal, domestic or household use or consumption'.

In relation to withdrawal of goods from the marketplace, under section 128 of the ACL, a supplier can voluntarily take action to recall consumer goods of a particular kind if:

- the goods will or may cause injury, including through reasonably foreseeable use (including misuse)
- a safety standard for such goods is in force and the goods do not comply with the standard; or an interim ban or a permanent ban on such goods is in force.

Suppliers are also required, under section 131 of the ACL, to report to the Commonwealth Minister any deaths, serious injuries or serious illness associated with consumer goods that they become aware of (mandatory injury reports), unless an exemption applies. These exemptions include situations where the supplier is already subject to a notification requirement under a Commonwealth, state or territory law specified in the regulations.

Section 104 of the ACL allows a Minister to make a safety standard imposing certain requirements that 'are reasonably necessary to prevent or reduce risk of injury to any person'. Section 105 of the ACL allows the Minister to declare a standard (or part thereof), prepared or approved by Standards Australia or by an association prescribed by the regulations, to be a safety standard under the ACL.

If the Minister makes a safety standard, it can include requirements for the composition, contents, method of manufacture or design, construction, finish or packaging of consumer goods.

As discussed previously in this paper, there is no horizontal safety standard addressing button battery safety across all relevant consumer goods supplied in Australia. There is also currently no General Safety Provision under the Australian Consumer Law

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[39] Consumer Affairs Australia and New Zealand, *Australian Consumer Law Review Final Report*, Commonwealth of Australia, Canberra, 2017, http://consumerlaw.gov.au/sites/consumer/files/2017/04/ACL_Review_Final_Report.pdf, viewed 1 August 2019.

(See section 19.1). The Australian Standard for toys for children up to and including 36 months of age does includes some requirements which address button battery safety, via provisions for small parts, and this standard is about to be updated with specific regard to the hazard of button batteries as well (see section 9.2).

In relation to button batteries, a safety standard could mandate requirements for manufacturing and packaging of button batteries and button battery related products including testing requirements.

A safety standard can also require the form and content of markings, warnings or instructions to accompany consumer goods. For button batteries, a safety standard could require suppliers to provide warnings and labelling that are affixed to the packaging of button batteries themselves or the products that contain button batteries (see section 19).

The ACL provides for information standards at section 134. An information standard can:

- deal with the content of information about the goods or services
- and/or require specified information to be supplied with the goods or services
- may require the information to be set out in a particular manner or form.

An information standard may be applied more broadly than to consumer goods or services supplied to consumers. Also, non-compliance with an information standard is not a reason for recall of relevant consumer goods.

The ACL also provides for safety warning notices about consumer goods or product-related services. Under section 129 of the ACL, a responsible Minister may publish notices that inform consumers and suppliers about consumer goods or product-related services that may cause injury or are under investigation. In March 2019, the Commonwealth Minister published a Safety Warning Notice to warn consumers of possible risks involved in the use of button batteries.

9.2. Australian mandatory standards

Toys for children up to and including 36 months of age

The mandatory standard *Consumer Protection Notice No. 14 of 2003—Consumer Product Safety Standard: Toys for children up to and including 36 months of age* prescribes requirements for the design, construction of toys for children of ages up to and including 36 months, and includes specific requirements for battery enclosures.[40]

A key requirement of the mandatory standard is that a tool or at least two independent and simultaneous movements be required to open a battery compartment before allowing access to the batteries within. The mandatory standard also states that toys should not have components that fit into a small parts cylinder. This requirement would apply to products containing button batteries as a coin-sized lithium battery is able to fit inside the small parts cylinder which poses a choking hazard.

This mandatory standard is based on certain sections of the voluntary *Australian/New Zealand Standard AS/NZS ISO 8124.1:2002 'Safety of toys Part 1: Safety aspects related to mechanical and physical properties'*.

The ACCC is currently reviewing the suite of mandatory standards for toys, which importantly includes the mandatory standard for toys for children of ages up to an including 36 months. The review is considering strengthening the requirements in this standard for the

[40] Federal Register of Legislation 2005, Australian Government, Canberra, https://www.legislation.gov.au/Details/F2008C00607, viewed 1 August 2019.

physical battery compartment (such as requiring the use of a tool or two separate and simultaneous actions to open) as well as warnings to be displayed on packaging, in user instructions or on the toy itself.

Regulation of Electrical Products

An overarching national Electrical Equipment Safety System (EESS) has been developed for application in Australian and New Zealand, but is not yet enacted in law by all Australian states and territories. Electrical safety laws of the Australian jurisdictions apply to the supply of 'in-scope' electrical equipment in most Australian states and territories[41]. 'In-scope' equipment is defined in law and identified in state and territory regulatory instruments. In addition to requirements addressing in-scope equipment, electrical laws also require suppliers to ensure the safety of electrical equipment generally through adherence to the (voluntary) Australia/New Zealand standard 3820: *Essential safety requirements for electrical equipment* which is called up in law. The ACCC intends to further explore the scope for general electrical safety legislation to apply to consumer goods powered by button batteries. Specific electrical standards called up in State and Territory legislation are further discussed below and listed in table 5.

10. Voluntary Australian standards

Standards Australia is a not-for-profit standards organisation that develops voluntary Australian standards through the formation of expert technical committees. Standards Australia are also Australia's representatives for the International Organisation for Standardisation (ISO) and the IEC.[42]

10.1. Packaging standards

Currently there are two voluntary Australian standards that relate to child resistant packaging of specific products including some button batteries, as detailed in Table 4 below.

Table 4: Australian Standards relating to child resistant packaging for button batteries

Name of standard	Description
AS 1928-2007: Child-resistant packaging– Requirements and testing procedures for reclosable packages	Provides a method for assessing if reclosable packaging is resistant to opening by a child.
AS 5808-2009: Child-resistant packaging– Requirements and testing procedures for non-reclosable packages for non-pharmaceutical products	Provides a method for assessing if non-reclosable packaging for non-pharmaceutical products is resistant to opening by a child.

The test procedure for both these standards involves providing packaging to a test group of 200 children and specifies the percentage of packages that should not be able to be opened within a specific timeframe for the package to be considered child resistant.

41 https://www.eess.gov.au/equipment/risk-level-definition/.

42 Standards Australia 2019, Sydney, www.standards.org.au, viewed 1 August 2019.

10.2. Electrical standards

Voluntary standards that stipulate requirements for battery compartments exist in Australia for electrical equipment and appliances. These standards are made by Standards Australia and Standards New Zealand, who work together to develop the joint AS/NZS standards. Each state and territory may call up standards in their legislation for mandatory application to products or services. These jurisdictions administer their own laws relating to electrical safety. Table 5 below lists the AS/NZS standards relevant to button batteries.

Table 5: Electrical standards that apply in Australia

Name of standard	Description
AS/NZS 3100:2017 Approval and test specification–General requirements for electrical equipment ***AS/NZS 60335.1:2011 Household and similar electrical appliances–Safety***	The AS/NZS 3100 standard provides minimum safety requirements for electrical equipment, including appliances, accessories and apparatus used in the home, when such equipment is not covered by another standard. The AS/NZS 60335.1 standard requires electrical appliances for household and similar use be constructed to function safely in normal use. The requirements of this standard take precedent over AS/NZS 3100 in areas of uncertainty. Both standards require that button or coin cell batteries only be accessible with the use of a tool, or that the battery compartment be opened with two independent and simultaneous movements.
AS/NZS 60065:2018 Audio, video and similar electronic apparatus–Safety requirements	This standard requires that electronic apparatus which has user replaceable button batteries be marked with a warning about the risk of injuries of injuries button battery can cause if ingested and to seek medical attention. Battery compartments likely to be accessible to children must require a tool or two independent but simultaneous movements to open the compartment cover.
AS/NZS 62115:2018 Electric toys–Safety	This standard requires electric toys with replaceable coin sized batteries to carry a hazard warning on the packaging, and additional injury warnings and to seek medical attention if a battery is ingested in the instructions. It also requires batteries that fit in a specified small parts cylinder not be removable without the aid of a tool.

Some suppliers of consumer products powered by button batteries reference existing electrical standards that are called up by electrical safety laws in Australian states and territories. While these standards do not address the overall hazard with as much specificity as the voluntary Code, they may be more prescriptive of certain features such as warning text and pictograms. Development of any new safety standard addressing button battery hazards will need to review existing electrical safety provisions to ensure there is no un-necessary duplication or conflict.

11. The Code

In 2016, an industry working group of retailers, associations and product safety consultants developed the voluntary Code, with input from the ACCC and other ACL regulators. The Code sets out best practice for supplying safer button battery related products. The Code is available on the ACCC's Product Safety Australia website. The Commonwealth Safety Warning Notice on button batteries, published in March 2019, also encourages suppliers to adopt the principles of the Code.

