

NOVEMBER 2019

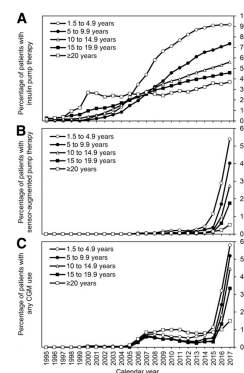
Diabetes Care®

In This Issue of
Diabetes Care

By Max Bingham, PhD

Increasing Usage of Insulin Pump Therapy and CGM in Germany and Austria 1995–2017

The use of insulin pump therapy by patients with type 1 diabetes in Germany and Austria has risen from 1% in 1995 to 53% in 2017, according to van den Boom et al. (p. 2050). A similar pattern exists in relation to continuous glucose monitoring (CGM), with just 3% using the approach in 2006 while 38% used it in 2017. The observations come from a population-based cohort study involving just under 100,000 individuals with type 1 diabetes. The authors looked at the use of pump therapy, CGM, and daily self-monitoring of blood glucose according to year and different age-groups. They describe how increasing use of pump therapy first emerged in 1998 in adults, then slowed in subsequent years, but was then followed by much younger users emerging in 2004 with a rapid increase in use in subsequent years. Similar patterns are also apparent for sensor-augmented pumps. In terms of CGM use, the authors describe how the approach was used initially over short periods and mainly for diagnostic purposes, but this was followed by a strong increase to the point where 58% of preschoolers with type 1 diabetes used CGM in 2017. They suggest that developments in the technologies over the years and also changes in regulations and reimbursement policies may be factors explaining the trends and the notable improvements in glycemic control that they report. They also suggest the findings may have implications for future patient care, noting that advances in closed-loop insulin delivery systems continue at pace. Commenting further, author Beate Karges told *Diabetes Care*: “Future studies are warranted to confirm the potential benefits of CGM technology in real-life settings. This includes the improvement of glycemic control in terms of lower HbA_{1c} levels and increased time in range, and also the reduction of severe hypoglycemia and ketoacidosis events.”

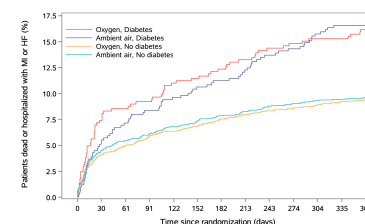


Temporal trends of insulin pump therapy (A), sensor-augmented pump therapy (B), and CGM use (C) between 1995 and 2017.

van den Boom et al. Temporal trends and contemporary use of insulin pump therapy and glucose monitoring among children, adolescents, and adults with type 1 diabetes between 1995 and 2017. *Diabetes Care* 2019;42:2050–2056

No Effect of Oxygen Therapy for Acute Myocardial Infarction Even in Cases of Diabetes

Oxygen therapy in myocardial infarction (MI) has no effect on a composite measure of 1-year all-cause mortality and rehospitalization for MI or heart failure, according to Nyström et al. (p. 2032). This was irrespective of underlying diabetes, although in such cases there was a 60% increase in relative risk of the composite end point in comparison with patients without diabetes. Consequently, the authors suggest that it seems reasonable and safe to withhold routine supplemental oxygen in patients with MI, including patients who also have diabetes. The conclusions are the result of a subanalysis of the Determination of the Role of Oxygen in Suspected Acute Myocardial Infarction (DETO2X-AMI) trial, which originally showed that oxygen therapy was not associated with reduced mortality in acute MI. In this more focused analysis, the authors looked at just over 5,000 individuals with confirmed MI at discharge with about half assigned to oxygen or ambient air at admission for MI. Of these, 934 individuals had diabetes at admission, again with about half assigned to oxygen or air. They found that just over 16% of individuals with diabetes and acute MI experienced the composite end point within a year of initial admission irrespective of whether they received oxygen or ambient air. In terms of individual end points, they found rates between 4.1% and 7.4%, but again there were no differences according to treatment groups. In patients without diabetes, the composite end point was reached in ~9.5% in both treatment groups, while individual end points were met in 2.7% and 4.8% of cases with no difference between the treatment groups. Commenting further, author Robin Hofmann said: “Despite the fact that the incidence of cardiovascular outcomes generally has declined substantially over the last few decades, we still observed markedly increased event rates in individuals with diabetes irrespective of oxygen treatment. With the new antidiabetic medications with proven safety and efficacy available now, we are obliged to do better for these high-risk patients.”



Percentage of patients with composite end point of mortality and rehospitalization for myocardial infarction or heart failure over 365 days.

