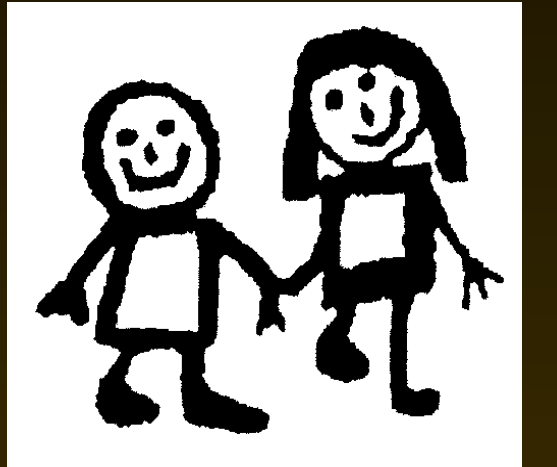


Outcomes of a rural model of extended adolescent diabetes care to mid 20s without transition to adult services



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Background

Transition of adolescents to adult diabetes services is a difficult resource intensive process that frequently results in poor clinic attendance, poor glycaemic control and recurrent hospital admissions. Recommended transition resources include a case manager, a preparation period, coordinated transfer, availability and choice of adult provider, joint consultations, accessible documentation, maintenance of contact after transfer and psychosocial support. (1) Ending paediatric diabetes team care is usually imposed by bureaucratic decisions that restrict the access to diabetic youth on an age basis, frequently 16 or 18 years. However this coincides with the developmental stage of emerging adulthood and the recognised problems of transition away from the parental home geographically, economically and/or emotionally. (2) It is seen as the “perfect storm” for chronic disease and the time of greatest risk of death for young people with diabetes. (3) A literature search failed to find any described outcomes of models of extended adolescent diabetes care by a paediatric team.

Gippsland Paediatrics manages most diabetic youth and emerging adults in an Australia rural region comprising about 95,000 people. The extended adolescent management model was consistent with our “RADICAL” (Rural Australian Diabetes Inspiring Control Activity and Lifestyle) model (4), with

- Co-location of multidisciplinary team,
- Point of care HbA1c,
- Case meeting between professionals (including psychologist) after each clinic,
- utilization of modern technology including insulin pumps and continuous glucose monitoring.

Since establishing the multidisciplinary care team approach in 2006, we have deliberately offered all patients extended adolescent care into mid 20's in order to support them through their time of greatest risk. We have also welcomed new patients diagnosed with T1DM under 25 years.

The team have offered a variety of options for the emerging adult.

- Allocation to 3 monthly clinics with paediatrician and diabetes educator
- Flexibility on visit dates, extra visits as required and for pump and CGM
- Forward planning with dates for their next 4 appointments
- Selective offering of emotional health support through psychologist
- Dietician care utilised as required
- Partners and support persons welcomed to appointments.
- Direct phone access to paediatrician and diabetes educator.
- Phone, email and additional videoconference appointment follow up
- Minimal cost except if non attendance without sufficient notice
- Reminder phone calls 5 days before appointment
- Continual efforts to re-engage non-attendees through phone or SMS
- Commitment to the patient long term through good and bad times
- Team attitude authoritative and supportive but not judgemental

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Aim

The purpose of this study was to evaluate a model of extended adolescent diabetes care by the paediatric multidisciplinary team that purposefully did not encourage transition to adult care until beyond their mid 20s.

Methods

This observational study examined how emerging adults over 18 years responded to our RADICAL model of extended adolescent care in terms of glycaemic control, adherence to follow up and complications of diabetes.

Eligible patients were late adolescents over 18 years with T1DM. All were managed exclusively by the Gippsland Paediatric Diabetes multidisciplinary team. All lived locally initially though during the study period some relocated to other parts of the state for tertiary studies or work. The study period was from early 2007 to the third quarter of 2013.

The average and median HbA1c for the cohort was measured annually over the 2007-2013 period. The mean and median HbA1c per year of birthday was also measured. The method of insulin delivery was recorded.

Medical records were analysed to determine attendance rates to the diabetes clinic appointments and frequency of missed appointments without notice.

The number of hospital admissions with diabetic ketoacidosis or diabetes related illnesses, excluding pregnancy, was measured.

We measured the rate of severe hypoglycaemia requiring assistance with glucagon, including loss of consciousness, seizure or motor vehicle accident.

We recorded incidence of retinopathy, hypertension and persistent microalbuminuria.

