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MAKING UNIT PRICES EASIER TO NOTICE AND READ

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The small print sizes many businesses use to show the unit price (price per unit of measure) of pre-packaged grocery and similar products is a major problem worldwide.

It results in far too many unit prices on instore shelf labels and price signs and packages, and on-line and in advertisements being too difficult for consumers to notice and read.

This contrasts markedly with selling prices (prices paid) which most businesses ensure are always very easy for shoppers to notice and read.

The general public policy justification for unit pricing is summarised in the European Union's Price Indication Directive (98/6/EC) as being: "the obligation to indicate the selling price and the unit price contributes substantially to improving consumer information, as this is the easiest way to enable consumers to evaluate and compare the price of products in an optimum manner and hence to make informed choices on the basis of simple comparisons".

Small print greatly reduces consumer awareness and use of unit pricing or, even worse, results in consumers not even noticing the information. This results in consumers getting much less value for money, and in less competition between businesses.

The small print problem exists not only with voluntary provision but also when provision is required by law¹ for certain products and by certain businesses.

This is because much unit pricing legislation is principles based and uses uncertain legal terms. For example the Australian Code only requires that the unit price be "displayed prominently" and be "legible". And, the European Union's Directive only requires that it be "easily identifiable and clearly legible".

Such legislation, especially without effective guidelines or legal decisions on what constitutes compliance, results in arbitrary interpretation by businesses about the print sizes used for unit pricing. And, it is extremely difficult for regulatory agencies to effectively monitor and enforce compliance.

Consequently, and unfortunately for consumers, too often businesses use print sizes that result in many unit prices being insufficiently prominent or legible even for consumers with normal sight and without other handicaps, and definitely not for consumers with visual impairment or other relevant disabilities, such as impaired mobility.

As a result, consumer awareness and use of much unit pricing is sub optimal so consumers cannot make informed choices, save less money, or get much less for what they spend, and there is less competition between businesses.

Therefore, ensuring that unit pricing is sufficiently prominent and legible for consumers is an

¹ For example, in Australia, under a mandatory Code administered by the ACCC, very large supermarkets, and online grocery sellers, must provide the unit price (which is additional to the selling price) for most grocery products sold in constant measure pre-packages, such as breakfast cereals, biscuits, dairy products, and laundry and cleaning products, and in Europe the European Union Directive 98/6/EC requires the provision of unit pricing by many retailers and for many products.

extremely important issue for the Guidance Standard on Unit Pricing now being developed by the International Standard Organisation (ISO). It will be also for the 10 year review of Australia's Unit Pricing Code that will be undertaken soon.

To facilitate consideration of this issue, the Queensland Consumers Association has examined the approaches taken by various countries/states to ensure that the print sizes used for unit pricing are satisfactory for consumers.

The approaches identified include requiring or recommending either, or a combination of,:

- Minimum print sizes (sometimes specific to certain display situations).
- The print size used for the unit price being a specific percentage of that used for the selling price.
- The print size used for the unit price being the same as that used for the selling price.

Examples of these approaches for shelf labels and other instore signs, and for packages, in various countries are provided in Appendix 1.

Importantly, in some places these approaches are also combined with requirements/recommendations on:

- The provision of words such as “unit price” and “selling price” (or their equivalents) with the actual unit and selling prices.
- The use of colours for the print and the background to result in high contrast levels between the unit price and the background and to facilitate awareness and recognition of the unit price.
- The location of the unit price relative to the selling price.

Another approach could be to use the results of experiments on legibility to set minimum print sizes for unit prices at various viewing distance and when the unit prices are on labels/signs that are vertical or angled out to facilitate legibility. This approach recognises that legibility is greatly influenced by viewing distance and viewing angle.

The results of an experiment on this conducted by the Queensland Consumers Association are provided in Appendix 2.

A German standard for legibility, DIN 1450 'Lettering - Legibility', includes requirements for good legible minimum type sizes. For the ISO Guidance Standard on Unit Pricing, the European Consumer Voice in Standardisation (ANEC)² has used DIN 1450 to propose an Annex on legibility for unit prices on shelf edge labels displayed in-store. This is provided in Appendix 3. It includes minimum character heights for unit prices on vertical and angled shelf edge labels for different viewing distances and distances from the floor.

