



19 August 2015

Mr Brook Hastie
Research Director
Health and Ambulance Services Committee
Parliament House
George Street
BRISBANE QLD 4000

Dear Mr Hastie,

It is with pleasure that Diabetes Queensland provides this submission on the Public Health (Childcare Vaccination) and Other Legislation Amendment Bill 2015.

Diabetes Queensland supports the Bill, and applauds the focus on preventative health.

While aimed at wider populations, this Bill will also have a positive impact on children with type 1 diabetes in the child care system.

Children with type 1 diabetes experience additional difficulties from illnesses which can be prevented through vaccination. Increasing vaccination rates or limiting exposure to unvaccinated children in child care settings will be of benefit to children with type 1 diabetes.

Some children with type 1 diabetes are at greater risk of contracting the illnesses than children without diabetes.

Some research also indicates a causal link between some preventable illnesses and subsequent development of type 1 diabetes.

However, care should be taken to ensure the legislation cannot be used in ways other than intended, such as excluding children with medical conditions including diabetes from enrolments.

Success of Vaccination programs

Vaccination programs have provided one of the most successful prevention strategies for disease, and resulted in the near-elimination of illnesses that have historically accounted for many deaths.

However, immunisation programs are reliant on participation to be effective, with an underlying principle of herd immunity. Usually around the 95 per cent mark, this is the proportion of the population who need to be vaccinated to control or eliminate a disease.

In recent years, the herd immunity level has not been met. In Queensland, as the Minister for Health stated in his second reading speech¹, childhood immunisation rates lie at about 92 per cent.

1 Dick, C. (2015) Second Reading Speech, Public Health (Childcare Vaccination) and Other Legislation Amendment Bill Queensland Parliament 15 July 2015.



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This leaves vulnerability in the system, and has led to increasing cases or outbreaks of preventable viruses such as measles or pertussis. In addition, factors such as increased mobility of populations mean viruses can travel borders with greater ease.

Children are naturally more susceptible to illness and severity of illness as their immune systems are still developing. In situations such as schools and child care, where children are routinely associating in large groups, the spread of illness can be predictably multiplied.

This Bill targets the approved education and care services as approved under the *Education and Care Services National Law (Queensland) Act 2011* and the *Education and Care Services Act 2013*. This includes preschool services such as kindergartens, long-day-care services and family day care services, as well as school age services such as outside school hours care. These are non-compulsory settings as a part of the wider education system.

The impact of illness on children with type 1 diabetes.

There are around 1,400 children (aged 15 and under, National Diabetes Services Scheme 2013) with type 1 diabetes in Queensland. Of these, 90 are aged 4 and under.

Type 1 diabetes is the prevalent form of diabetes among children. A child with type 1 diabetes in any care setting has to monitor (or be monitored for) their blood glucose levels, as well as requiring multiple insulin injections every day. Not maintaining the blood glucose to a recommended level can lead to one of two dangerous states – hypoglycaemia or hyperglycaemia.

Hypoglycaemia, or low blood glucose, leads to light-headedness, trembling, behavioural change, and headaches, and if not treated quickly can lead to loss of consciousness. Hyperglycaemia, or high blood glucose, is indicated by thirst, blurred vision and tiredness, and can lead to diabetic ketoacidosis, a life threatening emergency condition.

When a child with type 1 diabetes has another illness, from a cold to a preventable disease, there is an impact on blood glucose levels. The body's utilisation of hormones (and additional glucose) to fight viral infections can make it harder for the body to use insulin properly.

In many cases, this means that an illness can lead to higher blood glucose levels. However, a decreased appetite or nausea can also decrease the intake of food and glucose, raising the risk of lower blood glucose levels. The outcome is unpredictable, individual, and requires greater levels of management.

A child with type 1 diabetes exposed to a preventable illness is likely to experience more effects from their diabetes as well as the impact of the illness.

Some children with type 1 diabetes will also be more vulnerable to contracting viral diseases, due to problems with their immune systems.

Research indicates that some people with type 1 diabetes are more vulnerable to particular diseases for which vaccines are available:

- Chickenpox (Varicella): Results of studies have suggested that there is an increased risk of varicella zoster activation and reactivation in people with diabetes, and that diabetes can significantly lower the immunity to the viral infection^{2 3}.
- Diabetes also seems to be a risk factor for community-acquired pneumococcal bacteremia⁴.

Vaccinations and children with type 1 diabetes

Increased rates of vaccinations in child care settings will decrease the likelihood of any child, including any child with type 1 diabetes, from being exposed to the relevant viral infections.

While vaccinations for children with type 1 diabetes will help to protect them against contracting a disease, there is evidence to suggest that some people with type 1 diabetes who receive vaccinations have a less effective immunity response than people without diabetes⁵. This increases the importance of children without diabetes themselves having immunity and not spreading the illness.

