From: Alicia Jenkins
To: Committee, Health (REPS)

Subject: RE: [SEC=OFFICIAL] RE: [EXT] - RE: Files relevant to request re technology use benefits for people with Type 1 diabetes from Baker Heart and Diabetes Institute team
Date: Monday, 18 December 2023 11:15:47 AM

OFFICIAL

Dear Kate,
On behalf of the Baker team (Prof Jonathan Shaw and A/Prof Neale Cohen) please find attached the requested bibliography related to the previously sent 4 PDFs.

All the best,
Alicia

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I acknowledge the Traditional Owners of the land on which Baker Institute (Melbourne) resides, the Boon Wurrung peoples of the Yaluk-ut Weelam clan. I pay my respects to all elders past, present and future.

Panel Pledge
I stand for gender diversity at every forum

Bibliography related **to glycaemia and technology use for people with Type 1 diabetes related to manuscripts submitted by the Baker Heart and Diabetes Institute team (Jenkins A, Cohen N, Shaw J).**

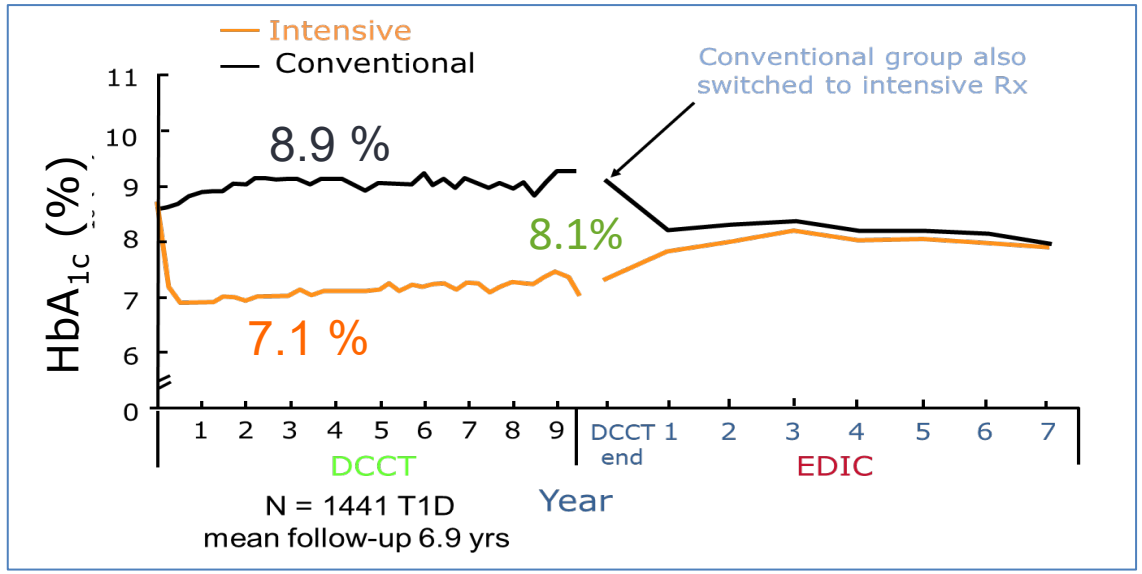
1: Nathan DM. Realising the long-term promise of insulin therapy: the DCCT/EDIC study. *Diabetologia. 2021* May;64(5):1049-1058. doi: 10.1007/s00125-021-05397-4. Epub 2021 Feb 6. PMID: 33550441.