The Code is a guide for suppliers (i.e. manufacturers, distributers, importers, retailers, and online suppliers) in making responsible decisions about button battery safety when procuring, designing, developing or retailing button battery-powered devices. The essential requirements for compliance with the Code include:

- Consumer goods that use one or more replaceable button batteries must be designed and manufactured such that batteries in the device are not accessible to young children under normal use or foreseeable misuse.
- Consumer goods that use one or more replaceable button batteries must either:
    - have a battery compartment (or other enclosure) that is secured (preferably with a captive screw, a bolt or mechanism) such that it requires a tool to gain access to the batteries
    - have a battery compartment that requires two or more independent, and simultaneous actions to remove its cover.
- Any button batteries supplied with consumer goods must be in packaging that is not accessible to young children under normal use or foreseeable misuse.
- Inform consumers at the point of sale, including for online sales, if the product they are purchasing requires button batteries to operate and that these are hazardous to young children.

The requirements above do not apply to professionally prescribed and fitted medical devices such as hearing aids.

The Code provides a range of further recommendations for suppliers to consider including:

- whether to supply products containing button or coin-sized lithium batteries at all
- whether products could be powered by other types of batteries that do not present the same danger as button batteries
- conducting audits of existing products and removing items that do not comply with the Code
- supplying only button batteries and products that contain button batteries that comply with the Code
- reviewing the height at which button batteries and products containing button batteries are displayed in stores, so they are less accessible to young children
- selecting brands of batteries that are supplied in suitable child-resistant packaging and are marked with warnings alerting consumers to the hazards to young children
- that packaging or instructions of button battery products should be marked with a warning alerting consumers to the dangers of young children ingesting or inserting button batteries
- alerting consumers to the risks of button batteries by providing warnings in store.

The industry working group is currently reviewing the Code. A list of the current industry working group members can be found in appendix D.

Questions

3. What information can you provide on the range of products that you supply that contain button batteries?
4. Do you think the recommended safety actions in the Code for products that contain button batteries are adequate to reduce the risk of children accessing button batteries? Please provide the reasons for your response.
5. Do you think the recommended safety actions in the Code should be made mandatory? What impact would mandating these requirements have on Australian suppliers?
6. If you are a supplier, do you supply products that comply with the Code? If no, please explain why. If yes, what actions do you have in place to reflect the Code?

12. Voluntary international standards

There are a number of international standards that relate to button battery safety. Major battery manufacturers have indicated that they voluntarily adopt international standards such as UL 4200a or ANSI C18.3M (table 6). Table 6 lists some of the standards relevant to button battery safety.

Table 6: Button battery related voluntary international standards

Name of standard	Description
UL 4200A—Standard for Safety of Products Incorporating Button or Coin Cell Batteries of Lithium Technologies	This standard requires the battery compartment of a product be designed to be opened only by the use of a tool or a minimum of two independent and simultaneous movements. Where a button or coin cell battery is not intended to be replaced, the battery is to be inaccessible by an enclosure or held fully captive by the product. A safety alert symbol and a hazard warning is required on the product and in the instructions.
ASTM F963-11: Standard Consumer Safety Specification for Toy Safety	This standard requires that no batteries in toys for children under 14 years of age should be accessible except with the use of a tool where the battery can fit in the small part test cylinder.
ANSI C18.3M, Part 2-2011 American National Standard for Portable Lithium Primary Cells and Batteries–Safety Standard	This standard specifies tests for portable primary lithium cells and batteries to promote the safe design of batteries. It also includes safety information on keeping small batteries out of reach of children. Marking requirements state a caution on ingestion should be included for small batteries (on the packaging if not on the battery itself) and that battery compartment closures should be designed to prevent access by children.

IEC 60086-4:2019 Primary batteries – Part 4: Safety of lithium batteries	This standard provides example warning text explaining the hazards of ingesting lithium batteries. A recommended pictogram is also provided which warns parents to keep products out of reach of children where there's a risk of accidental ingestion. Caution for ingestion is to be marked on packaging for and that the packaging be child resistant. Test methods for child resistant packaging are provided. Informative guidance states battery compartment closures should be designed to prevent access by children.

13. National Strategy

The National Strategy was launched in September 2016 in response to Coroner John Hutton's recommendations that the ACCC review button battery safety. The ACCC implemented this two-year strategy with the assistance of other ACL regulators.

The overarching objective of the National Strategy was to examine whether it was possible to reduce child exposure to unsecured button batteries through voluntary safety improvements made by suppliers and to raise awareness to eliminate button battery related injuries in Australia. The National Strategy included:

- co-surveillance with ACL regulators and assessment of products containing button batteries
- promotion of information to assist suppliers source safer products
- voluntary recalls of unsafe products by suppliers
- creation and promotion of safety awareness resources such as the 'Button Battery Safety in the Home' YouTube video
- collection of evidence sufficient to consider the need for regulatory intervention.

During the implementation of the National Strategy, the ACCC and the other ACL regulators strongly encouraged and supported industry to develop and implement voluntary safety improvements (including the Code). For example, when conducting market surveillance, correspondence between ACL regulators and retailers about button battery powered consumer products routinely referred to the available guidance and whether a product incorporated the relevant safety improvements or not.

In 2019, the ACCC has evaluated the impact of the National Strategy. Evidence collected throughout that evaluation process informs this Issues Paper.

13.1. Market surveillance

Market surveillance helps to identify compliance concerns and assists in the identification of product safety hazards. The ACCC and other ACL regulators undertook three rounds of market surveillance of button battery products as part of the National Strategy, with over 1000 products surveyed around Australia. The products examined were assessed against the surveillance methodology developed under the National Strategy by the ACCC and other ACL regulators. This methodology is consistent with the voluntary safety principles contained in the Code. The methodology helped to ensure that the market surveillance data captured was nationally consistent. Appendix C contains the surveillance methodology used.

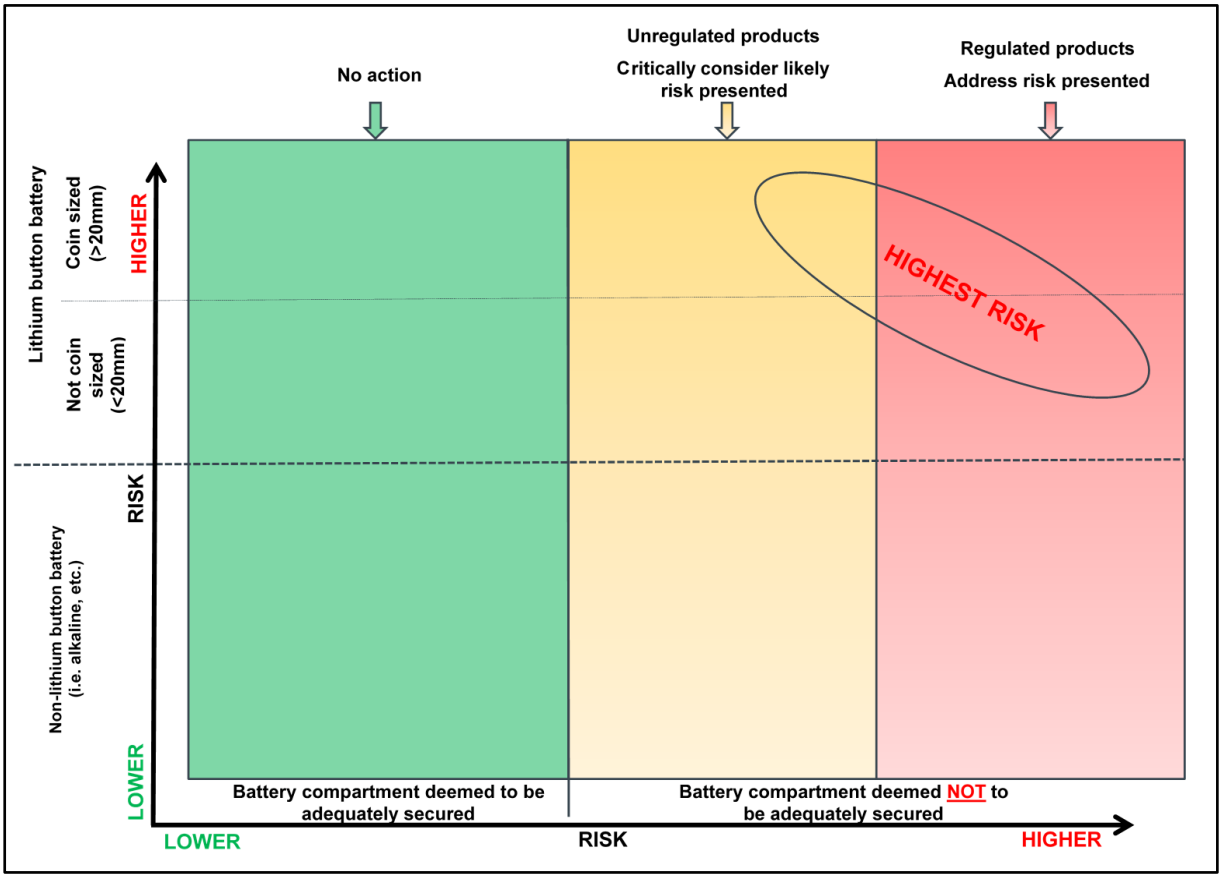
Products were not subject to testing against any published voluntary standards because the aim of the surveillance was to test against application of the principles contained in the Code. These principles are readily assessed by common sense examination such as:

- Visual inspection to see how the batteries are incorporated into the product—are they screwed in or is the compartment glued or sealed?
- Visual inspection of whether the product released batteries if it was accidentally dropped from a table height onto a carpeted or hard surface, or was trodden on by an average weight adult.
- Visual inspection of whether the battery could be released from the product with finger manipulation of the product or battery enclosure.