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² For further information about The European Voice in Standardization (ANEC) see www.anec.eu

EXAMPLES OF SPECIFIC PRINT HEIGHT REQUIREMENTS/RECOMMENDATIONS FOR THE DISPLAY OF UNIT PRICES

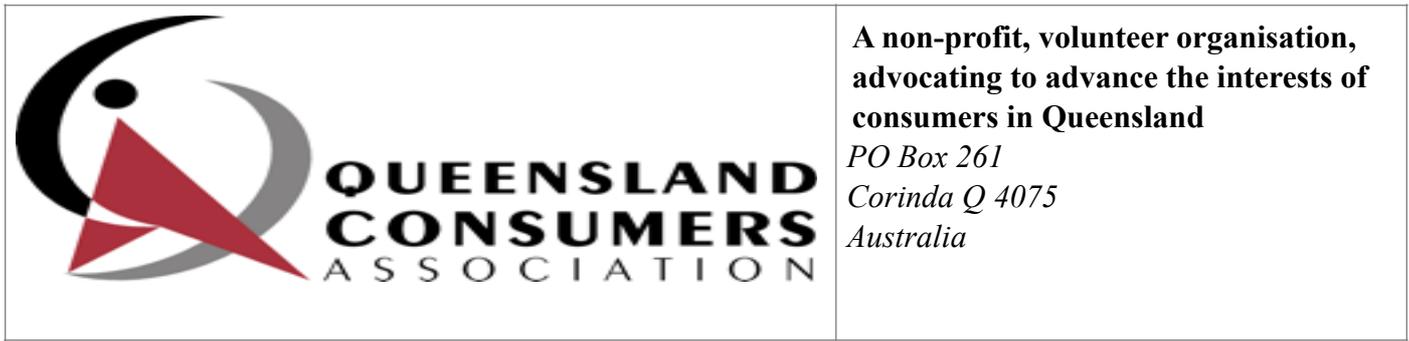
ON SHELF LABELS AND SIGNS

Country/ State	Type of Height Requirement/ Recommendation for Unit Price			Specific Height Requirement/ Recommendation for Unit Price
<u>USA</u>	Minimum	Equal to selling price	% of selling price	
Massachusetts State law - requirement	Y	Y	Y	Shelf labels and signs: Equal to the item price and no smaller than 3/8 th inch (9.5mm) and if the item price is larger than 3/8 th inch (9.5mm) no less than 25% of the item price or 3/8 th inch (9.5mm), whichever is greater. On packages: no smaller than the size of the item price.
Connecticut State law - requirement	Y	Y	Y	Shelf labels and signs: No smaller than for the retail price and at least pica print size (1/6 th inch/4.2 mm) and if the retail price is more than pica (1/6 th inch/4.2 mm) the unit price must be no less than that or 25% of the retail price, whichever is greater
New York State law - requirement	Y			Unit price Numerals: Minimum of 3/16 th inch (4.7mm) Words “unit price”: Minimum of 1/16 th inch (1.6mm)
New Jersey State law - requirement	Y	Y	Y	Shelf labels: No less than the size of the selling price and if the selling price is greater than the unit price no less than 50% of the selling price. Price signs: equal to the selling price if that is less than 5 inches (127mm) and if the selling price is greater than 5 inches (127mm) no less than 3 inches (76mm) or 50% of the selling price, whichever is greater.
National Institute of Standards and Technology Unit Pricing Guide - recommendation	Y		Y	Shelf labels and signs: Minimum of 6mm (0.24inch) and not less than 50% of the height of the retail price

Country/ State	Type of Height Requirement/ Recommendation for Unit Price			Specific Height Requirement/ Recommendation for Unit Price
	Y	Y	Y	
<u>Sweden</u> Good practice agreement between retailers and the Consumer Agency - requirement	Y	Y	Y	Shelf labels and price signs: a minimum of 11mm for numbers and 8mm for letters. Labels on products: a minimum of 6mm for numbers and 3mm for letters.
<u>Japan</u> Tokyo Metropolitan Government - recommendation	Y			Minimum of 14 point (5mm) for numbers and letters.
<u>Australia</u> Trade Measurement Regulations - requirement	Y			For random weight packages of products such as meat, fish, cheese, nuts, fruit and vegetables sold in non-rigid containers, the unit price need not be provided on the package if it is shown on an adjacent sign in characters at least 10mm high.

ON PRE-PACKAGES

Country/ State	Type of Height Requirement/ Recommendation for Unit Price			Specific Height Requirement/ Recommendation for Unit Price
	Minimum	Equal to selling price	% of selling price	
<u>Australia</u> Trade Measurement Regulations - requirement	Y			On variable measure packages of products such as meat, fish, cheese, nuts, fruit and vegetables sold in non-rigid containers a unit price printed by an approve printing device must be a minimum of 3mm high.
<u>Sweden</u> Good practice agreement between retailers and the Consumer Agency - requirement	Y			Minimum of 6mm for numbers and 3mm for letters
<u>USA</u>				
Massachusetts State law - requirement		Y		No smaller than the size of the item price.



