FOOD STANDARDS
Australia New Zealand
Te Mana Kounga Kai – Ahitereiria me Aotearoa

**SD6**

# PROPOSAL P301

# PRIMARY PRODUCTION AND PROCESSING STANDARD FOR EGGS & EGG PRODUCTS

# COST-BENEFIT ANALYSIS

**September 2009**

# Cost-benefit analysis

**TABLE 1: Cost estimates for illness in Australian Dollars**

| Outcomes | Incidence | Total QALDs Lost per Illness | Health Loss per Case | Medical Costs per Case | Weighted Dollar Loss per Case |
|---|---|---|---|---|---|
| | | | | | |
| **Gastroenteritis** | | | | | |
| Mild | .857 | 5.58 | $2,466 | $0 | $2,113 |
| Moderate | .154 | 10.65 | $4,707 | $73 | $736 |
| Severe | .018 | 16.15 | $7,138 | $ 1,526 | $156 |
| **Reactive Arthritis** | | | | | |
| Mild | .011 | 222 | $ 98,124 | $ 0 | $ 1079 |
| Moderate | .002 | 222 | $ 98,124 | $110 | $ 196 |
| Severe | .0002 | 222 | $ 98,124 | $ 4,063 | $ 20 |
| **Irritable Bowel Syndrome** | .0002 | Life Long | $3,738,000 | $1,526 | $748 |
| **Death** | .001 | 8454 | $ 3,738,000 | | $ 3,738 |
| | | | | | |
| **Total Expected Loss per Case** | | | | | **$ 8,786** |

*Cost per case in Table 1 is in the context of Australian estimates for **Quality Adjusted Life Year** (QALY) and **Value of Statistical Life** (VSL)[1]. This estimate takes into account productivity, welfare and medical costs for a range of effects ranging from a mild gastro illness to extreme consequences like death. See Table ... followed by Explanatory Notes for the breakdowns of this estimate.*

## *Explanatory Notes*

**Outcomes:** A range of adverse health outcomes have been associated with human illness resulting from foodborne salmonellosis. An occurrence could vary from a mild gastroenteritis illness (GE) to extreme consequences like death. Long term adverse health complications include Reactive Arthritis and Irritable Bowel Syndrome. These outcomes have been derived from the Dutch study (Kemmeran, et al. 2006).

**Incidence:** A Mild case of Gastroenteritis illness is classified as one that involves no visit to a general practitioner (GP), a moderate case involves a GP visit and a severe case would be one that requires hospitalisation. The breakdown of cases into Mild, Moderate and Severe cases of illness is based on Kemmeren et al. (2006) estimate of 35,000 community cases of *Salmonella*- associated gastroenteritis and sequelae illness. For example out of the 35,000 cases, 30,000 or approximately .857 or (approximately 86%) could experience mild symptoms.

**Quality Adjusted Life Day (QALD):** QALD refers to a day of life adjusted for its quality or its value. A day in perfect health is considered equal to 1.0 QALD. The estimated number of QALDs lost due to illness has also been derived from the Dutch study where a mild illness may only impact over 5 days whereas a severe illness could affect up to 16 days of an individual's life (Kemmerer, et al. 2006).

**Health loss:** Health loss is measuring what the community is willing to pay to avoid an adverse health outcome or consequence. It is obtained as a product of number of QALDs and value of QALD. The recommended Value

[1] Refer to Abelson, P. (2007) Office of Best Practice Regulation. Establishing a Monetary Value for Lives Saved: Issues and Controversies: WP 2008-02:21.

of a Life Year (VLY) which may also be expressed as Quality Adjusted Life Year (QALY) in Australia is $151,000 (Abelson, 2007). Therefore the value of a Quality Adjusted Life Day (QALD) would be $ 151,000 divided by 365 or $414 in 2007 prices. Based on Australian Taxation Office's (ATO) Consumer Price Index (CPI) the inflation adjusted value of QALD for 2009 is $ 442 (increase of 6.8%). E.g. the health loss for a mild gastroenteritis illness affecting 5.58 days at the rate of $ 442 per day is $2,466. In case of Reactive Arthritis cases it is 222 days at the rate of $ 442 or $ 98,124.

Similarly for death, the health loss is estimated to equal to the Value of Statistical Life (VSL) at $3.5m in 2007 prices (Abelson, 2007). This means that society is willing to pay approximately $3.74m in 2009 prices to avoid the death for a healthy individual (after CPI inflation adjustment of 6.8%) Health loss is limited to loss of leisure, welfare and quality of life.