Risk assessment

The figure below shows the button battery risk assessment guidance developed for market surveillance activities under the National Strategy to assist in identifying high risk button battery consumer products.

Figure 16: Risk assessment guidance for market surveillance



High risk products

Products were assessed on their level of risk. Battery sizes were assessed and products with batteries exceeding 20 mm in diameter were automatically weighted highest risk (in accordance with injury data available at the time of development). Products were then assessed according to further high risk categories, including products that:

- released batteries when dropped
- had battery covers (enclosures) that were not sealed, and did not require either a screwdriver or tool; or two independent simultaneous movements to open
- had battery covers (enclosures) that are easily able to be opened or forced open
- had loose batteries in the outer packaging of the goods.

The results of the market surveillance indicate that there are many high risk button battery products available in the market. This includes products with unsecure or flimsy button battery compartments. Types of products repeatedly identified as high risk included digital scales, LED candles, digital thermometers, LED torches and toys.

Surveillance identified that high risk button battery products were commonly supplied by discount variety stores or tobacconists.

The ACCC and other ACL regulators engaged with suppliers of high risk products to inform them of the principles of the Code, and ensure they take suitable action to address the safety risks. In some cases, this has included suppliers undertaking a voluntary product recall, or no longer selling the high risk product in their stores.

However, in many cases suppliers were resistant to taking voluntary measures to improve the safety of button battery products. If suppliers do not voluntarily recall products from supply, the ACCC may recommend that the Minister exercises powers under the Australian Consumer law to effect compulsory recall of the goods.

Overall, ACL regulators concluded that the presence of a voluntary Code did not persuade all suppliers to improve the safety of goods or remove likely unsafe products from users. Some suppliers complained that they were asked to take any action at all in relation to a Code that was voluntary in nature. This indicates that the voluntary guidance has not been effective enough in reducing the hazards associated with button battery products.

Packaging and labelling

The Code recommends a range of information and warning labels that should be present on packaging for products containing button batteries. The market surveillance also evaluated a product's packaging according to whether it included three types of information:

- a warning to keep out of reach of children
- a warning to seek emergency medical treatment if a battery is ingested
- the Australian Poisons Information Centre hotline phone number.

Despite evidence of many retailers adopting recommendations of the voluntary Code, overall results from the market surveillance indicated either a general absence of child resistant packaging and appropriate warning labels on button battery products available in the market, or a piecemeal approach. This was particularly the case for less expensive novelty products. Market surveillance also found that many suppliers had made some but not all recommended improvements. For instance, initiatives to improve packaging (such as removing perforations and changing plastic moulding design) or to improve labelling by including more warnings specified in the Code, and information about the dangers of button

batteries for goods sold online. See appendix C for further information on the market surveillance conducted under the National Strategy.

13.2. Community awareness

One of the goals of the National Strategy was to increase public awareness of the health risks posed by exposure of children to button batteries.

The ACCC published and promoted a button battery safety video on YouTube called *Button battery safety in the home* to raise public awareness of the health risks posed by exposure of children to button batteries.[43] The video aimed to give parents and carers practical advice to reduce children's exposure to button batteries. The ACCC and other ACL regulators undertook a range of media, social media and engagement activities to raise awareness of the issue. Since its launch in August 2016, the video has been viewed 28 990 times via the ACCC Product Safety Facebook and YouTube channels.

The ACCC and other ACL regulators also undertook a range of activities to raise supplier awareness of the risks and hazards associated with button battery products throughout the operation of the National Strategy. This included promoting the Code through media and social media channels and urging Australian business to adopt the principles of the Code. The Code was published on the Product Safety Australia website as a key resource on the button battery safety webpage. Since its publication on the Product Safety Australia website in 2016, the Code has been downloaded 5221 times.

13.3. Key Findings

Information obtained from the evaluation of the National Strategy indicates that community awareness raising activities and supplier self-regulation has not sufficiently reduced the risk of injury or death to children from exposure to button batteries.

Consolidated injury and exposure data indicated a consistently high number of button battery exposures and admissions each week to Australian emergency departments. There was no correlation identified between the implementation of the National Strategy and the rate of button battery exposures, injuries and presentations. Injury and exposure data has been considered in further detail in this Issues Paper (see section 5).

There have been some improvements during the course of the National Strategy, such as progress by suppliers in applying the principles of the voluntary Code, and many unsafe products have been recalled (see appendix B). However, there is still a significant lack of adherence by suppliers to the requirements of the Code. As seen through market surveillance, issues remain with products not containing child resistant packaging, or appropriate warning labels on button battery products. There are also a high number of products in the market that do not contain a secure button battery compartment.

14. Other government initiatives

14.1. Therapeutic Goods Administration

Some medical devices powered by button batteries are not considered consumer goods, as defined by the ACL. Others, such as glucometers and thermometers, are commonly supplied to and used by consumers. These goods are subject to specific regulatory controls, including approval, by the TGA. The ACCC does not propose to duplicate the work of specialist safety regulators and will discuss any outcomes of this consultation with the TGA directly.

[43] ACCC, Button battery safety in the home, loc. cit.

The guidance provided in the Code is also relevant to many medical devices. The ACCC shared its surveillance assessment method with the TGA in 2016. The TGA subsequently undertook a comprehensive review of medical devices it regulated. The TGA encourages suppliers of medical devices that contain button batteries to adopt the principles of the Code as well as ensuring that they are compliant with the Australian regulatory guidelines for medical devices.

Further information is available from the TGA website at https://www.tga.gov.au/publication-issue/medical-devices-safety-update-volume-5-number-6-november-2017.

15. Other initiatives

15.1. Health Practitioner Advice

Many government and non-government bodies have played a role in increasing the public awareness of the hazards presented by button batteries. This includes educating parents and carers as well as health care providers in the identification and treatment of potential button battery ingestions.

The ACCC engaged with the Queensland Consumer Product Injury Research Advisory Group and the Western Australian Consumer Product Advocacy Network throughout the course of the National Strategy. This engagement involved sharing information and providing updates on emerging issues and current activities relating to button battery safety across the broader community. These groups include representatives from various disciplines such as injury prevention, scientific research, behavioural economics and consumer protection.

Since 2016, a range of clinical guidelines to respond to the ingestion of foreign bodies have been developed or modified. These include specific guidance for managing suspected button battery ingestions and more sophisticated treatment algorithms.

The Royal Childrens Hospital has published a Clinical Practice Guideline for foreign body ingestion which includes specific warnings and protocols for known or suspected button battery ingestions.[44] This guideline highlights button battery ingestions as high risk and provides advice for management such as conducting an x-ray and immediate removal if the battery is lodged in the oesophagus. They have also published a range of other material including a fact sheet on button battery safety which is available on their website and on their Kids Health Info app.[45]

The Queensland Injury Surveillance Unit has published a clinical guideline titled *Disc batteries: who and what do I x-ray*. This guideline provides advice for clinicians on when an x-ray may be needed, common issues in identifying button battery ingestions and advice on what action to take if a battery is identified on an x-ray.[46]

The Sydney Children's Hospital Network has published a fact sheet on button battery safety that includes advice to contact the PIC and seek immediate medical attention if you suspect your child may have ingested a button battery.[47]

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[44] RCH, 2017, Melbourne, https://www.rch.org.au/clinicalguide/guideline_index/Foreign_body_ingestion/, viewed 1 August 2019.

[45] RCH, 2017, Melbourne, https://www.rch.org.au/kidsinfo/fact_sheets/Button_batteries/, viewed 1 August 2019.

[46] QISU, Disc Batteries: Who and what do I x-ray, Brisbane, 2019, https://www.qisu.org.au/modcorefrontend/upload/Disc-Batteries-QISU.pdf, viewed 1 August 2019.

[47] Sydney Children's Hospitals Network 2019, NSW Health, Sydney, https://www.schn.health.nsw.gov.au/fact-sheets/button-batteries, viewed 1 August 2019.

15.2. Community Sponsored Awareness Activities

Summer Steer's family honour her memory and work to raise awareness of the dangers of button battery ingestion in children through the Summer's Day program and website.[48] In 2017, the ACCC undertook paid Facebook promotion of the button battery safety video to coincide with the 'Summer's Day' awareness campaign. The ACCC also support the campaign by sharing social media posts and button battery safety messages.