LEGIBILITY AND PROMINENCE OF UNIT PRICES ON SUPERMARKET SHELF LABELS LOCATED CLOSE TO THE GROUND

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EXECUTIVE SUMMARY

To facilitate consumer use for value comparisons, the unit price (price per unit of measure) on all shelf labels should be easy to notice and read. However, for a variety of reasons, unit prices are often not sufficiently prominent or legible. Consumers likely have the greatest difficulty noticing and reading unit prices on shelf labels close to the ground, print size and viewing angle are likely to substantially influence prominence and legibility, and unit pricing regulations/guidelines usually require unit prices to be prominent and legible.

Therefore, this research examined the influence of print size and viewing angle on the prominence and legibility of unit price information on supermarket shelf labels located 20 cm from the ground.

37 adults looked at paper shelf labels located 20 cm from the ground on which the unit price was in print 2, 3, 4, 6, 8, and 10 mm high in bold Arial font located under the 12 mm high selling price. Half the labels were angled out at 45 degrees and half were vertical. For each label, participants indicated: how easy or difficult it was to notice the unit price; whether the unit price was unreadable or readable; and, if readable, what it was and how easy or difficult it was to read. Two indicators of prominence are reported – whether very easy (**high standard**) and very easy/easy to notice (**medium standard**) - and three indicators of legibility - whether very easy and very/easy to read, and whether unreadable/read inaccurately.

The main results were that large print sizes and angling the labels out greatly increased the percentage of the participants for whom the unit price was prominent and legible.

The 8 and 10 mm print sizes on angled out labels performed best in terms of the highest standard - whether the unit price was very easy to notice/read. However, the percentages were lower when the label was vertical and were similar to those for 6 mm print angled out. In terms of the medium standard - being very easy/easy to notice and read - 8 and 10 mm print height performed very well for both angled and vertical labels and 6 mm angled out also performed well.

Generally, 4 mm print did not perform well compared to 6, 8 and 10 mm even when the label was angled out. 2 and 3 mm print size performed very badly in terms of being either very easy or very easy/easy to notice and read. Also, most all participants were unable to read or read inaccurately the 2 mm and 3 mm print when the label was vertical, and even when the 2 mm print was angled out over 40% had that experience.

Most food and grocery retailers providing unit prices have shelf labels located around 20 cm from the ground and the print height is often small (sometimes only 2 or 3 mm). In addition, these shelf labels are frequently placed vertically on the shelf edge, not angled out. Also, retailers usually use the same labels on all shelves. Therefore, the results of this study are relevant to retailers, legislators and regulators wanting to ensure that unit prices are sufficiently prominent and legible not only on labels 20 cm from the ground but also on all types of shelf labels and other in store price signs.

PURPOSE

The purpose of this research was to assess the influence of print size and viewing angle on the prominence and legibility of unit price information on supermarket shelf labels located 20 cm from the ground.

BACKGROUND

There are substantial differences in how supermarkets display unit prices in Australia and other countries. Frequently the unit prices are very difficult/impossible for consumers to notice and read. There are many possible causes but the main ones are often small print size and inadequate viewing angle.

Unit prices that are not sufficiently prominent and/or legible greatly reduce consumer awareness and use of unit prices and therefore result in reduced benefits for consumers and economies.

Consumers probably encounter the greatest difficulties noticing and reading unit prices on shelf labels on the bottom shelf, which is usually about 20 cm from the ground.

Published quantitative research on the factors influencing the prominence and legibility of unit prices in supermarkets is very limited.

Therefore, in 2014, QCA conducted an exploratory study with 34 adults on the factors influencing the prominence and legibility of unit prices on shelf labels 20 cm from the ground. That study looked the influence of: three print sizes (3, 4 and 6 mm), print density, viewing angle, and location.

The results showed that much higher levels of prominence and legibility were achieved when the print was 6 mm high (not 4 mm or 3 mm), the label was angled out (not vertical), and the unit price was located under the selling price (not among or under the product information).

Since then, in 2015, a German seniors' organisation (BAGSO) has published³ (only in German) the results of an experiment with 362 adults on the factors influencing prominence and legibility of unit prices on vertical shelf labels at a variety of heights from the ground

That study's results concluded that the height at which a shelf label was viewed and the size of print used for the unit price (2, 3.25, 3.75, and 5 mm) had major influences on the legibility and visibility of the unit price. For a majority of respondents even the largest print size used (5 mm) did not make the unit price sufficiently legible even when viewed at eye level. And, on the bottom shelf (40 cm from the ground) it was not legible enough for 75% of respondents.

Also, font size had a decisive influence on legibility at eye level. The most frequently selected/preferred unit price sizes for legibility were: 5 mm (33%), 7.5 mm (30%) and 11 mm (27%). The least selected/preferred size was 2.5 mm (10%).

