A narrative synthesis for Germany

Fields of action for nationwide diabetes care amid rising prevalence and workforce shortage

The German health care system faces considerable financial and structural challenges, to which non-communicable chronic diseases – in particular type 2 diabetes mellitus (T2DM) – contribute significantly. Currently, around 9.3 million people in Germany live with (diagnosed) T2DM, and an estimated further 2 million cases remain undetected. Annual incidence is around 450,000 new cases. T2DM accounts for 95% of all diabetes cases – the prevalence of type 1 diabetes mellitus (T1DM) is considerably lower at 375,000 cases.[1,2] According to the German Center for Diabetes Research (DZD), around one in five deaths in Germany (approx. 16%) is associated with T2DM or its comorbidities, especially cardiovascular diseases.[3] Direct expenditure on diabetes amounted to EUR 9.7 billion in 2023.[4] Of greater health economic importance, however, are the medium- and long-term costs of diabetes-associated comorbidities, which account for 67% of total T2DM costs.[5] Total annual direct costs currently amount to EUR 36.1 billion, plus indirect costs, for example from incapacity to work or early retirement.[2] The number of people with diabetes is projected to rise to about 12 million by 2040.[1] Reasons include demographic aging of the population as well as improved care and the resulting reduction in mortality.[6] This development will further aggravate the existing care situation.

>> Diabetes mellitus entails an above-average care burden that increases further with disease duration and complexity.[7,8] Compared with patients in early disease stages, patients on intensified insulin therapy (ICT), with multimorbidity or with diabetic foot syndrome need more time per treatment contact as well as closer and coordinated care.[7]

Against this background, professional societies recommend for people with T2DM structured education and treatment programs tailored to target groups and therapies,[9] regular follow-up appointments, ongoing review of treatment strategies, regular screening and monitoring of complications and comorbidities, and interprofessional collaboration among different health professions.[7]

In Germany, diabetes care is currently delivered at three levels[2,10,11] (see Fig. 1):

Access to such comprehensive care and good therapy management are prerequisites for good glycemic control, which is essential for people with diabetes. Glycemic control is associated with long-term treatment success and serves as a predictor of the risk of diabetes-related complications (retinopathy, nephropathy, neuropathy).[12]

However, ensuring access to nationwide, high-quality care for people with diabetes will become increasingly challenging in the coming years, which may favor delayed treatment adjustments[13] and disease progression.[7] This can increase the burden, including the financial burden, that diabetes-related complications place on the health care system.

The cause is not a single factor but the interplay of several structural developments:

Shortage of diabetes specialists in rural areas

Specialist care (level 2) is unevenly distributed across Germany and shows a pronounced west–east gradient: while Rhineland-Palatinate (4.09 specialists per 100,000 inhabitants), followed by Saarland (3.06), has a high density of specialist care, density in rural regions – especially in eastern Germany – is considerably lower (Mecklenburg-Western Pomerania: 1.08, Brandenburg: 1.10).[14]

A lower density of specialists directly entails restricted access, which may manifest in longer waiting times, limited regional availability of specialized services and a greater burden on general practice.[1] These disparities in care[10,14] are particularly relevant given the above-average prevalence of diabetes in eastern Germany.[6,14] Regions with a higher disease burden thus have comparatively lower care capacities, so that patients with complex disease courses in particular may be affected by care bottlenecks, as they require closer monitoring and more time and staff resources.[7] This undersupply may potentially have negative effects on the continuity and quality of treatment.[15]

The next generation in diabetology

These regional differences in care should not be viewed in isolation but are closely linked to the available academic and structural resources.

University sites perform central functions in research, teaching and postgraduate medical training and thus contribute substantially to the training of future diabetologists. Over the past 20 years, the number of clinical chairs of endocrinology/diabetology has fallen from 17 to eight today. This has meant a loss of research and teaching capacity and of training and continuing education opportunities.[16] Such institutions are lacking particularly in rural regions,[17] which makes filling academic positions and the establishment of specialists in private practice both more difficult and less attractive.[18,19]

At the same time, the specialty has only a limited place in medical school and postgraduate training, resulting in little knowledge

of it and low appeal among prospective physicians.[16,20] Professional societies point out that this development hampers recruitment of young physicians and may contribute in the long term to a decline in diabetes expertise in hospitals and practices.[16,19]

The reduction in training opportunities and the implied lower willingness to open a practice, especially in currently underserved regions, can trigger a causal chain: poorer academic infrastructure fails to attract young physicians, specialist density declines further, which in turn may lead to a deterioration or shortage of regional care.