Isabella Rees's family have established a Facebook page, Bella's Footprints, as a memorial and awareness program. They also seek to improve community awareness of the dangers of button batteries.[49]

15.3. Kidsafe

Kidsafe Australia is an independent, charitable organisation dedicated to the prevention of unintentional death and serious injury to children aged 15 years and below. Kidsafe operates in cooperation with a variety of stakeholders including government, industry, schools, hospitals, the media, community groups, voluntary organisations and individuals.[50]

Kidsafe has a range of communication materials including posters, brochures and checklists for the public, general practitioners and clinicians which include the PIC hotline and the need to conduct an x-ray as soon as possible. Kidsafe Victoria has a useful page on their website devoted to the issue as do the other state affiliates.[51]

In 2013, the ACCC provided funding to Kidsafe ACT to investigate differences in outcomes of button battery ingestions between countries. The report titled *Button Battery Ingestion—An analysis of differences in injury severity outcomes between countries* was prepared by the Chief Executive of Kidsafe ACT in 2013.[52] The report highlights the lower incidence and severity of button battery injuries in Germany and Austria attributing this to differences in public education and levels of awareness resulting in faster diagnosis and medical intervention.

15.4. The Battery Controlled

The Battery Controlled was a safety awareness campaign launched in 2012 to raise awareness amongst parents about the risks associated with button batteries and provide key information on what to do if a child ingests a button battery. The campaign was supported by ACCC in partnership with Energizer and Kidsafe Australia. The Battery Controlled website, managed by Kidsafe, was established to share important safety information and resources to support the campaign. The website includes information and resources on the dangers of button batteries.[53] Energizer and Safe Kids Worldwide have a similar program in other countries including the USA.[54]

15.5. Australian Battery Recycling Initiative

The Australian Battery Recycling Initiative (ABRI) is a not-for-profit association established in 2008 to promote responsible environmental management of batteries at end of life. ABRI

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48 Kidsafe 2019, Australia, https://www.summersday.com.au, viewed 1 August 2019.

49 Facebook 2019, Menlo Park, https://www.facebook.com/bellasfootprints, viewed 1 August 2019.

50 Kidsafe 2017, Australia, https://kidsafe.com.au, viewed 1 August 2019.

51 Kidsafe Victoria, Melbourne, https://www.kidsafevic.com.au/home-safety/button-batteries, viewed 1 August 2019.

52 E Chalmers, *Button Battery Ingestion: An analysis of differences in injury severity outcomes between countries*, Kidsafe ACT, 2013, https://docplayer.net/22977703-Button-battery-ingestion.html, viewed 1 August 2019.

53 Energizer Australia2019 Sydney, http://thebatterycontrolled.com.au, viewed 1 August 2019.

54 Energizer 2019, St Louis USA, http://thebatterycontrolled.com, viewed 1 August 2019.

consists of a group of battery manufacturers, recyclers, retailers, government bodies and environment groups to promote the collection, recycling and safe disposal of all batteries.[55]

In 2018, ABRI conducted a research project to develop a container that could safely store small batteries in the household for later recycling. The ABRI provided a report on the project to the ACCC titled *Australian Battery Recycling Initiative—Exploring New Business Models for Battery Recycling*. The report made the following recommendations on container design:

- prioritise development and production of a single use button battery container
- secure industrial design partners to incorporate the results of the research and finalise specifications, costings and logistics for the single use container
- consider adapting the container specifically for hearing aid batteries, incorporating suggestions such as a smaller, more portable container and more accessible design to insert small batteries.

The research project concluded that, while the proposal had merit, the costs of putting button battery containers into production would be significant, likely in excess of AUD$1 million.

While the Australian Battery Recycling Initiative encourages recycling button cell batteries, they have advised that in situations where there is no recycling centre near the customer, consumers should place adhesive tape on both sides of the battery and place it in the bin. The tape is to prevent the battery from short circuiting and causing a fire. The Australian Battery Recycling Initiative is currently reviewing their guidance materials and have sought ACCC input.

16. International approaches

Many countries have protections to counter button battery and similar hazards provided in overarching legislation providing equivalence to a GSP (See section 19.1). The European Union has a *General Product Safety Directive 2001/95/EC*, which obliges suppliers to only place safe consumer goods into the market.[56] In Canada, there is a general prohibition on manufacture, import, advertisement, or supply of consumer goods that are dangerous for human health or safety. Malaysia has a GSP and New Zealand has an implied GSP in law.

16.1. The Organisation for Economic Co-operation and Development

The Organisation for Economic Co-operation and Development (OECD) has been active in promoting awareness of button battery safety. The OECD organised the International Awareness Week on Button Battery Safety from 16–20 June 2014. The aim of the event was to raise awareness worldwide of the risks and dangers posed by button batteries.[57]

The 26 participating countries, jurisdictions and authorities included Australia, Brazil, Canada, Chile, Colombia, the European Commission, France, Japan, Korea, Latvia, Mexico, New Zealand, the Organization of American States, Peru, Portugal and the United States.

The initiative was meant to ensure that relevant authorities and other stakeholders take the necessary precautions to reduce the risk of injury and death amongst consumers using button batteries.

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55 ABRI 2019, Australia, https://batteryrecycling.org.au/, viewed 1 August 2019.

56 European Commission, https://ec.europa.eu/info/general-product-safety-directive_en, viewed 1 August 2019.

57 OECD 2019, Paris, https://www.oecd.org/science/button-battery-safety-awareness-week.htm, viewed 1 August 2019.

16.2. New Zealand

In New Zealand, the government, industry and the medical profession is involved in dealing with the button battery hazard.

The New Zealand Minister of Commerce and Consumer Affairs issued a product safety policy statement on button batteries in February 2018.[58] The policy expects suppliers of button batteries, and goods containing, or supplied with button batteries to:

- take reasonable steps to ensure that their products limit access by children to button batteries
- highlight the potential risks to parents and caregivers.

The policy also outlines safety criteria for products that contain, are supplied with, or require button batteries similar to those in the Code in Australia.

16.3. USA

The USA has a record of button battery ingestion injuries in children dating back to at least 1977. Some of the prominent organisations involved in addressing the dangers of button batteries include the National Center for Poisons Control (NCPC), the Consumer Product Safety Commission (CPSC) and the Button Battery Taskforce.

The National Center for Poisons Control based in Washington DC under the leadership of Dr Toby Litovitz, has been at the forefront of addressing battery injury incidents since 1980 and has extensive button battery related research, management and safety information available on its website.[59,60] The NCPC data includes data from the National Battery Ingestion Hotline (NBIH), which was created to gather case data, create triage algorithms and identify methods to reduce the hazard. The NBIH also provides the public and health care providers with guidance on suspected battery ingestion cases.[61]

The Consumer Product Safety Commission is an independent government agency responsible for regulating product safety in the USA. The CPSC is heavily involved in promoting the awareness of the dangers of button batteries. The CPSC has issued warnings on the dangers of button batteries in 1983 and 2011, outlining the dangers of button battery ingestions, how to prevent them and what to do if an ingestion occurs.[62, 63]

In 2017, the Consumer Product Safety Commission voted to approve the *ASTM F963-11: Standard Consumer Safety Specification for Toy Safety* (Table 6) as a mandatory toy safety standard. The standard requires toys designed for children under 14 years of age to have warnings on packaging and instructions to alert consumers on the hazard on button batteries. The standard also includes new testing requirements for button batteries of 1.5 volts or more.

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58 Ministry for Business Innovation and Employment 2018, NZ Government, Wellington, https://www.consumerprotection.govt.nz/assets/PDFs/Product-safety-policy-statement-Button-batteries-safer-products-and-packaging-FINAL-as-published-on-website-2018-02-02.pdf, viewed 1 August 2019.

59 D Ferenczi 2019, Consumer Reports Inc., New York, https://www.consumerreports.org/cro/news/2011/04/button-cell-battery-dangers-dr-toby-litovitz/index.htm, viewed 1 August 2019.

60 NCPC 2019, Washington DC, https://www.poison.org/, viewed 1 August 2019.

61 KR Jatana, S Chao, IN Jacobs and T Litovitz, 'Button Battery Safety: Industry and Academic Partnerships to Drive Change', *Otolaryngologic Clinics of North America*, vol. 52, no. 1, 2019, pp. 149–161.

62 CPSC 1983, Bethesda, https://www.cpsc.gov/Newsroom/News-releases/1983/CPSC-Issues-Warning-On-Button-Batteries, viewed, 1 August 2019.

63 CPSC 2011, Bethesda, https://www.cpsc.gov/Newsroom/News-Releases/2011/CPSC-Warns-As-Button-Battery-Use-Increases-So-Do-Battery-Related-Injuries-and-DeathsToddlers-and-Seniors-Most-Often-Injured-in-Battery-Swallowing-Incidents, viewed 1 August 2019.

The Button Battery Task Force (US) was established in 2012 as a collaborative effort of representatives from relevant organizations in industry, medicine, public health and government to develop, coordinate and implement strategies to reduce the incidence of button battery injuries in children. The task force includes members of at least five American medical associations, and representatives from industry, government, poison control, and public health. The task force has collaborated with a range of key stakeholders and helped influence several notable safety changes. Progress to date has included adoption by manufacturers of child resistant battery packaging and development of warnings on button battery packaging, warning stickers on batteries and engraved warnings on some batteries. Significant improvements have also been made in medical emergency management procedures and treatment algorithms.[64]

16.4. Europe

There has been a significant history of button battery injury incidents across Europe and investigations into their cause and management.