Given the results of the above studies, the ISO's decision to develop an international guidance standard for unit pricing, the use by some retailers of print only 2 mm high for some unit prices, and the need to ensure that unit prices are sufficiently prominent and legible for all consumers (including those with impaired vision and mobility), the Association decided to conduct a new experiment that concentrated on the influence of print size and viewing angle on the prominence and legibility of unit prices on shelf labels 20 cm from the ground and that looked at a wider range of print sizes.

METHODOLOGY

6 types of shelf edge labels were created⁴: with the unit price 2, 3, 4, 6, 8, and 10 mm high in bold Arial font located under the 12 mm high selling price. Appendix 1 shows the 6 label types used. Two sets of labels were produced. Each label had a different selling and unit price and the labels were displayed in random order. One set of labels was angled out from the shelf at 45 degrees and the other was placed vertically on the shelf. All the labels were placed 20 cm from the ground.

For each of the 12 labels, 37 adults were asked to indicate⁵ :

³ <http://www.bagso-service.de/analyse-entwicklung-testung/studien/preisschilder/>

⁴ The basic features of the design were based on those used in many Australian supermarkets.

⁵ All participants were adults, stood upright and up to 1 metre from the labels, and looked at all labels before commencing the tasks.

- How easy or difficult⁶ it was to notice the unit price on each label.
- Whether the unit price was unreadable or readable and, if readable, what it was and how easy or difficult it was to read.

RESULTS

1. Legibility

Results are provided for three unit price legibility indicators each expressed in terms of the percentage of respondents for whom the unit price was:

- very easy to read (high standard)
- very easy/easy to read (medium standard)
- unreadable/read inaccurately

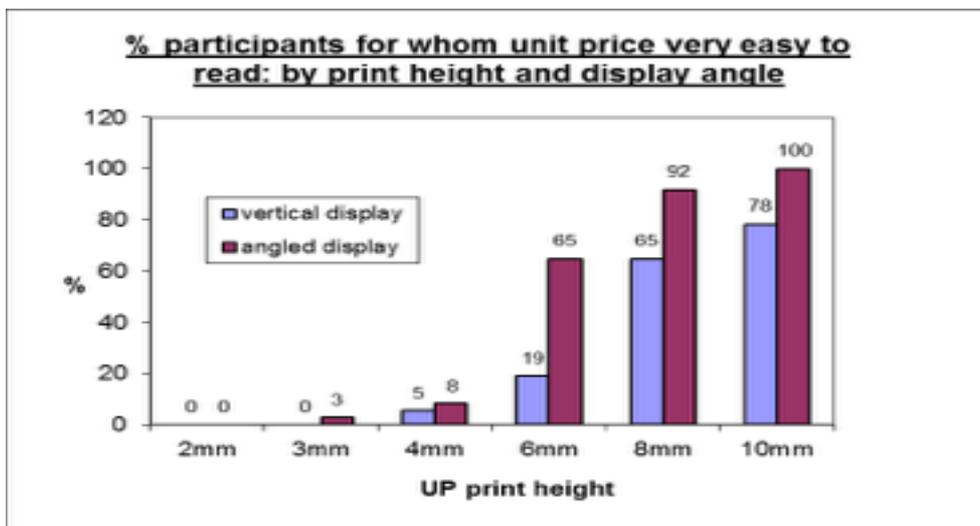
Percent very easy to read (High standard)

This indicator of legibility likely corresponds with that which influences retailer choice of the print height for the selling price on shelf labels. This is usually 10 mm or more and was 12 mm in this experiment.

Retailers likely choose a large print height to ensure that consumers can very easily read the selling price in a wide variety of situations, including on shelves only 20 cm from the ground and when the label is vertical not angled out to assist the viewer.

The results for this indicator are summarised in Graph 1.

Graph 1: UP very easy to read



The highest proportions of respondents for whom the unit price was very easy to read occurred only with the 8 and 10 mm print and when the label was angled out. For 10 mm print it was 100% and for 8 mm print it was 92%. With 6 mm print it was 65% and only 8% for 4 mm print.

The proportions were much lower when the labels were vertical. For example, for 10 mm it dropped to 78%, and for 8 mm to 65%. For 6 mm print it was only 19%.

