



**Australian Government**

**Australian Institute of  
Health and Welfare**

*Authoritative information and statistics  
to promote better health and wellbeing*

## **Post Market Review of Products Used in the Management of Diabetes: review of insulin pumps**

### **Submission by the Australian Institute of Health and Welfare**

**February 2013**

The Australian Institute of Health and Welfare (AIHW) is pleased to contribute to Stage 2 of the Post Market Review of Products Used in the Management of Diabetes. Having recently reported on the national epidemiology of insulin pump use both overall and specifically among Australian youth, and having conducted the first nationally representative survey examining the experiences of insulin pump users in Australia, the AIHW's existing work may help inform several aspects of this review.

#### **The AIHW's existing work in this arena**

In 2011, the AIHW conducted the Insulin Pump User Survey, a national level survey of people with Type 1 diabetes using continuous subcutaneous insulin infusions ('insulin pumps'). The survey questionnaire included basic clinical and demographic characteristics, examination of the reasons for initiating pump therapy and the benefits, barriers and general experiences of using this mode of insulin delivery. The study population comprised people with diabetes registered with the National Diabetes Services Scheme (NDSS) who were eligible to purchase insulin pump consumables and had consented to be contacted for research purposes. As the survey had a national scope, sampled people of all ages (including those under 18 and eligible for subsidies), achieved a high response rate (59%) and a study sample that was generally representative of all eligible NDSS registrants, the findings of this survey are considered representative of the experiences of people using insulin pumps in Australia. This is the first time that such a study has been conducted in Australia. The key findings from the survey have been reported elsewhere (AIHW 2012a) and detailed additional analyses are forthcoming.

In addition to this qualitative assessment, the AIHW examined the number of people in Australia using insulin pumps and profiled their demographic and clinical characteristics using data from the NDSS (AIHW 2012a). The AIHW has also recently published a report specifically examining the epidemiology of diabetes in youth (AIHW 2012b); this report includes analyses of the prevalence of insulin pump use among people with diabetes aged 0-30 years, the diabetes-related products accessed by people with Type 1 diabetes who are and

are not using pumps for insulin delivery, and insulin pump fitting procedures in hospital among youth with Type 1 diabetes.

This submission to the Post Market Review of Products Used in the Management of Diabetes highlights only the major points from this body of work which are pertinent to the focus of the current review; the reader is referred to the source AIHW publications, *Insulin pump use in Australia* (AIHW 2012a) and *Diabetes among young Australians* (AIHW 2012b), for additional information. These are publicly available at [www.aihw.gov.au](http://www.aihw.gov.au).

### **Contextual background: demographic characteristics of insulin pump users in Australia overall**

As of 30<sup>th</sup> June 2011, there were 10,510 people (or approximately 10% of those with Type 1 diabetes) registered with the NDSS who had purchased one or more insulin pump consumables at some stage since January 2004. There were more female pump users (61%) than males. Approximately one in every two pump users were aged under 25 years; the proportion of people with Type 1 diabetes using a pump was highest among those aged 10-14 years and then decreased with age. There was also geographic variation - the proportion of people with Type 1 diabetes using a pump varied by state of residence, being highest for the Australian Capital Territory (15%) and lowest for the Northern Territory (7%), compared with the national average of 10%; and by residential area socio-economic status, being 6% among those residing in the most deprived areas compared with 14% among people with Type 1 diabetes living in the least deprived areas (AIHW 2012a).

Considering the date of first purchase of an insulin pump consumable as a proxy measure of the date of starting insulin pump therapy, the average number of people in Australia commencing insulin pump therapy each month increased over time, from 107 in 2004 to 140 in 2010. The proportion of people commencing insulin pump therapy within two years of being diagnosed with diabetes has also increased over time, from 7% of those diagnosed in 2004 to over 18% of those diagnosed in 2009 (AIHW 2012a).

### **Insulin pump use among youth with Type 1 diabetes in Australia**

Between January 2004 and July 2011, 7,333 people aged 0-30 years obtained insulin pump products from the NDSS, corresponding to 22% of NDSS registrants with Type 1 diabetes in this age group. Compared with those aged over 18 years, a greater proportion of people aged 18 years or younger at the time of first purchasing an NDSS product were using insulin pumps, as suggested by the purchase of insulin pump consumables.

It is not possible to comment on clinical parameters or outcomes based on the data analysed. However, using the volume of blood glucose test strips obtained as an indicator of frequency of self-monitoring of blood glucose levels, there appeared to be differences in monitoring among youth with diabetes based on diabetes type and mode of insulin delivery. People aged 0-30 with Type 1 diabetes who were using an insulin pump purchased more blood glucose test strips through the NDSS per month on average (158) than did people with Type 1 diabetes not using an insulin pump (105) or those with Type 2 diabetes (63) (AIHW 2012b). Detailed estimates of the average number of specific types of consumables obtained per month and by age group are available in the AIHW source publication.

## **Experiences of people with Type 1 diabetes using insulin pumps: Main relevant findings from the Insulin Pump Users Survey**

Of the 9,618 NDSS registrants who were eligible for the Insulin Pump Users Survey ('insulin pump users'), 5,680 responded to the survey, 95% of whom were using an insulin pump at the time of completing the questionnaire. Of note, compared with all insulin pump users in Australia, people aged 15-40 years were generally under-represented in the survey.