The UK Office of Product Safety and Standards has recently launched a safety campaign for button batteries.[65] The Healthcare Safety Investigations Branch in the UK released a report in June 2019 following the death of a three year old child who had ingested a 23 mm lithium battery. The report recommends improving product safety, improving clinical detection and raising public awareness.[66]

The British and Irish Portable Battery Association (BIPBA) and the Children's Accident Prevention Trust (CAPT) in the UK have established an awareness program with detailed safety information on the CAPT website.[67] The current members of BIPBA include the main button battery manufacturers Panasonic, Duracell, Energizer, Sony, GP Batteries and Varta.[68] The European Portable Battery Association also has safety information on its site including an animated video, and a separate button battery safety website.[69] The UK Royal Society for the Prevention of Accidents has awareness information on its website and regularly raises the issue in the media.[70]

17. Emerging research and technologies

Researchers have been working on measures to improve the safety of button battery products. These measures are aimed at:

- making button batteries less harmful (see sections 17.1 and 17.2)
- detecting button battery ingestions and reducing their impact (see sections 17.3 to 17.5)
- controlling access to button batteries (see section 17.6).

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64 Jatana, loc. cit.

65 Office of Product Safety and Standards 2019, UK Government, Birmingham, https://www.gov.uk/government/news/button-batteries-campaign-how-to-stay-safe, viewed 1 August 2019.

66 Healthcare Safety Investigation Branch 2019, UK Government, London, https://www.hsib.org.uk/investigations-cases/undetected-button-battery-ingestion-children/final-report/, viewed 1 August 2019.

67 Child Accident Prevention Trust 2019, London, https://www.capt.org.uk/button-batteries, viewed 1 August 2019.

68 BIPBA 2019, http://bipba.co.uk/aboutus.php, viewed 1 August 2019.

69 European Portable Battery Association 2019, https://www.epbaeurope.net/button-battery-safety/, viewed 1 August 2019.

70 The Royal Society for the Prevention of Accidents 2019, https://www.rospa.com/home-safety/advice/product/button-batteries/, viewed 1 August 2019.

17.1. Pressure sensitive coating

Researchers with Landsdowne Labs in the US are working on developing a new technology to make button batteries safer. This involves coating batteries with a material that prevents them from conducting electricity should they be ingested.[71]

The material used to coat the batteries is called a quantum tunnelling composite, which is a rubber-like material usually made of silicone embedded with metal particles. The material allows the battery to conduct when under pressure but acts as an insulator when the batteries are not compressed. Once the coating has been applied, the batteries remain the same in look, size and capacity and functionality is not impacted. It has been estimated that the manufacturing cost of applying the coating would be less than five cents per battery. The technology is currently undergoing a range of testing and is still under development.

17.2. Safer batteries

When lodged in the body and in contact with bodily fluids, the electric current generated from button batteries creates corrosive substances that burn through and severely damage internal tissues and organs. Researchers in Italy have developed a new type of non-toxic battery for small toys that does not generate these corrosive substances when in contact with organic tissues and fluids. The battery is 10 mm in diameter and made of aluminium and carbon. It is a 2 volt battery but with a much lower current capacity (2.5 mAh) than the commercial lithium button batteries (220 mAh) that have been involved in deaths and severe injuries.[72]

17.3. Bitterants and dyes

A researcher at the Victoria University of Wellington has developed a method to improve the safety of button batteries that includes deterring ingestion and early detection of ingestion. His invention involves a saliva soluble coating containing a dye and embittering compound being added to the battery during manufacture. The embittering compound is intended to deter children from ingesting the battery by triggering a pungent taste, encouraging them to spit the battery out. The dye is activated by saliva, indicating that a child has placed the battery in their mouth and potentially ingested it, alerting caregivers and enabling them to seek immediate medical treatment.[73]

17.4. Protective oesophageal irrigations

Researchers in the US have conducted a study to test various household liquids for their ability to act as protective oesophageal irrigations to minimise injury when a battery has been ingested until the button battery has been removed. Liquids including apple juice, orange juice, Gatorade, Powerade, honey, and maple syrup were tested on a 3 volt lithium button battery using a cadaveric and live animal model. The liquids were administered at 10 minute intervals following the placement of the button battery in the oesophagus. The study found that using both honey and sucralfate (Carafate) decreased the severity of injury caused by the button battery. The researchers concluded that in the crucial period between

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71 B Laulicht, G Traverso, V Deshpande, R Langer, and JM Karp, 'Simple battery armor to protect against gastrointestinal injury from accidental ingestion', *Proceedings of the National Academy of Science*, vol. 111, no. 46, 2014, pp. 16 490–16 495.

72 A Rossi, S Vignola, F Nason, F Boschetti, M Bramerio, A Bailini, G Pinarello, 'Safe energy source in battery operated toys for children', *Journal of Pediatric Gastroenterology and Nutrition*, vol. 65, no. 5, 2017, pp. 496–499.

73 Victoria University Wellington 2016, Wellington, http://www.viclink.co.nz/technologies/child-safe-batter/, viewed 1 August 2019.

button battery ingestion and removal the frequent ingestion of honey or sucralfate (Carafate) has the potential to reduce injury severity and improve patient outcomes.[74]

The administration of honey at regular intervals where button battery ingestion is suspected is now included in triage protocols in the USA.[75] The protocols include advice that honey should be administered if:

- there is a risk that the child has ingested a lithium cell battery
- the child is over 12 months old
- the battery was ingested within the last 12 hours
- the child is able to swallow and
- honey is immediately available.

Administration of honey to children under 12 months of age is not recommended as raw honey can contain bacteria that can germinate in an immature digestive system and cause infant botulism which can be fatal.

The protocols also include a warning that honey is not a substitute for seeking immediate removal of a battery lodged in the oesophagus. Administering honey can slow the development of a battery injury but it will not stop it from occurring.

Australian triage protocols are similar to those in the USA. However, the current advice provided by Australian Poison Information Centres and other health organisations is to not allow children to eat or drink anything following a suspected ingestion until a full assessment has been made.[76] An article published by Dr Neil Long and peer reviewed by Dr Ruth Barker (Director, QISU) suggests that the studies completed on honey are controversial and that more research is needed before these treatments are included in current protocols. It also notes that these treatments may be worth considering in rural settings with transport delays.[77]

17.5. Identifying ingestions with metal detectors

Several studies have been conducted to determine the effectiveness of using handheld metal detectors to identify the presence or absence of ingested coins in children. One of the main objectives of these studies was to determine if the use of hand held metal detector could be used to safely reduce the number of x-rays requested in cases of coins ingested by children.

Results from these studies have found that use of the handheld metal detector is an accurate and effective method of identifying and localising coins ingested by children.[78] The device is very accurate in detecting the presence of ingested coins (99.4 per cent), but it does not appear to be as effective when expanded to other metallic foreign bodies ingested by children. In one study, the device identified only 47 per cent of non-coin objects.[79]

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74 RR Anfang, KR Jatana, RL Linn, K Rhoades, J Fry, IN Jacobs, 'pH-Neutralising Esophageal Irrigations as a Novel Mitigation Strategy for Button Battery Injury', *Laryngoscope*, vol.129, no.1, 2019, pp. 49–57

75 NCPC 2018, Washington DC, https://www.poison.org/battery/guideline, viewed 1 August 2019.

76 NSW Poisons Information Centre 2019, Sydney, https://www.poisonsinfo.nsw.gov.au/Factsheets/Button-Battery-Factsheet.aspx, viewed 1 August 2019.

77 Dr Neil Long, 2019, Life in the Fast Lane, https://litfl.com/button-battery-update, viewed 1 August 2019.

78 JB Lee, S Ahmad, CP Gale, 'Detection of coins ingested by children using a handheld metal detector', *Emergency Medicine Journal*, vol. 22, 2005, pp. 839–844.

79 PL Chaffin, JM Grischkan, PS Malhotra, KR Jatana, *Endoscopic Management of Paediatric Airway and Esophageal Foreign Bodies*, Intech Open, London UK, 2015, https://www.intechopen.com/books/endoscopy-innovative-uses-and-emerging-technologies/endoscopic-management-of-pediatric-airway-and-esophageal-foreign-bodies, viewed 1 August 2019.

No known specific study has yet been completed investigating the use of these devices specifically in relation to button batteries. These devices may be beneficial to confirm ingestion in circumstances where there x-ray facilities are not available such as some remote and regional hospitals in Australia. This may speed up the relocation of patients where it is confirmed that a metallic foreign body is present. However, any clinical presentation should be corroborated with imaging to ensure that ingestion of a button battery requiring urgent removal is not misdiagnosed.[80] The reduced effectiveness of these devices in identifying metallic objects other than coins also indicates that they are not a reliable substitute for medical imaging.