**Medical costs:** Medical costs include the health care and medical costs associated with the range of adverse health outcomes resulting from a foodborne salmonellosis illness. While a mild illness may not warrant any medical examination a moderate case could only involve a GP visit i.e. $60 in 2002 prices (Abelson, et al. 2006)[2]. For a severe hospitalisation case of gastroenteritis or Irritable Bowel Syndrome (IBD) the cost is estimated to be approximately $1,254, assuming an average hospital stay of 2 day. In the event of Reactive Arthritis, it is assumed one specialist visit at $90 for a moderate case and $ 3,339 for a severe case. Costs used are 2002 prices and derived from the annual cost of foodborne illness in Australia (Abelson, et al. 2006). As the above prices are of 2002 CPI inflation adjusted estimates for 2009 are $ 73 for a GP visit and $ 110 for a specialist visit, $1,526 for hospitalisation and $ 4,063 for a severe hospitalisation case (with ATO's CPI inflation adjustment of approximately 21.7% over 2002-09).

**Weighted dollar loss**: is the sum of Health Loss and Medical costs proportioned to the incidence or case breakdown, e.g. in a moderate gastroenteritis illness outcome, the health loss was $ 4,707. In addition there could be medical costs of a GP visit of $73. The sum of $4,780 apportioned to the incidence or likelihood of that event, i.e. 154 or 15.4% translates to $736 which has been placed in the weighted dollar loss column for a moderate gastroenteritis illness. In case of Death the VSL of $3,738,000 is then pro-rated to the incidence or likelihood of death at .1% (.001) to generate the weighted dollar loss for Death as $3,738.

[2] Abelson, P. et al. (2006) Australian Government Department of Health and Ageing. The annual cost of foodborne illness in Australia.

## *Calculations for Net Present Benefit/Cost over 5 years for PPP Standard*

| **Costs** | **Year 1** | **Year 2** | **Year 3** | **Year 4** | **Year 5** |
|---|---|---|---|---|---|
| Industry cost: | 9.14 Million | 3.48 Million | 3.48 Million | 3.48 Million | 3.48 Million |
| Govt Enforcement Costs | $ 154,000 | $ 57,000 | $ 57,000 | $ 57,000 | $ 57,000 |
| Total Costs | 9.29 Million | 3.54 Million | 3.54 Million | 3.54 Million | 3.54 Million |
| Discount Rate 7%<br>(1.07 for Y2, 1.07^2 for Y3 etc) | 1 | 1.07 | 1.07^2 | 1.07^3 | 1.07^4 |
| Present Value of Costs<br>(i.e. PV or Total Costs/Discount rate) | 9.29 Million | 3.31 Million | 3.11Million | 2.88 Million | 2.70 Million |

**Total PV of Costs after 5 years 21.29 Million (Year 1 includes Upfront component of $ 5.66m )**

## Benefits

| | | | | | |
|---|---|---|---|---|---|
| Reduced risk /damage to industry Goodwill | 2.36 Million | 2.36 Million | 2.36 Million | 2.36 Million | 2.36 Million |
| Savings from Foodborne illness, (2560 cases at 20% efficacy) OR | 22.49 Million | 22.49 Million | 22.49 Million | 22.49 Million | 22.49 Million |
| Savings from Foodborne illness, (4480 cases at 35% efficacy) OR | 39.36 Million | 39.36 Million | 39.36 Million | 39.36 Million | 39.36Million |
| Savings from Foodborne illness, (6400 cases at 50% efficacy) | 56.23 Million | 56.23 Million | 56.23 Million | 56.23 Million | 56.23 Million |
| Government surveillance Investigation and recall | $ 610,000 | $ 610,000 | $ 610,000 | $ 610,000 | $ 610,000 |
| Total Benefits at 20% efficacy 0R | 25.46 Million | 25.46 Million | 25.46 Million | 25.46 Million | 25.46 Million |
| Total Benefits at 35% efficacy 0R | 42.33 Million | 42.33 Million | 42.33 Million | 42.33 Million | 42.33 Million |
| Total Benefits at 50% efficacy 0R | 59.2 Million | 59.2 Million | 59.2 Million | 59.2 Million | 59.2 Million |
| Discount Rate 7%<br>(1.07 for Y2, 1.07^2 for Y3 etc) | 1 | 1.07 | 1.07^2 | 1.07^3 | 1.07^4 |
| Present Value of Benefits (20%)<br>(i.e. PV or Total Costs/Discount rate) | 25.46 Million | 23.79 Million | 22.33 Million | 20.70 Million | 19.44 Million |
| Present Value of Benefits (35%)<br>(i.e. PV or Total Costs/Discount rate) | 42.33 Million | 39.56 Million | 37.13 Million | 34.41 Million | 32.31 Million |
| Present Value of Benefits (50%)<br>(i.e. PV or Total Costs/Discount rate) | 59.2 Million | 55.33 Million | 51.93 Million | 48.13 Million | 45.19 Million |

**Total PV of Benefits at 20% efficacy – 111.72 Million, 35% - 185.74 Million, 50% -259.78 Million**

**Net Benefit in PV after 5 years at 20% efficacy – 90.43 Million, 35% - 164.45 Million and 50% 238. 49 Million.**