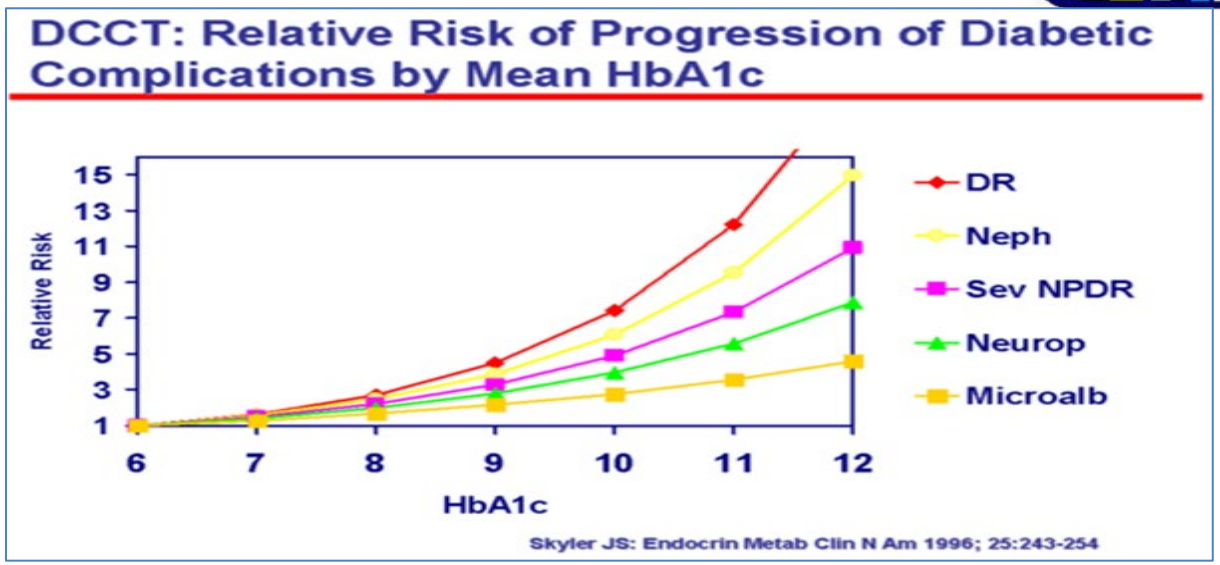
2: Zabeen B, Craig ME, Virk SA, Pryke A, Chan AK, Cho YH, Benitez-Aguirre PZ, Hing S, Donaghue KC. Insulin Pump Therapy Is Associated with Lower Rates of Retinopathy and Peripheral Nerve Abnormality. *PLoS One. 2016* Apr 6;11(4):e0153033. doi: 10.1371/journal.pone.0153033. PMID: 27050468; PMCID: PMC4822832.

3: Steineck I, Cederholm J, Eliasson B, Rawshani A, Eeg-Olofsson K, Svensson AM, Zethelius B, Avdic T, Landin-Olsson M, Jendle J, Gudbjörnsdóttir S; Swedish National Diabetes Register. Insulin pump therapy, multiple daily injections, and cardiovascular mortality in 18,168 people with type 1 diabetes: observational study. *BMJ. 2015* Jun 22;350:h3234. doi: 10.1136/bmj.h3234. PMID: 26100640; PMCID: PMC4476263.