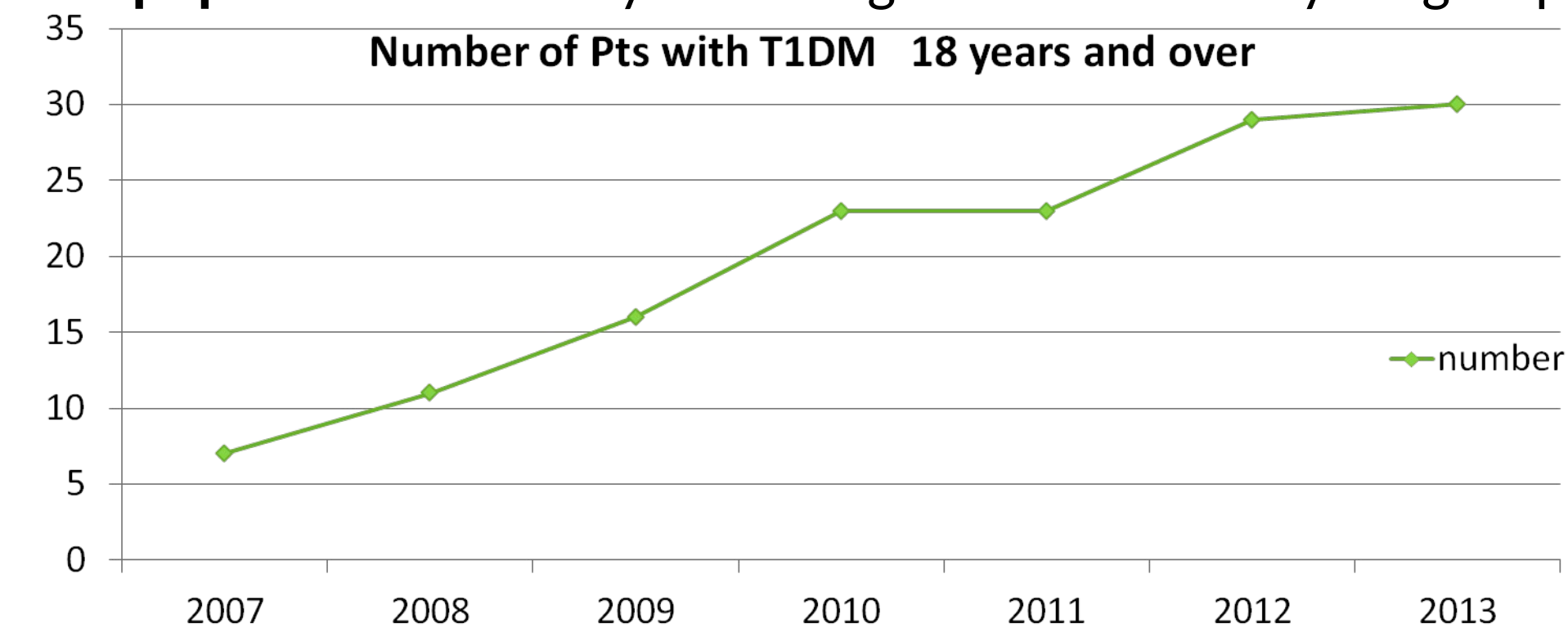
We recorded how many patients had relocated from their home town, the number that had elected to remain with the clinic even if located elsewhere and the number that returned to clinic care after being absent for one year.