Links between diseases and diabetes

Quite apart from the impact of the illnesses and their own severity, there is ongoing investigation into the causality of diseases such as mumps, rubella, rotavirus, pertussis and polio on type 1 diabetes.

There have been studies which have suggested a causal link between mumps and type 1 diabetes. A Finnish study⁶ found that the decrease in the incidence of mumps following a vaccination program also resulted in a decreased rate of type 1 diabetes in children to an extent. Mumps antibody levels declined in children with type 1. This was interpreted as a causal link between mumps and subsequent diagnosis of type 1 diabetes following pancreatic damage.

An Italian study⁷ also found a significant link between type 1 diabetes incidence and mumps, and to a lesser extent, rubella.

Pertussis (Whooping cough) has been indicated by research to increase the risk of subsequent development of Type 1 diabetes.⁸

² Wolf, J; Nagel, MA; Mahalingam, R; Cohrs, RJ; Schmid, DS and Gilden, D: (2012) Chronic active varicella zoster virus infection. *Neurology*. 2012 Aug 21; 79(8): 828–829.

³ Okamoto, S; Hata, A; Sadaoka, K; Yamanishi, K; and Mori, Y. (2009) Comparison of varicella-zoster virus-specific immunity of patients with diabetes mellitus and healthy individuals. *Journal of Infectious Diseases* 2009 Nov 15;200(10):1606-10. doi: 10.1086/644646

⁴ Thomsen, RW; et al. (2004) Risk of Community-Acquired Pneumococcal Bacteremia in Patients With Diabetes: A population-based case-control study. *Diabetes Care*. May 2004 27:5 1143-1147; doi:10.2337

⁵ Eibl, N; Spatz, M; Fischer, GF; Mayr, WR; Samstag, A; Wolf, HM; Schernthaner, G; and Eibl, MM. (2002). Impaired primary immune response in type-1 diabetes: results from a controlled vaccination study. *Clinical immunology*. 2002 Jun;103(3 Pt 1):249-59.

⁶ Hyöty, H; et al; and the Childhood Diabetes in Finland Study Group. (1993) Decline of mumps antibodies in Type 1 (insulin-dependent) diabetic children and a plateau in the rising incidence of Type 1 diabetes after introduction of the mumps-measles-rubella vaccine in Finland. *Diabetologia*. December 1993, Volume 36, Issue 12, pp 1303-1308

⁷ Ramondetti, F; et al; and RIDI Study Group. (2012) Type 1 diabetes and measles, mumps and rubella childhood infections within the Italian Insulin-dependent Diabetes Registry. *Diabetic Medicine*. 2012 Jun;29(6):761-6. doi: 10.1111/j.1464-5491.2011.03529.x

⁸ Montgomery, SM; Ehlin, AG; Ekblom, A; and Wakefield, AJ (2002) Pertussis infection in childhood and subsequent type 1 diabetes mellitus. *Diabetic Medicine* 2002 Dec;19(12):986-93.

Rotavirus can potentially accelerate the development of type 1 diabetes in children predisposed to the condition⁹, by allowing rogue immune cells to attack the pancreas. Some research has gone further to draw a direct link between rotavirus infection and the induction of type 1 diabetes¹⁰.

Encouraging vaccination through measures such as those provided in this Bill could then have an additional benefit in causal factors of type 1 diabetes.

Risks of discrimination

Diabetes Queensland would like to see the legislation clearly explained to child care providers to ensure it cannot be used in ways other than intended.

As child care is non-compulsory, application procedures are more fluid than for school based education.

Diabetes Queensland is aware of cases where children have been refused enrolment at child care centres because they have had type 1 diabetes and required medical supervision.

In the view of Diabetes Queensland, this amounts to discrimination.

While the legislation sets out the relationship between the provisions and the immunisation schedule, Diabetes Queensland does not want to see this legislation used as a basis for excluding children with medical conditions including diabetes. Because the legislation operates on the protection of a centre from liability, it needs to be reinforced that this is not an acceptance of discrimination.

It is important that the guidance to centres is accompanied by strongly worded education that emphasises this relates solely to vaccination schedules.

Yours sincerely



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⁹ Pane, JA; Webster, NL; Coulson, BS (2014) Rotavirus Activates Lymphocytes from Non-Obese Diabetic Mice by Triggering Toll-Like Receptor 7 Signaling and Interferon Production in Plasmacytoid Dendritic Cells. *PLOS Pathogens*. 27 March 2014 DOI: 10.1371/journal.ppat.1003998

¹⁰ Ballotti, S; and de Martino, M/ (2007) Rotavirus infections and development of type 1 diabetes: an evasive conundrum. *Journal of Paediatric Gastroenterology and Nutrition* 2007 Aug;45(2):147-56.