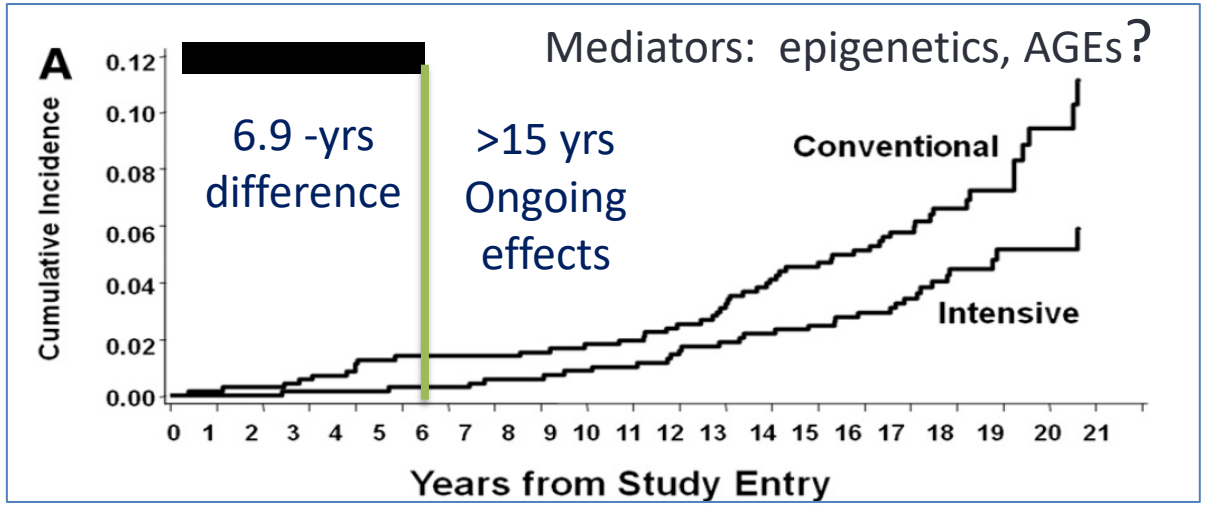
4. Virk SA, Donaghue KC, Wong TY, Craig ME. Interventions for Diabetic Retinopathy in Type 1 Diabetes: Systematic Review and Meta-Analysis. *Am J Ophthalmol. 2015* Nov;160(5):1055-1064.e4. doi: 10.1016/j.ajo.2015.07.024. Epub 2015 Jul 23. PMID: 26210869.

DCCT Trial: Less Long-term Complications With Better HbA1c
EDIC Observation: Metabolic Memory





Complication	↓ in DCCT	↓ in EDIC
Retinopathy	26 – 76 %	72 – 77%
Nephropathy	39 – 54 %	53 – 82 %
CVD	41% (n.s)	42%