17.6. Secure storage of replacement and used batteries

A Brisbane based designer is in the early stages of developing a small packaging unit for replacement batteries wherein a flat battery being replaced is needed to push the fresh battery out of the packaging. The old battery is then retained securely within the pack. When all new batteries are similarly replaced within the pack, the pack and used batteries within can be disposed of as a unit to recycling or waste as available.

Question

7. What other research and development activities are you aware of that are directed toward:

   (a) improving button battery safety

   (b) improving the safety of consumer goods containing button batteries

   (c) improving the medical approach to button battery ingestion or injury?

18. Economic cost of deaths and injuries

The ACCC has not yet sought comprehensive data about the economic costs and benefits of introducing regulation to address the hazards of button batteries. Information about the costs of exposures, injuries and deaths will be needed to progress any regulatory proposal.

[80] ibid.

19. Policy considerations

19.1. General Safety Provision

At present, there is no general legislative prohibition on the supply of unsafe goods in Australia. The EU (including the UK), Canada and Malaysia have adopted a General Safety Provision and New Zealand has one implied in their legislation.

In April 2017, Consumer Affairs Australia and New Zealand released the ACL Review Final Report, which put forward a proposal to introduce a General Safety Provision that would require traders to ensure the safety of a product before it enters the market.[81] The Treasury is leading a public regulatory impact assessment and stakeholder consultation on the proposal to introduce a General Safety Provision.

The ACCC strongly advocates a change in the law that would see the introduction of a General Safety Provision. The ACCC made a submission to Coroner English as part of the coronial inquest into the death of Isabella Rees advocating the introduction of a General Safety Provision. Such a law would impact on the design, sourcing and supply of unsafe consumer products including button batteries and products that contain them, and incentivise their safe supply. As a result, the ACCC considers that a General Safety Provision would impact on the number of button battery injuries occurring.

In her report investigating the death of Isabella Rees, Coroner English supported the ACCC's position in recommending the introduction of a General Safety Provision.

19.2. ACL Provisions

Under the ACL, the product safety regulatory framework includes safety standards, information standards, bans and recalls to address supply of consumer goods and related services that will or may cause injury. With regard to button batteries, the defined consumer goods are broad and the safety hazards persist across each stage of the battery or product lifecycle from initial supply, to use and through to disposal or recycling.

Safety Standard

As stated previously, there are currently no mandatory safety standards made under the ACL specifically with respect to button batteries or related products. The mandatory standard for toys for children of age up to 36 months and under currently includes provisions for choking hazards that incidentally address accessible button batteries and this standard is currently under review. As discussed above (section 9.1), a safety standard may be made under section 104 of the ACL that imposes certain requirements that 'are reasonably necessary to prevent or reduce risk of injury to any person' or a standard may be declared a safety standard under section 105 of the ACL.

For button battery products, a new safety standard could:

- mandate requirements for the design and construction of battery compartments on products powered by button batteries
- require button batteries to be supplied in child resistant packaging with appropriate warnings and information
- prescribe the form and content of any warnings, graphics or information that needs to be provided on the packaging of supplied products i.e. button batteries and products that contain button batteries. This could include a warning to keep out of reach of children, a

[81] Consumer Affairs Australia and New Zealand, loc. cit.

warning to seek emergency treatment if a battery is ingested and the contact details of the Australian Poisons Information Centre hotline.

A safety standard under the ACL could apply to all consumer goods that contain a button battery, or to a particular subset of button battery products, unless a specific exemption is applied.

Although the disposal of used button batteries is an important safety issue, a safety standard under the ACL could not impose requirements for disposal of end of life button batteries and can only require information about product hazards insofar as the information can be provided with the product itself at the time of supply, for instance, warnings and labelling on the product or external packaging.

Information Standards

There are no information standards made under the ACL with respect to button batteries. Unlike a safety standard, information standards can require the provision of advice and information about a consumer good separate to the physical product. An information standard may be required in addition to a safety standard to ensure adequate warnings are provided to consumers at the point of sale and when purchasing products online. For instance an information standard could require information to be provided about safety hazards and the safe use of a consumer product.

Product bans (interim and permanent)

There are no interim or permanent consumer product bans that apply to consumer products containing button batteries. An interim or permanent ban could prohibit the supply of consumer goods of a particular kind because the goods will or may cause injury to any person.

19.3. Implementation

Button batteries are used across a vast number of industries and product ranges. They are sold individually and in multipacks as consumer replaceable batteries; or supplied either pre-installed in or packaged with consumer products. The safety hazard is pervasive throughout the lifecycle of button battery products—primary supply, use, servicing, repair, secondary supply, disposal and recycling. While lithium and alkaline chemistry battery types are known to have caused more major injuries and fatalities, all button batteries present a risk when ingested or inserted. Batteries with diameters 20 mm or more are most often implicated in severe and fatal injuries however, batteries over 10 mm in diameter have been associated with fatalities and in many cases the battery size and type are unknown. Not all products powered by button batteries fall within the ACCC's primary remit of consumer goods, and some are regulated by specialist safety regulators. There are also complex human factors relating to recognition, prevention and reaction to the hazard and exposure.

Regulatory intervention cannot address the totality of exposure circumstances, nor can it address the human factors affecting the recognition, prevention, treatment and outcomes of an exposure to the button battery hazard. As such, button battery products pose an especially complex problem for regulation.

If the ACCC recommends that a mandatory safety standard be introduced, consideration will need to be given to the range of products that should be subject to the standard, or whether there should be different requirements depending on the product.

Consideration will also need to be given to the additional costs that a mandatory standard would impose on Australian suppliers, and whether it creates barriers to trade. As batteries are not manufactured in Australia and most products containing them are also imported, a

delayed commencement date and transitional period many be appropriate to allow manufacturers and suppliers time to implement any changes and undertake any testing necessary to ensure compliance with the new standard.

Questions

8. Would a mandated safety standard for the security of battery compartments of products containing button batteries be likely to reduce the number of injuries and fatalities caused by button batteries in Australia? Please provide the reasons for your response.
9. Would a mandated safety standard and/or an information standard for child resistant packaging and labelling be likely to reduce the number of injuries and fatalities caused by button batteries in Australia? Should any such standard require provision of Australian PIC details? Please provide the reasons for your response.
10. If it is your view that child resistant packaging and labelling requirements should be mandated, do you think this should apply to all button batteries regardless of size or chemistry? Please provide the reasons for your response.
11. In your view, should any consumer products containing button batteries be banned from supply in Australia? If yes, please provide details and reasons.
12. If any of these requirements were mandated in Australia, what additional cost would be imposed on Australian suppliers or a relevant supplier segment?
13. If you are a supplier, what information can you provide on the actual or likely cost of implementing the safety standard and information standard outlined in section 19.2 for button batteries and for products that you sell?
14. Are there any button battery products that you think should be exempted from any mandatory safety or information standards? Please provide reasons why.
15. Please provide any other information you consider may be relevant to the ACCC's consideration of these issues.

20. Next steps

The questions set out throughout this Issues Paper identify the issues that the ACCC is reviewing to develop a Draft Recommendation to the Hon Michael Sukkar, Assistant Treasurer. A consolidated list of these questions is included at the beginning of the Issues Paper. The ACCC encourages you to respond to any of the questions that are relevant to you, and to raise any additional issues that you consider relevant.

Submissions in response to this Issues Paper will inform the ACCC's development of the Draft Recommendation, including, should regulation be recommended, preparation of a draft Regulation Impact Statement (RIS) in accordance with Office of Best Practice Regulation's *The Australian Government Guide to Regulation*.[82] The ACCC intends to release its Draft Recommendation in the last quarter of 2019 for public consultation, and to then provide a Final Recommendation to the Hon Michael Sukkar, Assistant Treasurer in 2020.

[82] Department of the Prime Minister and Cabinet 2014, Canberra, https://www.pmc.gov.au/resource-centre/regulation/australian-government-guide-regulation, viewed 1 August 2019.