Results

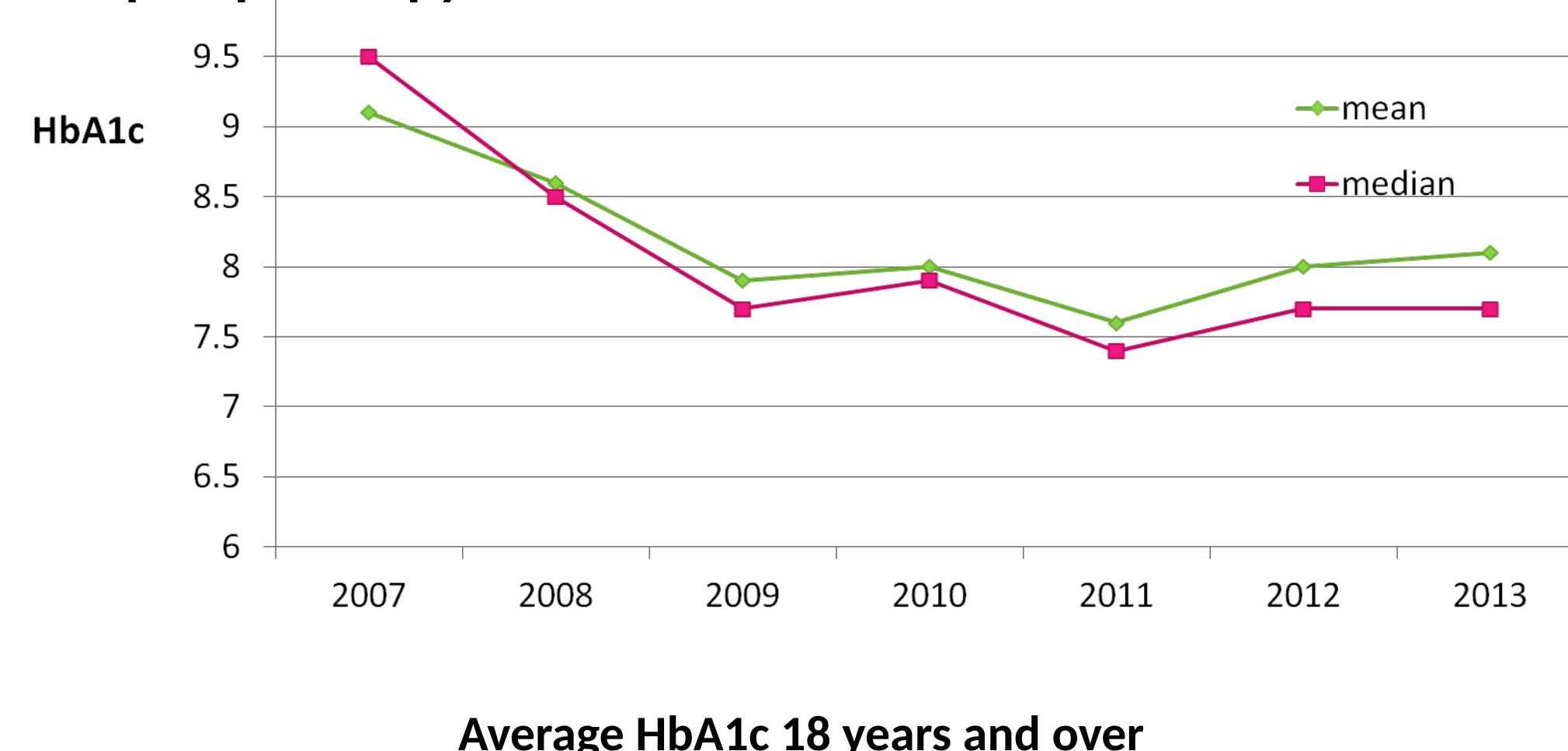
32 patients (10 female, 22 males) now aged 18 to 29 years comprise the cohort of extended adolescent care. Two patients have been transferred to ongoing adult care (at ages 24 and 25) leaving 30 current patients, 4 of whom are now over 25 years.

No patient has been lost to follow up though 4 have required active chasing after missing 3 consecutive 3 monthly appointments. The average duration of diabetes within the cohort at the start of 2013 was 12.35 years \pm 4.6, (median 13 years).