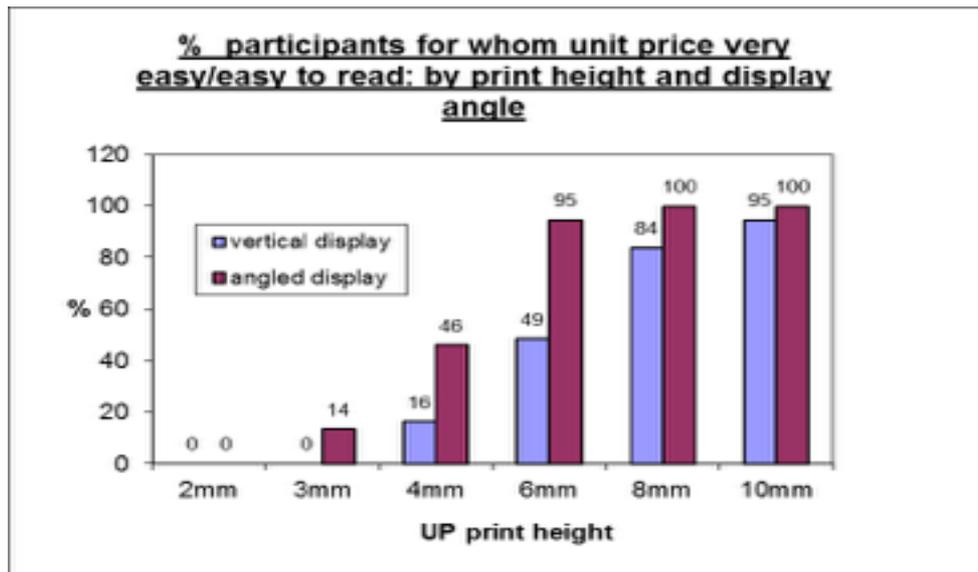
Percent very easy/easy to read (Medium standard)

This is an indicator of **lower** legibility than whether the unit price is very easy to read.

The results for this indicator are summarised in Graph 2.

⁶ Ease or difficulty to notice/read was indicated in terms of: very easy, easy, somewhat easy, somewhat difficult, difficult, very difficult.

Graph 2: UP very easy/easy to read



The legibility of the unit prices, measured by whether they could be read very easily or easily, was very high for the 10 and 8 mm unit prices when angled out from, and vertical on, the shelf. For both 8 and 10 mm print on angled out labels, for 100% of the participants the unit price was very easy/easy to read and this only fell to 84% and 95% respectively when the labels were vertical.

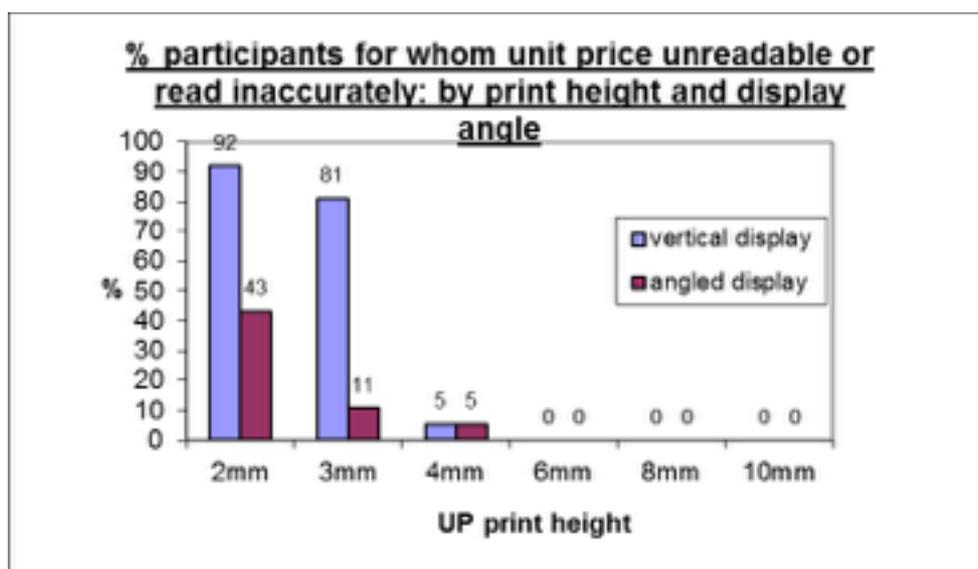
The 6 mm print angled out also achieved a high percentage, with 95% of observations being that the unit price was very easy/easy to read. But, this declined to only 49% when the print was vertical. The percentages for the smaller print sizes were very low. The only exception was 49% for 4 mm print angled out.

Percent unreadable/read inaccurately

This is a very objective indicator of legibility and assesses the ultimate objective i.e. that the consumer is able to accurately read the unit price. However, it must be used in combination with ease of reading because consumers also need to be able to read unit prices very easily.

The results for this indicator are summarised in Graph 3.

Graph3 UP unreadable/read inaccurately



With the angled and the vertical labels and when the unit price was 6, 8, or 10 mm, no participant found the unit price unreadable or read it inaccurately. However, there were many such observations with the 2 and 3 mm print heights

and when the labels were vertical.

With 2 mm print and the label vertical 92% of the observations were that the print was unreadable or it was read inaccurately. The percent for 3 mm print displayed vertically was also very high at 81%. The percent was much lower when the label was angled out but for 2 mm print was still very high at 43%.