Appendix A: Examples of serious button battery injuries from across Australia

Victoria

This report is from the Monash Medical Centre in Clayton, Victoria. A 14 month old boy with abnormal neck posture, poor feeding, drooling, cough, and fever was taken to hospital where an x-ray found that he had ingested a button battery. The doctors removed the corroded battery and surrounding dead tissue. One week later the baby was taken to hospital again because of excessive bending of his neck and difficulty in breathing. The doctors found that the button battery had caused a condition called spondylodiscitis, which is infection and inflammation of a part of his spine. [83]

Another case from Victoria is a five year old girl who complained that her throat hurt and that food wouldn't go down. She was tired and lethargic and lost a lot of weight. She was taken to a GP a number of times and eventually to a paediatrician. She suddenly started getting worse, developed a fever and started vomiting. She was taken to hospital where an x-ray eventually revealed the presence of a rusty eroded button battery in her oesophagus. Doctors estimated that the battery had been in her throat for about six months, blocking the flow of food to her stomach. She was rushed to Monash Children's Hospital, put in an induced coma and the battery was surgically removed. She recovered from the surgery and was tube fed for a period of time. She will need to have ongoing treatment on her throat.[84]

New South Wales

A seven month old girl presented to the ED at a district hospital after a choking episode and a reluctance to eat. She showed no signs of distress and was discharged. Her parents noticed a remote control in pieces with the button battery missing and took her to hospital the next day. A chest X-ray revealed a button battery stuck in her oesophagus. She was transferred to a larger hospital where a 3 volt lithium button battery was removed from her throat. There was severe corrosive damage to her oesophagus, a section of which was perforated and narrow. After one week of observation, the girl showed signs of improvement and was discharged with a treatment and follow up plan.[85]

Queensland

A one year old boy was brought to hospital 19 hours after choking on a foreign object. A chest X-ray revealed a coin shaped object in his upper oesophagus. He was transferred to a larger hospital where the object was removed, by which time approximately 24 hours had elapsed. The object was a button battery. The battery had burnt a part of his oesophagus. A week later, the boy had developed a trachea-oesophageal fistula which is a hole in his oesophagus that had created a passage into his windpipe. A feeding tube was inserted directly into his stomach because he could not swallow food through his oesophagus.[86]

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83 V Kieu, S Palit, G Wilson, M Ditchfield, J Buttery, D Burgner, and PA Bryant, 'Cervical Spondylodiscitis Following Button Battery Ingestion', *The Journal of Pediatrics*, vol. 165, no. 6, 2014, pp. 1500–1500e.1.

84 K Caines 2019, Nine News, Australia, https://www.9news.com.au/national/button-battery-shaylah-carmichael-monash-hospital-melbourne-isabella-rees-inquest/164e95e5-a948-43a2-b8c8-f031353e6ea9, viewed 1 August 2019.

85 AY Liao and D McDonald, 'Oesophageal complication from button battery ingestion in an infant', *Journal of Paediatrics and Child Health*, vol. 49, no .4, 2013, pp. 330–332.

86 R Jarugula and T Dorofaeff, 'Oesophageal button battery injuries: Think again', *Emergency Medicine Australasia*, vol. 23, no. 2, 2011, pp. 220–223.

Western Australia

A 10 month old boy from Bunbury, ingested a button battery from his father's guitar. The doctors removed the battery from his oesophagus 12 hours after he had ingested it. Four weeks after the removal, he was taken to hospital because he couldn't breathe and blood was coming out of his mouth. He was urgently flown to Princess Margaret Hospital for Children in Perth, where doctors found that the button battery he had ingested had burned a hole in his oesophagus and caused an aorto-oesophageal fistula, the same injury that killed Summer Steer and Isabella Rees. The boy survived after 14 hours of surgery and a blood transfusion. He spent another two weeks in intensive care and almost three months in hospital, returning home two days before Christmas. One of the doctors on the medical team that treated the boy described the baby's injury as "dreadful" and said that he was the only survivor in the world of this type of injury.[87]

[87] L Burke 2012, The West Australian, Perth, https://thewest.com.au/news/australia/a-battery-nearly-killed-our-son-ng-ya-334118, viewed 1 August 2019.

Appendix B: Voluntary recalls of consumer products containing button batteries

2019

- Regent Sporting Goods—Regent 330 Pedometer and Regent 340 Step and Distance Pedometer.
- Hunter Leisure—Kaleidoscope Design Your Own Sparkly Candles.
- Hunter Leisure—Kaleidoscope Make Your Own Glow Bugs.
- Royal Automobile Association of South Australia (RAA—Promotional Silicone LED bicycle light distributed as part of the RAA Street Smart Program.
- Officeworks—Teknikio1, Teknikio2, Teknikio3, Teknikio4—Electronic Circuit Sewing and Activity Kits.
- Daiso Industries (Australia) Pty Ltd—Various Candles, Lights, Calculator and Stopwatch Products containing Button Batteries.
- Cricket Australia—Promotional LED Wristband.
- St John Ambulance Australia—Tiny Tots First Aid Kit.

2018

- PSEA Dept Stores Pty Ltd—Smith + Nobel 10 kg Electronic Kitchen Scale.
- ToLife Technologies Pty Ltd—Rite Aid Mini Digital Temple Touch Thermometer.
- Park Avenue Foods Pty Ltd—Star Wars Dyno Torch with Milk Chocolate Eggs 51 g.
- Intervet Australia Pty Ltd trading as MSD Animal Health—LED Keyring Torch.
- PSEA Dept Stores Pty Ltd—IS Gift Illuminate Bunny LED Light.
- University Cooperative Bookshop Limited t/as AG Co-op (Australian Geographic)—Compass Lensatic.
- Sports & Events Promotions Pty Ltd—Neighbourhood Watch Keyring LED Light.
- PSEA Dept Stores Pty Ltd t/as Harris Scarfe—Smith+Nobel 15 kg Glass Platform Electronic Kitchen Scale—Black.

2017

- Target Australia Pty Ltd—Halloween LED Pumpkin Spinning Wand.
- Knog Pty Ltd—Knog Frog Strobe Bicycle Light.
- City of Gold Coast—LED Torch.
- Everything Glows—Flashing 7 News Necklace.
- Nebula Trading Co Limited—LED Fidget Spinner.
- Elka Australia—Flashing spiders.
- AG Co-op—Chibitronics Chibi Lights Starter Pack & Chibitronics Intro Pack.
- Wens Bros Trading Pty Ltd—Assorted Children's Toys.
- Ace of Hearts—LED Fidget Spinner.
- Target Australia Pty Ltd—Young Ones My First Torch.

- Moose Enterprise Pty Ltd—Little Live Pets Lil Frog & Lil Frog Lily Pad.
- Wens Bros Trading Pty Ltd—Soft toy dolls.

2016

- Vicinity Centres—Santa Themed Toy Watches.
- CS Global Pty Ltd—Flashing Duck with LED Light.
- Woolworths Limited—Halloween Flashing Tumbler and Goblet.
- Woolworths Limited—Halloween LED Spinning Wand.
- Big W—Finding Dory Under the Sea Light Up Treasure Chest.
- Big W—Ditto Novelty Heart Shaped Calculator.
- Smiggle—Yoco Loco children's yo-yo.
- Elka Australia—Flashing Rings.
- Actsmart—Actsmart branded Digital Shower Timer.
- Vicinity Centres—7060 Night Lights—Cat, Sheep, Whale & Wombat (Night Lights).

2015

- Penny Miller—Silent Pet Training Collar.
- Independence Studios Pty Ltd—LED Lava Drops.
- Kmart Australia Limited—7cm LED Claydough Hanging Decoration.
- TNW Australia Pty Ltd—Octalight Rainbow Light Wand.
- Smiggle Pty Ltd—Original Spy Pen and Notebook Lock Holographic with Spy Pen.
- Commonwealth Bank of Australia—Cosmic Light Beam Torch.
- Village Roadshow Theme Parks Pty Ltd—Light Figurines.
- Event Cinemas—Novelty Beverage Cup—Inside-Out.
- Red Dot Stores—LED Concert Light Stick.
- Smiggle—Smiggle Colour O'Clock Cube Clock & Smiggle Build A Light.

Further information on these voluntary recalls can be found on the ACCC's Product Safety Button Battery Recalls page at https://www.productsafety.gov.au/recalls/browse-all-recalls?f%5B0%5D=field_accc_psa_product_category%3A5030.

Appendix C: Market Surveillance under the National Strategy

Inspection/Surveillance methodology

The inspection methodology is consistent with the voluntary approach developed by industry:

Guidance for the inspection:

BATTERY CONTAINMENT

1. Does the product contain a button battery of 20 mm diameter or greater?

Yes—explain that while all button batteries are hazardous, and are associated with injuries to children, this diameter of battery is the most hazardous and has been responsible for the deaths of children in Australia. If swallowed emergency medical treatment is needed and life threatening injuries can occur in as little as two hours.

No—explain that all button batteries are hazardous and are associated with injuries in children if ingested or inserted in an orifice.

2. Is it a consumer product?

Yes—proceed to Q3.

No—if no, do not inspect but provide a discussion on the hazard.

3. Is the product for a child under 3 years of age?

Yes—assess in accordance with the Toy Standard—advise the supplier that the product is regulated, proceed as per jurisdictional usual approach.

No—proceed with the National Strategy assessment.

4. Is the battery installed in the product?

Yes—proceed to Q6.

No—proceed to Q5.

5. Is the battery loose in the packaging?

Yes—alert the supplier to the hazards associated with loose batteries—install the batteries and proceed to Q6.

No—proceed to Q6.

6. Is the battery sealed in the product?

Yes—proceed to Q11.

No—proceed to Q7.

7. Is the battery compartment accessed with a screw or a tool?

Yes—proceed to Q8.

No—proceed to Q9.

8. When loaded with a battery, can you remove the cover by reasonable force and without the use of a tool?

Yes—explain to the supplier that this product is potentially hazardous—proceed to Q11.

No—record/explain that this product appears to provide reasonable protection—proceed to Q11.

9. Does removal of the battery cover require two independent movements?

Yes—proceed to Q10.

No—proceed to Q11.

10. Using reasonable force can you dislodge the cover without making both of the movements?

Yes—explain to the supplier that this product is potentially hazardous—proceed to Q11.