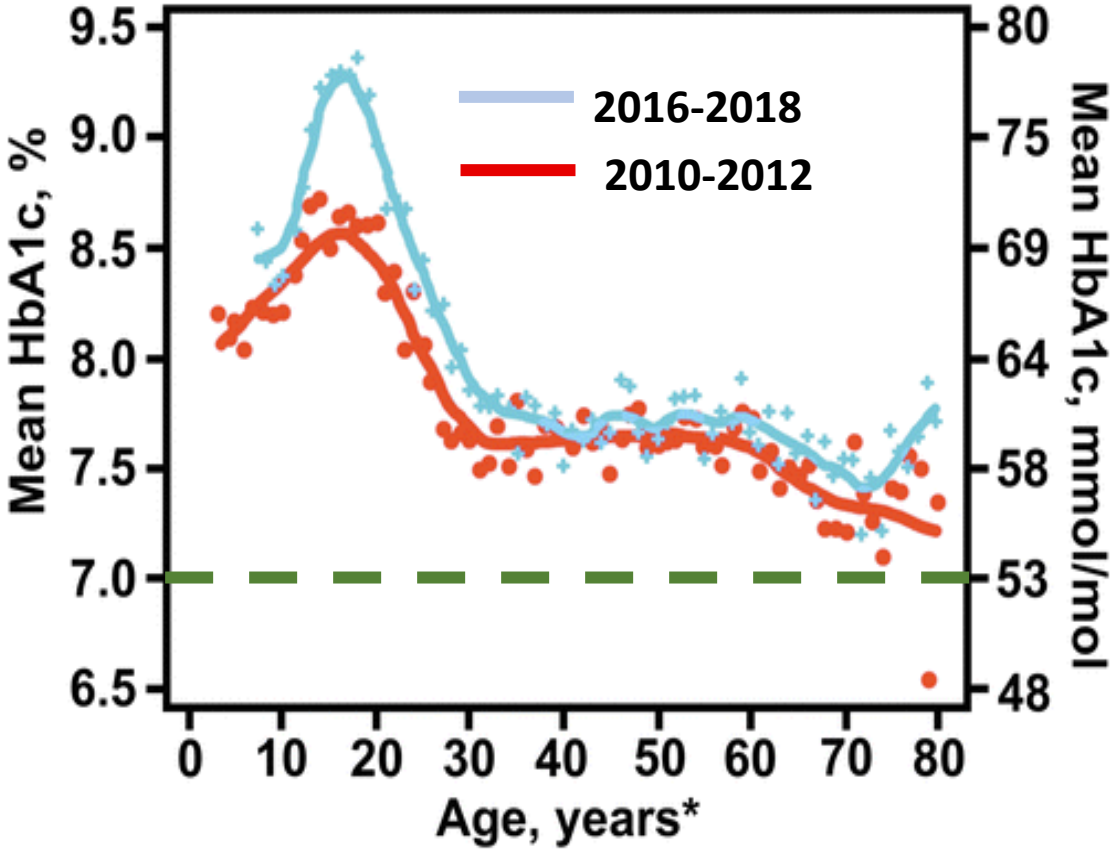


DCCT: NEJM 1993; Diabetes 1995; N Engl J Med; DCCT/EDIC NEJM 2015; DCCT Diab Care 2014

UKPDS, Germandy Cardiovasc Diabetology Gaede P NEJM 2008

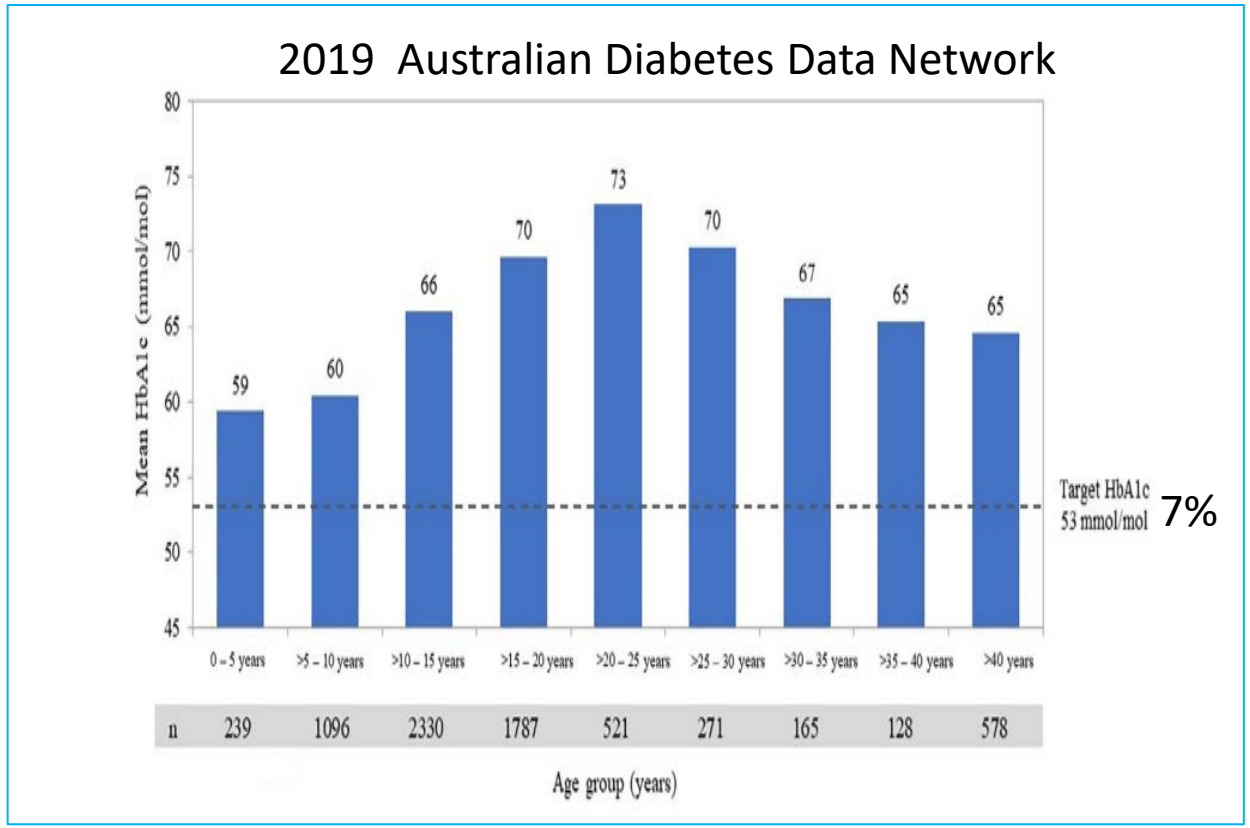
Suboptimal Mean HbA1c (>7%) in T1D All Ages