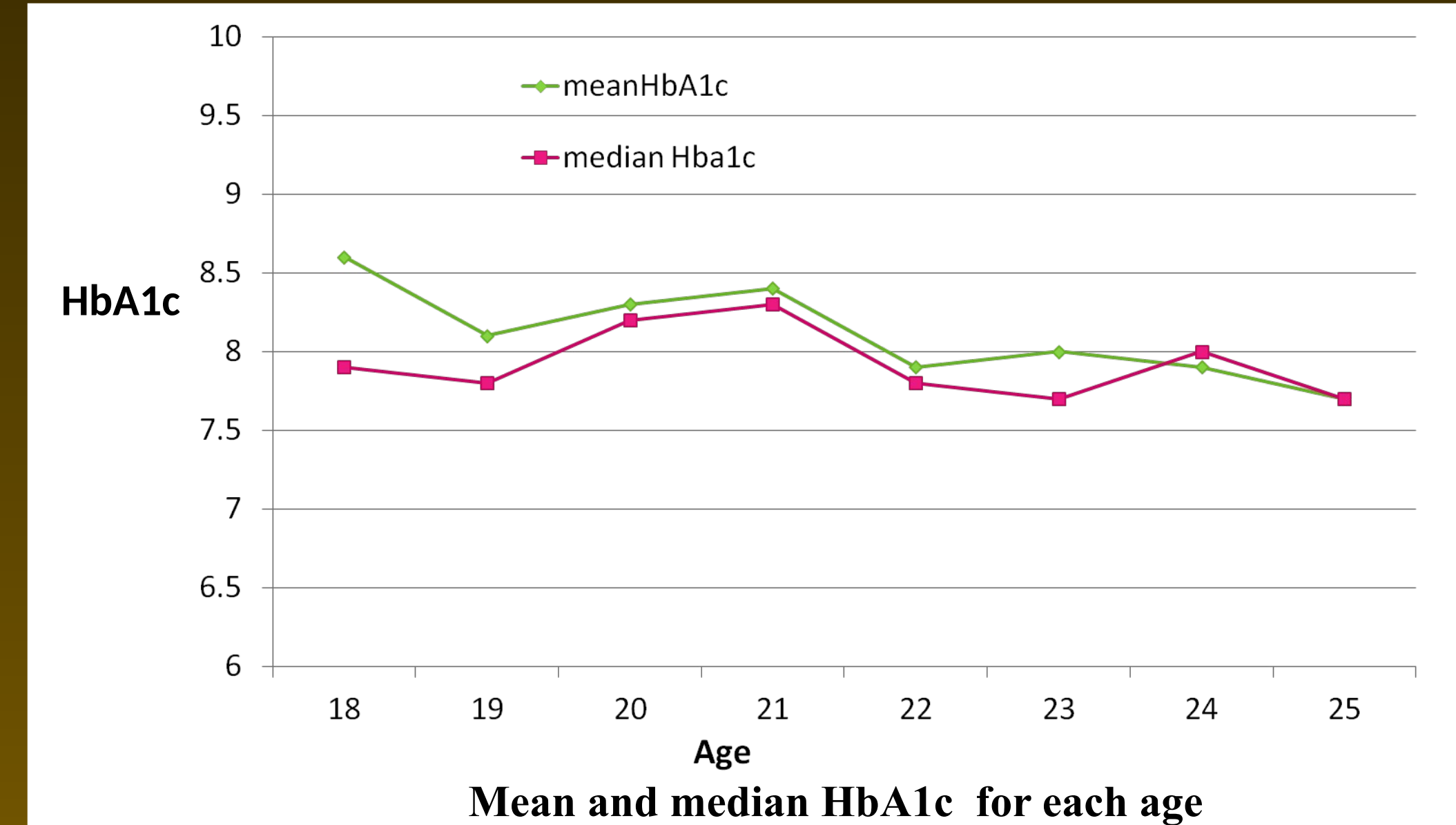
The number of patients in the clinic in the young adult group gradually grew from inception of the model in 2007. We estimate the clinic cares for about **90% of the T1DM population** currently in the region in the 18-25 year group.



Attendance to clinic or medical appointment averaged **5.0 visits per year** missing **scheduled appointments** at an overall rate of **0.49 per year**. 7/32 (84%) have been managed with insulin pump therapy. One patient, a female aged 21 years had insulin pump therapy ceased following poor compliance resulting in an episode of diabetic ketoacidosis. Hence 26/32 (81%) or 24/30 (80%) of current patients remain on insulin pump therapy.



The **median HbA1c** since 2009 of the group 18 and over has consistently remained **under 8%** with whilst **mean HbA1c** has fluctuated **around 8%**. Target HbA1c of <7.5% has been achieved by 38-57% patients over the past 4 years.



The trend for glycaemic control showed a “bump” in the 19-21 year age group settling at 22 years and beyond with mean and median HbA1c both less than 8%.

Hospital admission rate was 4.3 (6/139) per 100 patient years. All admissions were with DKA – one female was admitted twice with DKA during the period. There were **no deaths**.

3 patients required assistance for **severe hypoglycaemia** representing **2.1 per 100 patient years**.

7/30 (23%) have significant ongoing **mental health issues** (anxiety, depression or bipolar disorder).

8/32 (25%) **have moved** from their home town over the years, mostly to the capital city Melbourne over 200km away. **All have elected to return for ongoing follow up**. 6/32 returned to the clinic after over 1 year absence.

Management of 3 pregnant females was through shared care with a physician specialising in diabetes and pregnancy. One patient has mild retinopathy, one has persistent microalbuminuria requiring treatment and one has mild hypertension.

Year	2007	2008	2009	2010	2011	2012	2013
HbA1c av	9.1	8.6	7.9	8.0	7.6	8.0	8.1
SD	1.2	0.96	0.93	1.49	0.74	1.56	1.6
Median	9.5	8.5	7.7	7.9	7.4	7.7	7.7
Numbers	7	11	16	23	23	29	30
HbA1c <7.5%	0	1	6	10	13	13	12
% HbA1c <7.5%			38%	44%	57%	45%	40%

Conclusion

➤Our extended adolescent care model has resulted in good adherence to follow up, few hospital admissions and reasonable glycaemic control in a difficult patient group.

➤The model of maintaining paediatric multidisciplinary team care until mid 20s provides a solution to known difficulties with traditional transition to adult care models through this age group.