2. Prominence

Results are provided for two prominence indicators each expressed in terms of the percentage of respondents for whom the unit price was:

- very easy to notice (High standard)
- very easy/easy to notice (Medium standard)

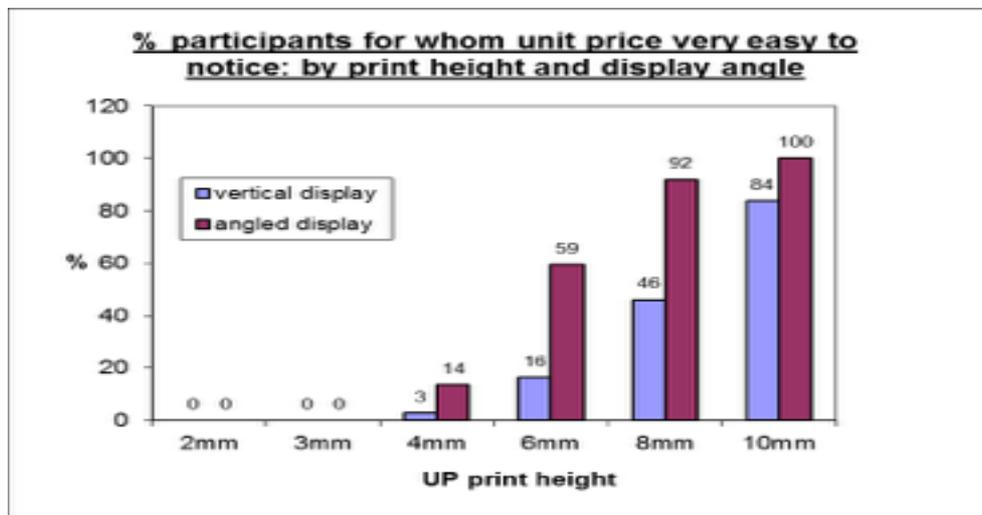
Percent very easy to notice (High standard)

This indicator of prominence likely corresponds with that which influences retailer choice of the print height for the selling price on shelf labels. This is usually 10 mm or more and in this experiment was 12 mm.

Retailers likely choose such a large print height to ensure that consumers can very easily notice the selling price in a wide variety of situations, including on shelves only 20 cm from the ground and when the label is vertical not angled out to assist the viewer.

The results for this indicator are summarised in Graph 4.

Graph 4: UP very easy to notice



The prominence of the unit prices, measured by whether they could be noticed very easily, was highest for the 10 and 8 mm unit prices when angled out from the shelf. For example, with 10 mm print 100% of participants said that the print was very easy to notice and for 8 mm print it was 92%.

Prominence declined when the levels were vertical and for 10 mm it dropped to 84% and to only 46% for 8 mm.

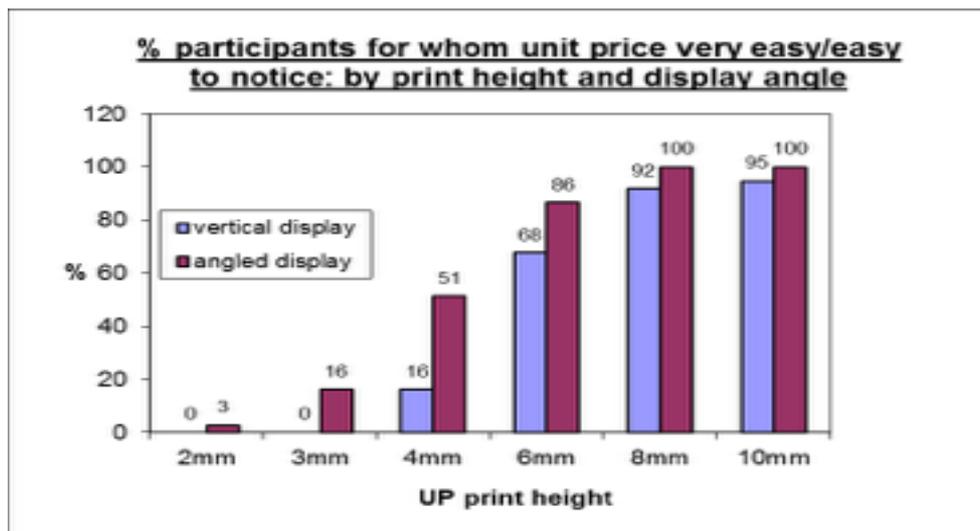
6 mm print angled out was the only other size to achieve a reasonably high percentage (59%) and when the print was vertical this fell to only 16%.

Percent very easy/easy to notice (Medium standard)

This is an indicator of **lower** prominence than whether the unit price is very easy to notice.

The results for this indicator are summarised in Graph 5.