USA and Australia



N = 22,697 US T1D Exchange

Foster et al. Diabetes Tech. + Therapeutics. 2019

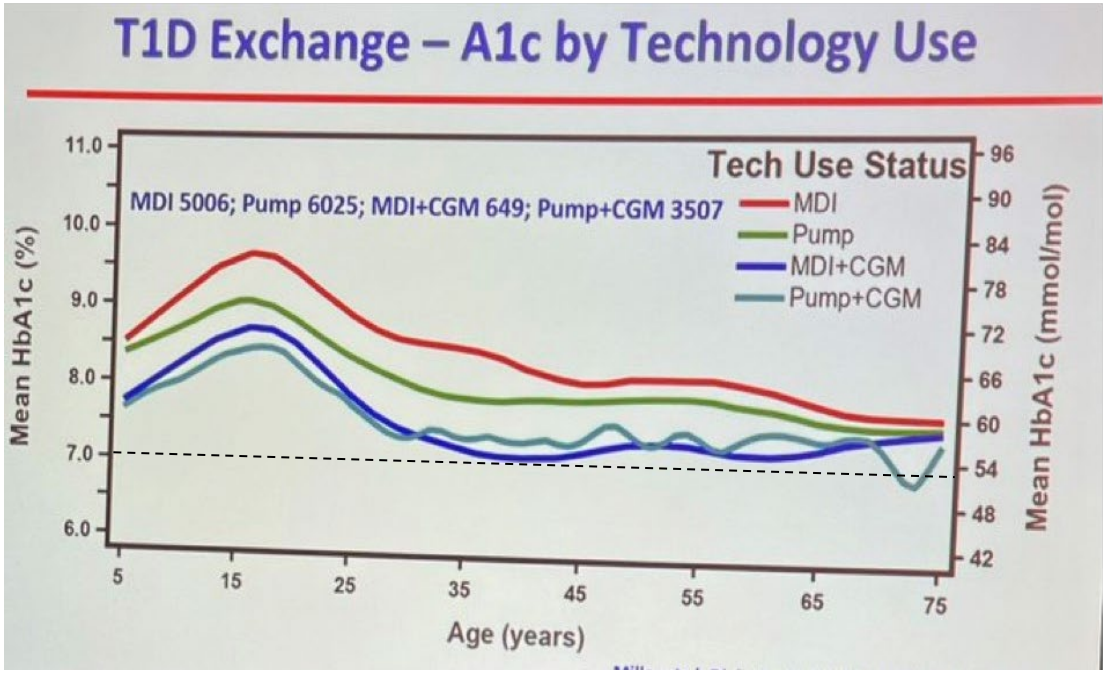


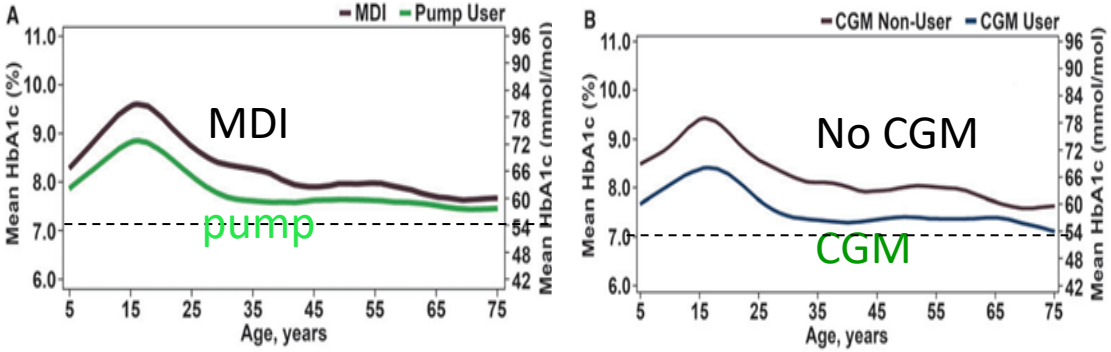
N = 7988, median (IQR) age 15.3 (10) yrs, yrs T1D 5.7 (9.4)
Mean HbA1c 8.2 % HbA1c <7% in 18% youth, 13% adults
36% CSII: mean (SD) HbA1c 8.0 (1.3) vs 8.3 (1.7) %, p <0.001