No—record/explain that this product appears to provide reasonable protection—proceed to Q11.

11. Are any batteries released if you drop the product?

Yes—record/explain that this product is likely to be hazardous—proceed to Q12.

No—record/explain that this product appears to provide reasonable protection—proceed to Q12.

WARNING AND HAZARD INFORMATION

12. Does the product packaging or labelling include a warning 'keep out of reach of children' statement or pictogram?

Yes—explain that this is a good safety feature—proceed to Q13.

No—explain that the warning information is important—proceed to Q13.

13. Does the product packaging or labelling include a warning statement about seeking emergency medical treatment if swallowed?

Yes—explain that this is a good safety feature—proceed to Q14.

No—explain that the warning information is important—proceed to Q14.

14. Does the product packaging or labelling include the poisons information hotline?

Yes—explain that this is a good safety feature—proceed to Q15.

No—explain that the poisons hotline is very important and staff are trained to respond to battery exposures—proceed to Q15.

BATTERY PACKAGING

15. Is the battery packaging child resistant?

Yes—explain that this is a good safety feature—explain that once opened the package should be placed out of reach of children—proceed to Q16.

No—explain that this product is potentially hazardous to children—proceed to Q16.

RETAIL DISPLAYS (if applicable)

16. Are lithium battery products displayed out of reach of children?

Yes—explain that this is a good safety feature—proceed to Q17.

No—explain that placing batteries in store displays out of reach of children is a useful measure that many suppliers are introducing.

17. Are button battery store displays accompanied by any warnings?

Yes—explain that this is a good safety feature—proceed to Q18.

No—explain that signage alerting consumers to the hazards of button batteries is a good step to take—proceed to Summary and Next Steps.

SUMMARY AND RESPONSE

Was the answer YES to Q1 and YES to any of questions 5, 8, 10 or 11?

Yes—explain that the product presents a risk of death to children and the product is unsafe. Encourage voluntary recall and consider immediate escalation if the product is a toy or child attractive product.

Was the answer YES to any of questions 5, 8, 10 or 11 and NO to any of questions 12, 13, 14 or 15?

Yes – explain that this product presents a risk of injury to children and voluntary recall would be appropriate. However, some interim steps might also be applicable such as over-stickering warning information to draw attention to the hazard.

The following table illustrates answers that are critical to guide response to the product assessment:

1. Does the product contain a button battery of 20 mm diameter or greater?	Y	N
2. Is it a consumer product?	**Y**	**N**
3. Is the product for a child under 3 years of age?	**Y**	**N**
4. Is the battery installed in the product?	**Y**	**N**
5. Is the battery loose in the packaging?	**Y**	**N**
6. Is the battery sealed in the product?	**Y**	**N**
7. Is the battery compartment accessed with a screw or a tool?	**Y**	**N**
8. When loaded with a battery, can you remove the cover by reasonable force and without the use of a tool?	**Y**	**N**
9. Does removal of the battery cover require two independent movements?	**Y**	**N**

10. Using reasonable force can you dislodge the cover without making both of the movements?	**Y**	**N**
11. Are any batteries released if you drop the product?	**Y**	**N**
12. Does the product packaging or labelling include a warning 'keep out of reach of children' statement or pictogram?	**Y**	**N**
13. Does the product packaging or labelling include a warning statement about seeking emergency medical treatment if swallowed?	**Y**	**N**
14. Does the product packaging or labelling include the poisons information hotline?	**Y**	**N**
15. Is the battery packaging child resistant?	**Y**	**N**
16. Are lithium battery products displayed out of reach of children?	**Y**	**N**
17. Are button battery store displays accompanied by any warnings?	**Y**	**N**

Market surveillance results

The following tables show the market surveillance results following three rounds of market surveillance conducted under the National Strategy. Two rounds of the market surveillance were conducted by the ACCC and other ACL regulators, and the third round was conducted by the ACCC. Over 1000 products were surveyed across Australia.

The figures show results found in relation high risk products and the packaging and labelling of button battery products in the market.

Figure 17: Percentage of high risk products identified by market surveillance from 2016 to 2019

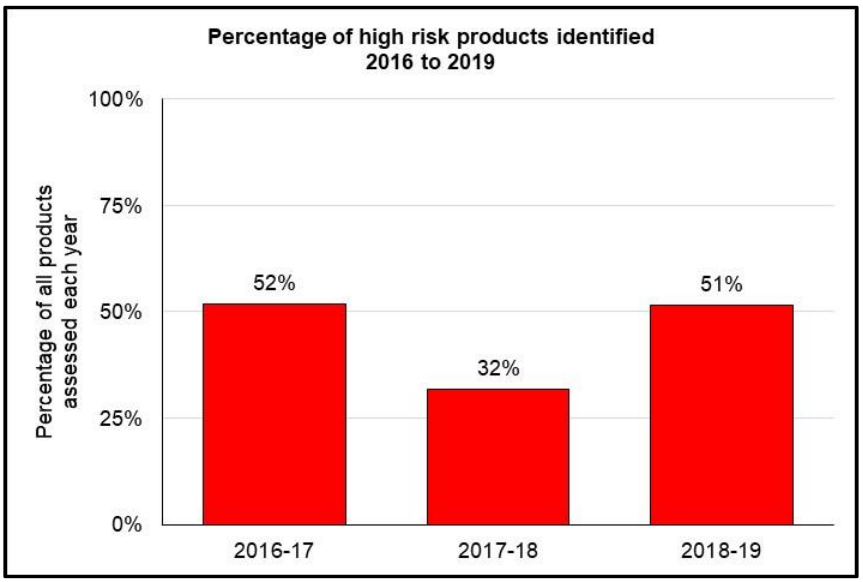
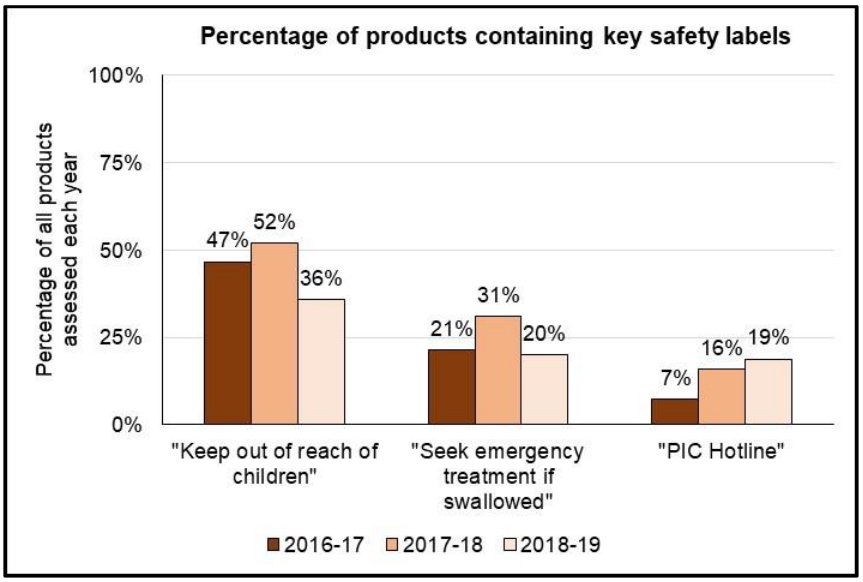


Figure 18: Percentage of products containing key labels identified by market surveillance from 2016 to 2019



Appendix D: Button Battery Industry Working Group

Table 7: Membership of the Button Battery Industry Working Group as at 9 July 2019

Organisation	Name	Position
Australian Battery Recycling Initiative (ABRI)	Libby Chaplin	Chief Executive Officer
Australasian Promotional Products Association (APPA) / Inck	Adrian Davidson	Managing Director (Inck)
ATA (Australian Toy Association)	Richard Hayman	Product Compliance Consultant
Australian Industry Group	James Thomson	
Breville	Alex Tofaili	
CESA	Colin Doyle	General Manager
CESA	Robert Wooley	Technical Manager
Conformity Certification Services Pty Ltd; Woolworths Food Company	Elaine Clayton	General Manager Policy & Regulatory Specialist - Health, Beauty & Household
IBM AIA	Paul Robinson	Executive Manager Product Standards & Compliance
John Sands	Darren Peters	Product Manager
Kathmandu	Fiona Harrington	Quality Assurance Developer
Lighting Council Australia	David Crossley	Technical Manager
Officeworks	Barbara Geens	Quality & Product Safety Manager (Chair of the Working Group)
Product Safety Solutions	Gail Greatorex	Director
Queensland's Injury Surveillance Unit	Ruth Barker	Director
Samsung	Chris Redfern	Regulatory Affairs & Environmental Officer
Super Retail Group	Sara Byrnes	Group Compliance Advisor
Target	Damian Lim	Product Technologist – Electrical & Audio
Woolworths	Mousa Lazar	General Merchandise Standards Specialist
Woolworths	Selvarajah Kidnapillai	Policy and Regulatory Specialist-GM and Electrical Products
	Mustafa Muharrem	Private Citizen