Graph 5: UP very easy/easy to notice



The prominence of the unit prices, measured by whether they could be noticed very easily/easily, was very high for the 10 and 8 mm unit prices when angled out from and vertical to the shelf. For both 8 and 10 mm print on angled out labels 100% of the participants said that the unit price was very easy to notice and this only fell to 92% and 95% respectively when the labels were vertical.

The 6 mm print angled out also achieved a high percentage, with 86% of participants saying that the unit price was very easy/easy to notice. But, this declined to 68% when the print was not vertical. The percentages for all other print sizes were very low the only exception being 51% for 4 mm print angled out.

CONCLUSIONS

If the percentage of participants able to very easily notice and read the unit price (the **High standard**) is used to indicate prominence and legibility of unit price on labels 20 cm from the ground, the 10 and 8 mm print heights were much superior to 6, 4, 3, and 2 mm print sizes especially when the labels were angled out to improve the viewing angle (100% and 92% respectively for both prominence and legibility).

However, using the same indicator, when the labels were vertical the reduction in prominence and legibility with the 8 mm label resulted in percentages similar to those achieved by the 6 mm label angled out. For example 65% very easy for 8 mm vertical and 6 mm angled out. This highlights the beneficial impacts on prominence and legibility of angling the label out rather than having it vertical, especially for smaller print sizes.

When the **Medium standard** is used to indicate prominence and legibility (i.e. percentage of participants able to very easily/easily notice and read the unit price) the 10, 8 and 6 mm print heights with the label angled out all achieved very high percentages compared to 4, 3, and 2 mm print sizes. However, the 6 mm score was much lower, especially for legibility when the label was vertical.

Unit prices 2 and 3 mm high scored very lowly for prominence and legibility using either of the above indicators when the label was angled out or vertical. These print sizes also resulted in very high levels of inability to read the unit price or it being read inaccurately. For example, for both sizes it was over 80% when the label was vertical and 43% for 2 mm even when angled out.

For 4 mm print, using the High standard as the indicator of prominence and legibility 4 mm print for unit prices resulted in very low levels of prominence and legibility irrespective of whether the label was angled out or vertical. And, even when the Medium standard was used as the indicator and the label was angled out, the score was only around 50%.

The prominence and legibility of unit price information is likely to be influenced to varying degrees by factors other than print size and viewing angle. These factors include: contrast with the background, background colour, font type and density, space between characters, clear space around the unit price, inclusion of the words “unit price”, and location relative to the selling price.

However, this experiment shows clearly that, for the label design used, print size and viewing angle has major influences on prominence and legibility when the labels are located 20 cm from the ground. It also shows that prominence and legibility, as measured by several indicators, were greatly improved when the print size was large and the label was angled out to improve the viewing angle.

Therefore, when unit prices will be displayed are on shelf labels 20 cm from the ground, to achieve the high levels of prominence and legibility needed by customers, retailers and regulators should to pay great attention to the print sizes used and the viewing angle that customers will experience.

IMPLICATIONS, ETC

Although this was a small scale experiment, these results, which indicate the large impacts of print size and viewing angle on the prominence and legibility of unit prices on shelf labels 20 cm from the ground, have major implications for how retailers choose to provide unit prices voluntarily, and for any regulations or guidelines on mandatory or voluntary provision.

However, the implications and the appropriate responses are likely to vary greatly depending on specific situations and circumstances.

For example, this experiment was conducted with unit prices shown in Roman script. However, although Roman script is used for numbers and letters in most countries, many others are also widely used for example Arabic, Chinese, Hebrew, Japanese, Korean, Russian, and Indian. Therefore decisions about appropriate print size should take account of the script type characteristics.

Also, in a few places laws not only aim to ensure that unit prices are very prominent and legible but also contain specifications designed to achieve this such as print size, (usually the same as or close to that of the selling price), use of a specific background colour, and display of words indicating what is the unit price. Therefore, there may be no need to make changes to some existing display requirements. Nevertheless, it may still be necessary to consider how to ensure that these, and other labels, are displayed at angles which assist the customer and do not reduce the effectiveness of the design requirements.

However, currently many retailers in many countries, including Australia, display unit prices 20 cm from the ground with small print⁷, and with the labels not angled out. This may reflect many factors including retailers' own policies and practices and often a lack of specification in regulations or guidelines of minimum print sizes or measurable required minimum levels of prominence/legibility.

Since this experiment has shown that unit prices provided using these small print sizes, even when the label is angled out, result in unsatisfactory and unacceptable levels of prominence and legibility, the results are particularly relevant, and have major implications, for these retailers and any associated regulations/guidelines.

There are also implications for the display and angle of presentation of unit pricing on shelf labels not just 20 cm from the ground. This is because retailers prefer to have only shelf labels suitable for **all** shelf levels. Therefore, the results have implications for shelf labels on all shelves. Also, although the experiment was conducted with a label type not displaying a special offer, the results are relevant to the display of unit prices on these types of labels.