Pease A, Diab Res Clin Prac 2020

Better HbA1c With Technology Use At All Ages

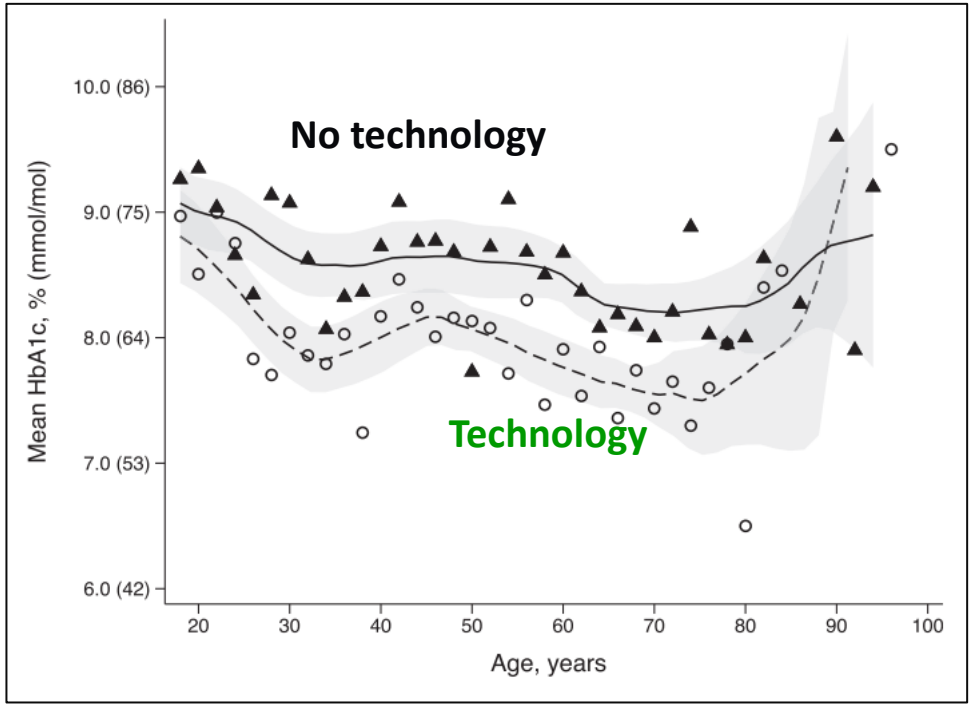
USA





Miller et al. Diab Technol Ther 2020

Australia



N = 1693, 27% pumps, 23% CGM

	HbA1c % Mean (SD)
CGM alone	8.3 (1.6)
Pump alone	8.2 (1.4)
Pump + CGM	7.8 (1.4)
No technology	8.6 (1.8)