The age structure of specialists further aggravates the shortage of young talent: in a survey conducted for the dt-Report, more than half of the diabetologists surveyed were older than 55 years, and only about 10% were younger than 40.[21] A further decline in medical specialists can therefore be expected in the medium term.[2] These developments increase the risk of inadequate diabetes care, particularly as a result of reduced use of appropriate specialized services,[22] with the consequences described above of delayed treatment adjustments and effects on glucose control.[13,23] The latter may necessitate treatment escalation, causing rising costs for medicines, medical aids and consumables.[7] In addition, there is an increased risk of diabetes-related complications and hospitalizations,[12,23-25] which may cause rising costs due to follow-up treatment.[5]

To address the existing challenges, which will intensify in the future, various measures need to be discussed.

Strengthening diabetology in medical education and training

Given the rising care burden and the looming shortage of skilled professionals, clinical chairs and treatment capacities in diabetology and endocrinology should be preserved and expanded again at all medical faculties in Germany. The service group "complex diabetology/endocrinology" (LG 2) should be established and secured in the long term at larger hospitals in order to meet the increasing complexity of diabetes disease courses according to need. Diabetes expertise could also be routinely anchored in general internal medicine (LG 1) in hospitals through physician-led, multidisciplinary treatment teams (e.g., diabetes units). In addition, certified DDG centers should in future be recognized more strongly as beacons of structured, guideline-based care and strengthened in their care function.[26,27]

Furthermore, targeted measures for the training and continuing education of outpatient diabetologists should be expanded or newly implemented to close existing gaps in care, especially in specialist care. Particularly noteworthy are the DDG's long-standing initiatives, including travel grants, mentoring programs, events such as the "Students' Diabetes Day" at universities, project funding and the working group for young talent (Arbeitsgemeinschaft Nachwuchs).[28,29]

Postgraduate training of outpatient diabetologists could also be organized within cross-sectoral training networks between hospitals and DSPP. A prerequisite would be reliable and uniform refinancing of postgraduate training in both care sectors, independent of the residents' immediate revenue-generating capacity.[2,30]

In view of regional differences in care and limited training capacities, a targeted expansion of university structures also appears sensible. Especially in structurally weak and underserved regions, additional chairs of diabetology and endocrinology could help strengthen research, teaching and the recruitment of young physicians. Existing rural physician programs offer a suitable starting point for making medical practice and establishment in rural areas more attractive.[31]