On average, survey respondents selected more benefits (average of five from a list of eight) than problems (average of one from a list of nine) associated with pump use. About 1% of survey respondents reported that they had not experienced any benefits with pump use, the majority of whom (69%) were no longer using a pump and had no intention of resuming pump therapy. One-third of respondents indicated that they had experienced no significant problems with insulin pump use.

The most frequently identified benefits were that insulin pump use fitted in with the respondent's lifestyle (selected by 86% of respondents); that pump therapy resulted in better diabetes control (83%); that relocating a pump cannula was better than having to administer multiple daily insulin injections (76%) and that pump use was convenient (71%). Of the benefits presented in the questionnaire, the least frequently selected option was that pump use resulted in improved hypoglycaemic awareness (29%). Many additional benefits were volunteered by respondents. These included ease during travel and with exercise, increased flexibility with meal times, and health benefits such as improved nocturnal glycaemic control, weight loss and improvements in diabetes complications. Some parents also reported behavioural improvements and other psychological benefits in their children, and that pumps were more acceptable to schools and childcare facilities. A number of respondents reported that pumps allowed improved glycaemic control during pregnancy; pregnancy was also a reason for some women choosing to initiate pump therapy, cited by 13% of female respondents aged 16 years and over.

The perceived benefits associated with insulin pump use varied with age. For example, those aged 12-24 years were less likely than other age groups to select improved diabetes control as a benefit of pump use, and more likely to cite that the pump fit in with their lifestyle, was discreet and convenient. The oldest respondents (those aged over 60 years) were more likely than those of other ages to report improved hypoglycaemic awareness and were less likely to report that the pump fitted in with their lifestyle.

Similarly, the number of problems associated with pump use varied with age, with older people reporting fewer problems than younger respondents. Overall, the most frequently reported problems were those of pump consumables being too expensive (32%), problems associated with relocating the cannula or tubing (16%) and a dislike of wearing the pump (15%). A small proportion of respondents indicated other technical issues with pump use. For example, 12% reported problems with air bubbles affecting insulin delivery, 6% that the pump kept breaking down, 1% indicated that the pump was difficult to use, and a number of respondents specified additional problems, including cannula site issues and discomfort while sleeping. Few respondents selected the options indicating they received inadequate support from the pump company (3%) or from their diabetes healthcare provider (5%). Some problems were reported by more females than males, and there was also variation in the type of problems reported by age. For example, compared with all other age groups, a smaller proportion of those aged 12-17 years indicated that they received inadequate support; young people aged 0-11 and 12-17 years also were least likely to report that the cost of pump consumables was problematic. However, these groups reported the highest rates of

difficulties with air bubbles impacting on insulin delivery. Reports of pump breakdown were highest in those aged 12-24 years.

The questionnaire asked respondents if they have had to present to an Emergency Department or have been admitted to hospital specifically for their diabetes management while using an insulin pump. Overall, 23% of respondents indicated that they had, with a greater proportion of females (25%) than males (20%) requiring this form of acute care. Younger people had higher rates of presentation than those aged over 25 years, with 27% of 0-11 year-olds, 25% of 12-17 year-olds and 31% of 18-24 year olds presenting to Emergency or being admitted. Notably, it is not possible to ascertain from the survey any clinical details such as the presenting problem or discharge diagnosis, or to differentiate between those who did and did not require an inpatient admission.

Of the 5% of survey respondents who were not using a pump for insulin delivery at the time of completing the questionnaire, the most commonly cited reasons for discontinuing pump therapy were a dislike of wearing the pump (50%), experiencing little or no improvement in diabetes control (30%), problems relocating the cannula or tubing (29%) and wanting a break from pump use (29%). Other reasons volunteered by survey respondents included cannula site problems, lifestyle factors such as holidays, and intermitting pump therapy at the recommendation of a healthcare provider or because of healthcare access issues (e.g. to healthcare providers familiar with pumps). Of those who were not currently using a pump, 42% had no intention of resuming pump therapy again.

## Summary

In summary, the AIHW has profiled the epidemiology of insulin pump use in Australia. Additionally, the AIHW's Insulin Pump User Survey provides the first national snapshot of the experiences of people with Type 1 diabetes using continuous subcutaneous infusions for insulin delivery. Among other details, the survey has identified both the barriers and perceived benefits associated with insulin pump use, and as such may help inform the current review into insulin pump use in Australia. Full details of the survey methodology and results can be found in the *Insulin pump use in Australia* report, and details of pump use among youth with diabetes can be found in the *Diabetes among young Australians* report, both of which are available on the AIHW website ([www.aihw.gov.au](http://www.aihw.gov.au)).

## REFERENCES:

AIHW (Australian Institute of Health and Welfare) 2012a. Insulin pump use in Australia. Diabetes series no. 18. Cat. no. CVD 58. Canberra: AIHW.

Australian Institute of Health and Welfare 2012b. Diabetes among young Australians. Diabetes series no. 18. Cat. no. CVD 59. Canberra: AIHW.