Pease A, Diabetes Research Clinical Practice, 2021

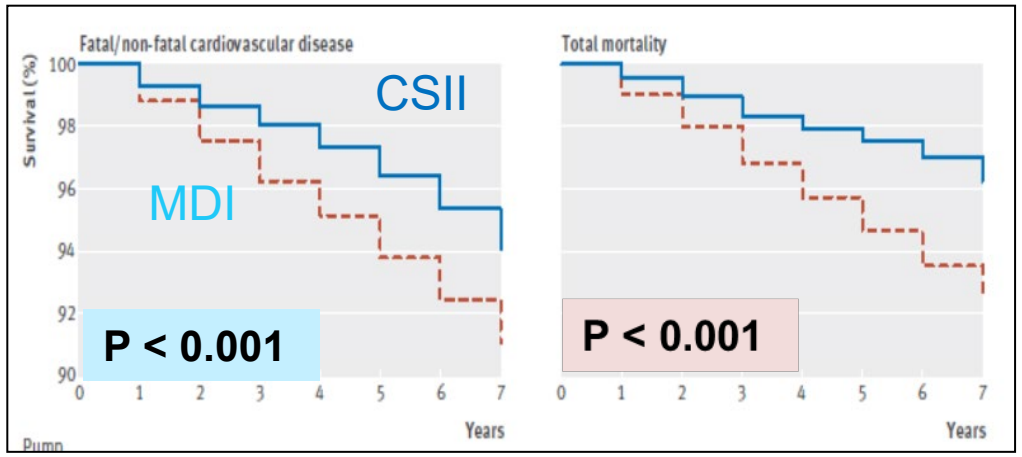
Less Vascular Complications With CSII Use in T1D Even For the Same Mean HbA1c

Insulin pump therapy, multiple daily injections, and cardiovascular mortality in 18 168 people with type 1 diabetes: observational study

BMJ 2015

Isabelle Steineck,[1] Jan Cederholm,[2] Björn Eliasson,[3] Araz Rawshani,[4] Katarina Eeg-Olofsson,[3] Ann-Marie Svensson,[4] Björn Zethelius,[5,6] Tarik Avdic,[4] Mona Landin-Olsson,[7] Johan Jendle,[8] Soffia Gudbjörnsdóttir[3,4] the Swedish National Diabetes Register

- 2441 on CSII vs 15727 MDI
- mean 6.8 yrs follow-up, similar HbA1c
- **HR 0.55** (95% CI 0.36 to 0.83) fatal CHD
  0.58 (0.40 to 0.85) fatal CHD or stroke
  0.73 (0.58 to 0.92) all cause mortality



- CSII less hospitalisations ≥3 severe hypos

Diabetic Retinopathy

- Meta-analysis 24 studies, n = 9302
- Incident DR less with CSII
  RR 0.45; 95% CI 0.24-0.83
  independent of HbA1c

Virk S, Am J Ophthalmol 2015

Prospective Observational Study

- n=989, age 12 – 20 y, T1D > 5y
- Equal HbA1c ≈ 8.7%
- **Diabetic Retinopathy**

  OR 0.66; 95% CI 0.45-0.95
- Peripheral neuropathy
  - **OR 0.63**; 95% CI 0.42-0.95
  - Both p < 0.03

Zabeen B, Plos One 2016

Why Less Complications With CSII vs MDI?

- Lower insulin dose – often 20 – 30% less than on MDI

- Better HbA1c
- Less hypoglycaemia
- Less glucose variability

- Less inflammation and oxidative stress?

Scott E, Januszewski A et al. BMJ Open 2019; Scott E et al Diab Metab 2020, McAuley S, Diabetes Care 2020

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