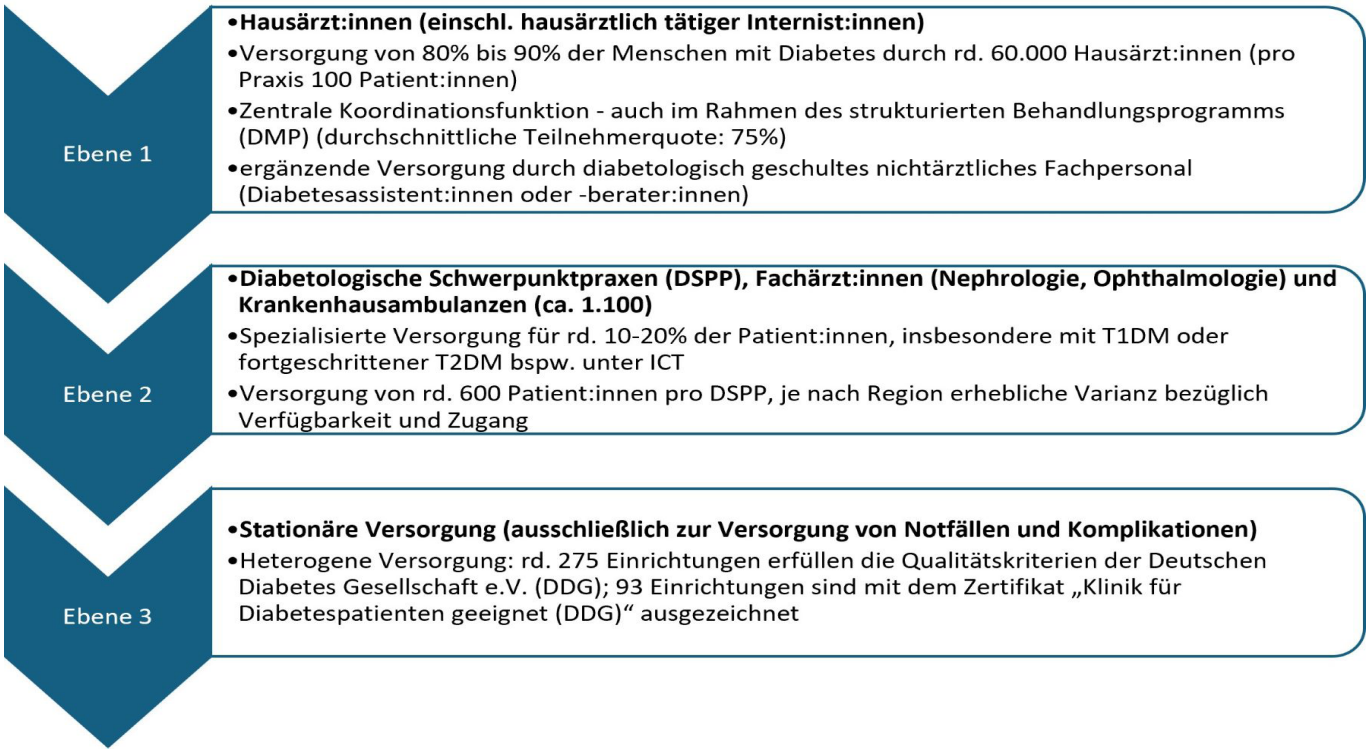


Fig. 1: Diabetes care in Germany. Own illustration based on DDG (2025a), Nagel et al. (2006) and Laiteerapong (2019).

Cross-sectoral care

Given regional differences in care and growing care needs, cross-sectoral care concepts can make a decisive contribution to ensuring needs-based diabetes care.[32] In particular, expanding telemedical structures offers the opportunity to improve access to diabetes expertise in rural and underserved regions, to intensify collaboration between general practice and specialist care, and to enable continuous care of people with diabetes.[32]

In view of rising prevalence, a growing shortage of skilled professionals and regional care bottlenecks, limited resources can thus be used more efficiently. Digital technologies such as real-time continuous interstitial glucose monitoring systems (rtCGM) can support effective telemedical care by visualizing glucose dynamics and facilitating data-based care. They can also promote patients' self-management, improve glycemic control and reduce the risk of diabetes-related complications.[33] Examples of cross-sectoral cooperation models are diabetes units, consultation services and coordinated care pathways that incorporate digital tools such as the electronic patient record, e-prescriptions, telemedical applications or digital DMPs.[1,2,32]

Cross-sectoral care facilities thus have the potential to better meet the different medical and psychosocial needs of people with diabetes and to coordinate care across the entire course of the disease. Closer networking of the healthcare providers involved, continuous monitoring and early exchange of information allow treatment decisions to be made promptly, gaps in care to be reduced and avoidable acute complications to be prevented.[2]

Such integrated care concepts should be developed particularly with the involvement of DSPP, which already have established multiprofessional care structures, diabetes expertise, education capacities and the technical infrastructure to carry out complex outpatient treatment and care processes.[2,30] Owing to their interface function between general practice, hospitals and other health professions, DSPP could take on a coordinating role within regional diabetes care networks. This applies especially to regions with limited availability of specialized diabetology structures.[2,30]

For these projects to be implemented sustainably, however, adjusting remuneration structures (hybrid DRGs, adaptation of existing fee and budgeting rules) is essential.[1]