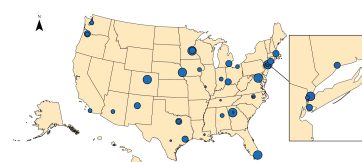
Nyström et al. Oxygen therapy in myocardial infarction patients with or without diabetes: a predefined subgroup analysis from the DETO2X-AMI trial. *Diabetes Care* 2019;42:2032–2041

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Baseline Characteristics of GRADE Study Are Broadly Reflective of U.S. Patients With Type 2 Diabetes

The baseline characteristics of participants in GRADE (Glycemia Reduction Approaches in Diabetes: A Comparative Effectiveness Study) are reflective of the U.S. patient population with type 2 diabetes treated with metformin alone, according to Wexler et al. (p. 2098). That means the study has successfully met its first goal of enrolling a generalizable sample and can now continue to assess the primary goal of the trial. This was to compare the effectiveness of four diabetes medications that can be added to metformin to improve glucose-lowering outcomes. The authors describe GRADE as a 36-center unmasked, parallel treatment group, randomized controlled trial that includes participants aged ≥ 30 years at diagnosis with a duration of diabetes of less than 10 years and HbA_{1c} 6.8–8.5%. The participants also needed to have a prescription for metformin monotherapy. They were then randomized to one of the four second-line therapies with a planned or estimated follow-up of ~ 5 years. They report that just over 5,000 participants were enrolled with a mean age of ~ 57 years and nearly two-thirds were male (reflecting the inclusion of 10 Veterans Affairs centers). Mean BMI was 34.3 kg/m², and metformin dose was just under 2,000 mg/day. Over two-thirds of the cohort reported a history of hypertension, and nearly three-quarters reported a history of hyperlipidemia. A total of 6.5% of the cohort had a history of heart attack or stroke. To then assess whether the cohort is representative of the wider U.S. diabetes community, they applied the inclusion criteria from GRADE to a similar cohort from the National Health and Nutrition Examination Survey (NHANES) and found that baseline characteristics were very similar. Commenting further, author Deborah J. Wexler told *Diabetes Care*: “This study demonstrates that GRADE has recruited a cohort of patients in the relatively early stage of diabetes. The majority of recent large diabetes studies have enrolled patients at more advanced stages of disease, with prevalent cardiovascular and even advanced renal disease. Therefore, in addition to reporting on the comparative effectiveness of commonly used diabetes medications over time, GRADE will shed light on the progression of type 2 diabetes and its complications over time in the modern treatment era.”



Map of GRADE clinical centers in the U.S.

Wexler et al. Baseline characteristics of randomized participants in the Glycemia Reduction Approaches in Diabetes: A Comparative Effectiveness Study (GRADE). *Diabetes Care* 2019;42:2098–2107

Hong Kong: Care Quality Improvement Programs for Diabetes See Success

A series of quality improvement programs implemented in the Hong Kong health care system has resulted in improved trends associated with diabetes and its complications, according to Chan et al. (p. 2022). In particular, they describe how a combination of randomized controlled trials, real-world data, specific staff training, and patient outreach and interaction has resulted in a string of improvements in the care of patients with diabetes. This includes marked reductions in cardiovascular events and deaths but also improved trends in key risk factor markers such as HbA_{1c}, blood pressure, and LDL cholesterol. The authors detail their initial success in the late 1980s with the use of a structured approach to care and follow-up of patients that centered on using a personalized approach. They describe how they moved away from usual care—particularly in the context of overcrowded settings and uncertain adherence—and found that over the years far fewer patients died in the structured care group compared to usual care. From this initial success, they describe how data became central to their approach and how standardizing workflows and data collection led to the establishment of the Hong Kong Diabetes Register (HKDR). This served to provide patients and caregivers with better information on disease developments, but crucially that meant wider research could be completed on risk factors and trends that could feed into improved care. They also describe developments that included linking with electronic medical records and the establishment of a series of programs that included the Joint Asia Diabetes Evaluation (JADE) Program and Risk Assessment and Management Program for Diabetes Mellitus (RAMP-DM). According to the authors, the combined approaches have resulted in a reduction of 30% to 60% of major events linked to diabetes and also major cost reductions. Author Juliana C.N. Chan previously told *Diabetes Care*: “By changing the practice environment to implement protocol-driven risk assessment and stratification and care triage, using trained health care professionals and personalized reports to provide feedback, we can reduce clinical inertia and improve self-management. To date, more than [400,000] people with diabetes have undergone these structured assessment and management programs in the public care setting.”

Chan et al. From Hong Kong Diabetes Register to JADE Program to RAMP-DM for data-driven actions. *Diabetes Care* 2019;42:2022–2031

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