The results of this experiment highlight need to take full account of the major influences of print height and viewing angle on the prominence and legibility of unit prices in the design of shelf labels and other in store price signs for the provision of unit pricing. However, other influences should also be taken into account including: contrast with the background, background colour, font type and density, space between characters, clear space around the unit price, inclusion of the words "unit price", and location relative to the selling price. Designs should also aim to minimise/avoid consumer confusion between the unit price and the selling price.

The results provided here reflect the experiences and views of people with normal vision. However, retailers and regulators should also aim to provide unit prices that will meet the needs of customers with uncorrectable impaired vision and of people with corrected vision but who may have uncorrected vision⁸ when looking at unit prices.

The Association encourages others to undertake and publish research on the factors that influence the prominence and legibility of unit prices displayed by retailers, not only instore but also on internet selling sites and in various types of advertisements.

⁷ Usually much smaller than that used for the selling price and sometimes as small as 2 and 3 mm.

⁸ For example due to not having with them any, or the required, spectacles.

APPENDIX 1 – LABEL TYPES

2 mm unit price

\$ 8 60 \$1.72 per 100g	Nestle Drinking Malt 500gram <small>07000 24006 6 761004 12</small>
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3 mm unit price

\$ 8 49 \$1.70 per 100g	Nestle Drinking Malt 500gram <small>07000 24006 6 761004 12</small>
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4 mm unit price

\$ 8 12 \$1.62 per 100g	Nestle Drinking Malt 500gram <small>07000 24006 6 761004 12</small>
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6 mm unit price

\$ 7 75 \$1.55 per 100g	Nestle Drinking Malt 500gram <small>07000 24006 6 761004 12</small>
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8 mm unit price

\$ 8 43 \$1.69 per 100g	Nestle Drinking Malt 500gram <small>07000 24006 6 761004 12</small>
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1. General

This Annex x is only about legibility – ability to read. It does not address prominence – ability to notice.

Also, it relates only to unit prices on shelf edge labels displayed in-store. It does not relate to unit prices displayed in-store on other signs or online or in advertisements.

It is based on a German standard DIN 1450 'Typefaces, Legibility'.

2. Minimum character heights for in-store shelf edge labels

Character height has a major impact on legibility.

In a well-lit environment, for persons with normal visual acuity (Visus 0,7) standing upright 0,60 m from the shelf, a minimum character height of 3,2 mm is required for good legibility of unit prices on vertical labels 1,20 m to 1,80 m from the floor.

For larger viewing distances Table 1 shows the required minimum character heights for vertical and angled shelf edge labels with the viewer standing upright and 0,6 m from the shelf⁹.

Table 1: Minimum character heights for vertical and angled shelf edge labels for different viewing distances and distances from the floor

Distance of unit price from the floor (m)	Viewing distance (m)	Minimum character heights (mm) for shelf edge labels:	
		vertical	angled (angle 40)
1,10	0,72	3,4	-
1,00	0,78	3,9	-
0,70	1,00	6,4	4,1
0,40	1,25	10,3	5,3
0,10	1,52	15,2	6,7

⁹ The viewer is standing upright in a distance of 0,6 m to the shelf and can see the labels at height of 1,50 m and above in a viewing distance of about 0,60 m by slightly changing posture. Below 1,50 m the viewing distances are larger than 0,60 m, because the viewer looks diagonally downwards.

Table 1 shows that when a shelf edge label sign is close to the ground (for example on the lower shelves), and vertical to the viewer, much larger character heights are required to provide good legibility than when the shelf edge label is angled out towards the viewer.

To take account of the needs of viewers in wheel chairs (with an eye level of 1,2 m):

- Angled shelf edge labels signs should be only up to 0,8 m from the floor and above that should be vertical.
- For vertical shelf edge labels on the upper shelves (1,80 m from the floor) at larger viewing distances (0,85 m) the minimum character height should be 4,7 mm.

The given minimum character heights refer to persons with normal visual acuity (Visus 0,7) and good luminosity ($L = 100 \text{ cd/m}^2$).

If the visual acuity is less (Visus: $< 0,7$ and $\geq 0,5$) the values of these character heights have to be multiplied by 1,4. If the visual acuity is between Visus $< 0,5 \geq 0,4$ these character heights have to be multiplied by 1,75.

If the luminosity is adequate ($L = 10 \text{ cd/m}^2$) these character heights have to be multiplied by 1,25 for people with normal visual acuity (Visus 0,7) or 1,7 for people with reduced/limited visual acuity (Visus 0,5).

If the luminosity is inadequate ($L = 1 \text{ cd/m}^2$) these character heights have to be multiplied by 1,5 for people with normal visual acuity (Visus 0,7) or 2 for people with reduced/limited visual acuity (Visus 0,5).