Strengthening therapy management through patient empowerment

Alongside structural measures, it is increasingly important to promote the empowerment of people with diabetes to manage their own therapy as a central pillar of diabetes treatment.[18] Education supported by medical professionals and the use of diabetes technologies such as rtCGM systems can significantly improve both disease-specific knowledge and the ability to manage therapy independently.[19-22]

Randomized controlled trials such as the recently published FreeDM2 study[33] show that rtCGM systems, through direct biofeedback

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on dietary and exercise habits, promote behavioral adjustments and self-management, whether used alone or in combination with education. This leads to significant improvements in glycemic control (HbA1c, time in range (TIR))[15-18] and to a reduction in microvascular and macrovascular comorbidities and complications.[19-25] The positive effects of rtCGM systems have been demonstrated across different treatment stages, from oral medication through basal insulin-supported oral therapy (BOT) to ICT.[20,26-28]

Currently, however, unlike in other European countries (e.g., Italy, France, Switzerland), these systems are reimbursed in standard SHI care only for patients on ICT.[34-36]

Moreover, rtCGM-based care concepts can help address structural challenges. Given the existing shortage of physicians, rtCGM systems could be used for telemonitoring to reduce routine visits by patients with diabetes. Continuous remote monitoring and data-based treatment adjustment could thus also reduce gaps in care and the resulting comorbidities and complications. At the same time, improved self-management can help reduce the number of physician contacts needed[33], allowing limited staff and structural resources to be allocated according to need.

Diabetes care in Germany faces growing challenges. Rising prevalence and the associated increase in care needs are set against regional disparities in care, a looming shortage of skilled professionals and limited training capacities. These factors can reinforce each other: especially in rural and structurally weak regions, limited training structures make it harder to recruit and retain diabetes professionals, which may further restrict access to needs-based care. To counter this development, diabetes training should be expanded through greater emphasis on the specialty in medical school and support for young physicians, alongside stronger cross-sectoral networking and innovative care concepts. Diabetes units, consultation services and coordinated treatment processes using digital applications can help deploy existing resources more efficiently and coordinate care across sectors. In addition, modern medical technologies such as rtCGM systems can support treatment optimization by strengthening patient self-management and help ensure needs-based and sustainable diabetes care in the long term. <<

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Abbreviations

BOT = basal insulin-based therapy combined with SGLT2 inhibitors and/or GLP-1 receptor agonists
DZD = German Center for Diabetes Research
DDG = German Diabetes Association
DMP = structured treatment program (disease management program)
DRG = diagnosis-related groups
DSPP = specialized diabetes practice
GLP-1 = glucagon-like peptide-1
HbA1c = hemoglobin A1c
ICT = intensified insulin therapy
LG = service group (Leistungsgruppe)
rtCGM = real-time continuous interstitial glucose monitoring
SGLT2 inhibitors and GLP-1 receptor agonists
SGLT2 = sodium-glucose cotransporter 2
T1DM = type 1 diabetes mellitus
T2DM = type 2 diabetes mellitus
TIR = time in range

Abstract

Introduction: Type 2 diabetes mellitus binds a growing share of care capacity in Germany. Prevalence, disease burden and the direct and indirect costs of diabetes-related complications are rising. Access to specialist diabetes services also differs between regions, and a shortage of specialists together with limited training capacity threatens their nationwide availability.
Methods: Narrative synthesis of epidemiological and health economic studies, health care reports, the German National Care Guideline (NVL) and reports and recommendations of the German Diabetes Association (DDG).
Results: Fields of action are training in diabetology at undergraduate, postgraduate and continuing level, stronger university and hospital structures, and the recruitment of junior specialists. Cross-sectoral and telemedical care models improve access to diabetological expertise in structurally weak regions and support care coordination. Structured education and treatment programmes and real-time continuous glucose monitoring (rtCGM) support therapy management, health literacy and self-management.
Discussion: Meeting future demand in diabetes care requires structural reform, additional capacity, closer cross-sectoral integration and the use of corresponding medical technologies. Combining these approaches within integrated care models can improve efficiency and quality of care.
Keywords: Type 2 diabetes mellitus, diabetes care, health care structures, training in diabetology, cross-sectoral care, telemedicine, continuous glucose monitoring, self-management